SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVI.—No. 12. [NEW SERIES.] NEW YORK, MARCH 23, 1867. $3 per Annum. [IN ADVANCE.]

George Peabody and his Munificent Gifts.

We give herewith an engraving of four blocks of tenement houses erected at Islington, in London, for the accommodation of the poor of that great metropolis. The funds were furnished by that benefactor of his age, Mr. George Peabody, a very accurate portrait of whom we also present to our readers. The site of these buildings has been named for him Peabody Square. His gift, a portion of which—$158,450 —has been appropriated to the purchase of the land and the erection of the buildings, amounts to the princely sum of $2,250,000.

These buildings are five stories in hight, each block being sufficient for the accommodation of sixty families, or two hundred and forty in the aggregate. Notwithstanding their utilitarian purpose, they are, as will be seen by a reference to the engraving, sightly and even imposing edifices. The rooms average nine by twelve feet square, and are let as desired, either singly, two, or three together, the weekly rent ranging from about sixty-two cents for one room to about $1.25 for three. The qualification for a tenant is merely a condition in life fairly bringing him within the category of one of "the poor of London." Ventilation, cleanliness, water, and facilities for washing, etc., are amply provided for. Other buildings have been erected or are in process of erection in other parts of the great city by means of this donation. Mr. Peabody is now in this country, of which he is a native, having been born in Danvers, Essex Co., Mass., in 1795, and is therefore, seventy-two years old. He is one of the most remarkable of living men. If the style of "self-made" is ever appropriate Mr. Peabody deserves it. His parents were poor, and at the early age of eleven years he was compelled to earn his living as a grocer's clerk until his fifteenth year, when he occupied a similar position in a small dry goods store. Afterwards he went into a mercantile business at Georgetown, D. C., and subsequently settled in Baltimore, from which city he went to England, making several business visits. In 1837 he took up his residence in London, and since then his course is more or less familiar to the people of both hemispheres. For many years the banking house he established has been the headquarters of Americans visiting England and the center of American news and intelligence. His benefactions, which have been made public by reason of their magnitude, began in 1852, when on the occasion of the bi-centennial of the settlement of his native town, Danvers, he sent, in a sealed envelope, a check for $20,000, subsequently raised to $250,000, for the founding of an institute, lyceum, and library.



GEORGE PEABODY.

We give a list of his most prominent and important benefactions, by which it will be seen that he remembers gratefully the people of those towns in which he has resided, being, in this country, Danvers, Salem, Newburyport, and Georgetown, Mass; Thetford, Vt., and Baltimore, Md.:—

The Poor of London	$2,250,000
Town of Danvers	250,000
Grinnell Arctic Expedition	10,000
City of Baltimore	1,000,000
Phillips Academy	25,000
Massachusetts Historical Society	20,000
Harvard College	150,000
Yale College	150,000
To the South	1,500,000
Memorial Church in Georgetown, Mass.	50,000
Free Public Library in Georgetown, Mass.	15,000
Free Public Library in Newburyport, Mass.	15,000
Free Public Library in Thetford, Vt.	5,000
United States Sanitary Commission	10,000
Maryland Historical Society	20,000
Kenyon College	25,000
Essex Institute, Salem, Mass.	140,000
Other public gifts, at least	30',000
Total	$5,665,000

Such a record is one of which even a king might be proud. Indeed, it is doubtful if any potentate has ever done more for the benefit of his kind than this American merchant and banker. And the conditions of his donations are such that the poorest can reap the benefits. He has chosen rather to accomplish the useful than to gain a notoriety for splendor evidenced in mere show.

GREEN VITRIOL FROM IRON SLAG.—A sulphate of iron which is esteemed by dyers, according to M. Ch Mène, may be produced from the slag of iron forges more cheaply than in any other way. It is pulverized and mixed with sulphuric acid, then heated in an oven to eliminate the hydrated silica, the residuum treated with boiling water, and made to crystallize



HOMES FOR THE POOR—PEABODY SQUARE, ISLINGTON, LONDON.

Science Familiarly Illustrated.

The Earth Worm.

Probably there are few boys who read the Scientific American who do not occasionally indulge in the sport of angling, if not for sport at least for the pleasure of enjoying the fruit of their exertions—if successful—when brought to the table. It is well that we put in this proviso, for "fisherman's luck" is a phrase every boy understands. No fish bait is so generally used in angling as the earth worm, and we shall endeavor to give some information in regard to this despised, but useful creature, which boys who often handle it may not possess.

The earth worm belongs to the class called annelids, from the Latin *anellus*, a small ring, because the body of the worm appears to be composed of a series of small rings joined together like beads on a string. The worm has also another name, *Lumbricus Terrestris*, which is simply the Latin for earth worm, so this apparently insignificant creature bears a high sounding name. And he is worthy of it. He is a remarkable individual, belonging to the only class of invertebrate animals which have red blood. This is quite a distinction, one which many animals much higher in the scale of life do not enjoy.

We have said this is a useful animal. We do not refer to its value as bait for fish, but its usefulness as a cultivator of the soil. It does, beneath the surface, just what the farmer does on the surface, opens the soil to the action of air and moisture by running galleries in every direction. It does even more. It is a superior worker of fertilizers, turning crude and rank manure to valuable compost, fit for the support of vegetable life. If not allowed to do this in the heap, it will carry on the work after the manure has been removed to the field or garden. But this does not exhaust the list of its useful qualifications. It actually turns poor and grudging soil in some cases to valuable and generous mold. In dry times the worm is driven by the necessities of his nature deeper into the earth, as he cannot live in dry soils. When he returns to the surface he brings with him the earth he has swallowed—for he is an earth eater, but of this presently—and voids it upon the surface. And this which he leaves upon the surface is of the very finest quality. Every one has seen these worm castings heaped about the mouth of their holes.

Thus the manures added to the soil by man and the constituents of the soil, themselves, are thoroughly mingled by this indefatigable cultivator, and these castings in time accumulate on the surface, so that instances have been known where several inches of vegetable mold have been added by this means to the surface of a field. In this manner the earth worm proves himself to be one of the farmer's best friends and assistants.

Now let us see whether he, like some of the feathered tribe, has some bad qualities which offset his usefulness. He certainly does not destroy living vegetation, either roots, stems, or leaves; for even those who deny that he is a dirt eater do not charge him with eating living plants. They merely assert that he eats dead and decaying vegetation. A correspondent in our issue of Feb. 9th, gave a well written description of what he had seen him do; eating decayed leaves, and minutely described his process of feeding. The worst that can be said of him is that he defaces our nicely kept walks by his nocturnal deposits of exuviæ.

What does the earth worm eat? This is a disputed question, but we incline to the opinion expressed by Samuelson and Hicks in their treatise on "The Earth Worm and the Common Housefly;" Jean Macé, in his "History of a Mouthful of Bread;" Appleton's Eyclopedia, art. Earth Worms and Annelids; Chambers Educational Course, art. Zoology, and Prof. Seeley in No. 2 current volume Scientific American, that the earth worm does eat dirt, as much as the Ottomacs, those South American Indians described in "Odd People" by Capt. Mayne Reid. Most boy anglers will also agree with these authorities that the earth worm is a dirt eater, with the exception, perhaps, of the boy who while fishing was asked by an acquaintance passing what he had in his mouth, and replied: "Wums fur bait."

A few other peculiarities of this animal and we will release him and our readers. The swelled protuberances enveloping the body of worms at some seasons, must have been noticed by all who have seen them. These appear like the results of disease or accident, but are simply the envelopes of the ova for the reproduction of the animal. The head of the worm is destitute of eyes and ears. It is furnished with a mouth alone, which may be easily perceived by the aid of a small lens or microscope. Take a worm on your hand and let him crawl across the palm and you will feel a rough sensation on your skin. Or attempt to pull a worm out of a hole in the earth and very likely you will break his body in two. Why? Simply because the worm has legs, or at least, substitutes for them. These substitutes are hair hooks, easily seen through a common magnifying glass and they are retractile at the will of the worm. This will explain the tenacity with which he adheres to the walls of his home when force is used to pull him out.

If this brief account of some of the peculiarities of this reptile are of interest and prompt a wish for more, we refer our juvenile readers to Messrs Samuelson and Hicks book or the interesting volume of Mons. Macé, before alluded to, and also to a close observation of the habits of the *Lumbricus Terrestris*.

The Dental Profession.

The dental art is one of the beneficent products of the nineteenth century. There are men now living who cared for it in its infancy. In 1820, throughout all this country only about one hundred dentists could be found, and these with a few yet conspicuous exceptions were illiterate and awkward. In 1840 the number had increased to 1,000. At the present time there are probably 8,000. The art of dentistry has now become one of our necessities, and its practitioners are a well recognized and honored profession.

Books and periodicals devoted to dentistry, of a high order of literary and scientific merit, are constantly being published. To be qualified for the successful practice of dentistry nearly as much study is required as for divinity or medicine. Several colleges for the education of dentists have been instituted and are in successful operation. There is little doubt that in a few years a high standard of education will be so generally appreciated, that the diploma of a dental college will become a necessary passport for admission to a respectable place in the profession. And it may even be hoped that the dental profession may rank evenly with other learned professions.

Our constant respect for the dental art was greatly stimulated by attending the first commencement of the New York College of Dentistry, which took place at Steinway Hall on the 6th inst. The venerable Dr. Eleazar Parmly presided, and Mayor Hoffman, Dr. Frank H. Hamilton, and Dr. Allport took prominent parts in the exercises. Those who witnessed the dignified proceedings of the occasion cannot doubt that this college is one of the most worthy and successful of our educational institutions.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The regular meeting of this branch of the American Institute, was held on Thursday evening, February 27th, Prof. Tillman presiding.

NOVELTIES.

After the reading of the usual scientific summary by the President and an opportunity being given for bringing forward new inventions for the inspection of the Club, Dr. Fitch presented a sample of white lead prepared directly from litharge by dissolving it in nitric acid, precipitating by sulphuric acid, and boiling in oxalic acid, the whole process being completed within two hours. A hand shoe-pegging machine of ingenious construction was exhibited and operated to the satisfaction of the members. The inventor claims that by its use he can peg a pair of boots per minute, the work consisting of cutting the pegs from long strips of birch wood, punching the holes and driving a double row of pegs. The machine is designed to enable small manufacturers to successfully compete with the large establishments. Mr. Maynard showed a piece of copper tubing, the ends of which were quite intricately entwined, the flexures showing no crack or edge. The hollow ingot from which this tube was formed, he stated, had been rolled until it had acquired a laminated structure and great flexibility.

THE HYDROGRAPHIC BASINS OF THE UNITED STATES.

Dr. Stephens read a long and able article on this subject, describing first the geological formation of this continent, and entering at some length into statements respecting the agricultural and mineral wealth of each of the resulting hydrographic basins, showing the capacity of each for supporting an immense population, and closed by drawing a glowing picture as to the future history of this nation.

At the conclusion of Dr. Stephen's paper, Prof. Van der Weyde was introduced and explained the construction of a new

SPECTROSCOPE.

It is more especially to the labors of the physicists Kirchhoff and Bunsen that we are indebted for the discovery of the spectral analysis. They ascertained that the salts of the same metal, when introduced even in the minutest quantity in a flame always produce lines in the spectrum identical in color, position, and number. In toxicology it is no longer necessary to test successively for all the known poisons, but by the lines in the spectrum, given by burning a small quantity of the suspected compound, the presence or absence is instantly seen.

The spectroscope exhibited by the Professor has some marked advantages over the ordinary instrument, which, in the form usually employed, consists of three telescopes mounted on a common foot whose axes converge towards a prism of flint glass. The new instrument, is a simple teleoscopic tube having within, two triangular, and two rectangular prisms so that the tube being directed toward the flame, the light enters through a narrow crevice, and is twice reflected and twice refracted before reaching the eye. In this improved form the spectroscope can be used in connection with the magic lantern and the spectra from various flames may thereby be shown to a large audience.

Trial of Horse Hay Forks.

A series of interesting competitive trials to determine the merits of the various horse forks now in market, took place on Monday and Tuesday the 5th and 6th inst. at Rye village in Westchester county, on the premises of Mr. Josiah Macy. The trials were conducted under the auspices of the American Institute, and sixteen forks were entered for competition. A tabulated statement of the general results is given below:—

	Where manufactured.	*Lbs. removed.*	*Time*
Blodgett's cats-claw fork	Watertown, N. Y.	1,500	9:30
Davidson's hay knife and fork	Troy, Pa.	1,997	9:45
Sprout's hay fork and knife	Muncy, Pa.	1,850	5:50
Chapman's grappling fork	Utica, N. Y.	2,180	12:00
Reynolds' Union fork	Stockport, N. Y.	2,050	21:00
Excelsior Palmer fork	Hudson, N. Y.	1,830	8:05
Rodgers' harpoon fork	Pittsburg, Pa.	1,582	8:30

A fork manufactured by the Ames' plow company of this city, failed to operate satisfactorily and was removed from the field: a similar fate befel the forks entered by J. S. Brown of Washington, by M. E. Plumm of Munson, Ct., and by L. L. Johnson of Chatham, N. J. Our data are defective respecting the work performed by the Halsted fork made in this city, the Case harpoon fork, entered by E. Sharkley of Lewisburg, Pa; Walker's harpoon fork, Buckman's grappling fork, and the Farmer's Friend entered by C. N. Culver, Bowling Green, Ohio. Of the sixteen forks exhibited, eleven were of the harpoon pattern: of the remainder, two were grappling and three were claw forks. The several trials were witnessed by a large assemblage of practical farmers and general satisfaction was expressed at the admirable manner in which nearly every machine did the work assigned. The decision of the committee appointed by the American Institute, has not yet been made public.

REPORT OF THE COMMISSIONER OF PATENTS.

United States Patent Office, January 30, 1867.

Sir:—I have the honor to submit the following report of the business of this office during the year 1866:—

The receipts and expenditures of the office for the year, and the condition of the Patent Fund at its close, are shown by the following statements:—

No. 1.

Number of applications for patents during the year	15,269
Number of patents issued, including reissues and designs	9,480
Number of caveats filed	2,733
Number of applications for extensions of patents	67
Number of patents extended	58
Number of patents expired	1,042
Of the patents granted there were—	
To citizens of the United States	9,210
To subjects of Great Britain	127
To subjects of the French Empire	48
To subjects of other foreign governments	65

No. 2.

Statement of money received during the year, namely:

On applications for patents, reissues, etc	$460,768 20
For copies and recording assignments, etc	34,897 13
Total	$495,665 33

No. 3.

Statement of Expenditures.

For salaries, including $29,107 48, additional pay as per act of June 18, 1866	$149,623 17
For contingent expenses	96,096 60
For temporary clerks	115,381 76
For withdrawals	540 00
For refunding money paid by mistake	924 00
For fees to judges in appeal cases	248 75
Total expended	$361,724 28

No. 4.

Statement of the Condition of the Patent Fund.

Amount to the credit of said fund Jan. 1, 1866	$130,184 78
Amount of receipts during the year	495,665 38
Total	$625,850 16
From which deduct the amount of expenditures	361,724 28
Leaving to the credit of the Patent Fund, Jan. 1, 1867	$264,125 88
Surplus of receipts over expenditures during the year	$133,941 10

Table *showing the business of the office for thirty years ending December* 31, 1866.

Years.	Applications filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1837	....	....	435	$29,289 08	$33,506 98
1838	....	....	420	42,123 54	37,402 10
1839	....	....	425	37,260 00	34,543 51
1840	765	228	473	38,056 51	39,020 67
1841	847	312	495	40,413 01	52,666 87
1842	761	291	517	36,505 68	31,241 48
1843	819	315	531	35,815 81	30,766 96
1844	1,045	380	502	42,509 26	36,344 73
1845	1,246	452	502	51,076 14	39,395 65
1846	1,272	448	619	50,264 16	46,158 71
1847	1,551	553	572	63,111 19	41,573 35
1848	1,628	607	660	67,576 69	58,905 84
1849	1,955	595	1,070	80,752 78	77,716 44
1850	2,193	602	995	86,927 05	80,100 95
1851	2,258	760	860	95,738 61	86,916 93
1852	2,620	996	1,020	112,056 34	95,916 91
1853	2,673	901	968	121,527 45	132,869 83
1854	3,324	868	1,902	163,789 84	167,146 32
1855	4,435	906	2,024	216,459 35	179,540 33
1856	4,960	1,024	1,502	192,588 02	199,931 02
1857	4,771	1,010	2,910	196,132 01	211,582 09
1858	5,264	943	3,710	203,716 16	193,195 74
1859	6,225	1,097	4,538	245,942 15	210,278 41
1860	7,653	1,084	4,819	256,252 59	252,820 80
1861	4,643	700	3,310	157,351 44	221,491 91
1862	5,038	824	3,521	215,754 99	182,810 89
1863	6,014	787	4,170	195,593 29	189,414 14
1864	6,972	1,093	5,020	240,919 98	220,868 00
1865	10,664	1,063	6,616	348,791 84	274,199 34
1866	15,269	2,733	9,480	495,665 38	361,724 28

The foregoing shows that the number of applications for patents received in 1866 exceeded that of 1865, by nearly fifty per cent, and that of 1864 by more than one hundred per cent; and the number of caveats filed exceeded that of 1865, by nearly two hundred per cent. The number of patents issued exceeded that of 1865 by nearly fifty per cent, while that of 1865 exceeded any previous year by more than thirty per cent.

The receipts into the patent fund exceeded that of 1865 by more than forty-two per cent, while the expenditures were increased less than thirty-three per cent, and 1865 exceeded that of any previous year in receipts by more than thirty-six per cent.

If the business of the Office continues to increase as now, and as it has for several months last past, it is not unreasonable to suppose that the number of applications during the present year will amount to nearly, if not quite twenty thousand. This very great increase of the business of the Office renders it absolutely necessary, that the clerical and examining force be correspondingly augmented, and this cannot be done without providing more room than we now have, as every room we have is filled far beyond its utmost reasonable capacity. In some of the rooms the clerks are so crowded that they cannot comfortably do their work, and of necessity they very often and very greatly interrupt each other, which seriously retards the business of the Office, and which cannot be remedied in any other way than by furnishing us with additional rooms.

The Examiners have suffered great inconvenience and the public interests great detriment, from the necessity that has existed for several years past of conducting the examination of several classes of subjects in the same room, for instance, steam engines and all cognate subjects under one principal Examiner with his several assistants; and Hydraulics, Pneumatics, and Wearing Apparel, under another with his several assistants, are all crowded into one room. The inconvenience named arises, to a great extent, from the limitation as to space; but in a far greater degree from the diverse character of the inventions under examination, the exposure to the many applicants of inventions that should be kept private; the discussion in the hearing of both the principal Examiners, their several assistants, and of the various attorneys and applicants, of matters which should be known only to the parties in interest, often, doubtless, to the prejudice of justice, and always to the embarrassment of the business of those not engaged in the particular case in controversy.

The draftsmen who prepare the small drawings from which the engravings for the illustrations to accompany the Patent Office reports are made, are greatly in need of more room. Six are now employed, and they are at present located in one of the model saloons, between the model cases, with merely a temporary curtain suspended across from one case to another to shut them out from the view of the many visitors who are daily traversing the saloons. They are thus located because there is no other place to put them, and this difficulty must very soon be increased, as it is absolutely necessary to double the number of the draftsman in order to keep up with the increasing business of the Office.

In the room in which the drawings of inventions are kept, there are about 100,000 sheets of said drawings in a space originally designed for the reception of about 25,000, and the consequent damage resulting to these drawings from the crowded condition in which they are kept in this room, is a matter of very serious consideration.

Should the business of this Office continue to increase, (and it doubtless will do so), it will soon be entirely impossible to take proper care of the drawings unless more room be furnished for that purpose.

The library of this Office has vastly grown in importance within the last few years. It is not only needed and used as an absolute necessity by the Examiners in the performance of their duties, but it is now so much consulted by inventors and those engaged in their interests, by whose money

the Office has been built up, and who exclusively sustain it, that the want of room and books is now signally felt. It is not an uncommon thing for persons to come from distant parts of the United States to consult books which can only be found here. A careful examination of the catalogues of other libraries shows that the Patent Office collection is now one of the best technical libraries in the world, if not the very best. The high price of gold and the limited means of the Office during the war prevented the purchase of many volumes which are much needed. Gold has very much depreciated and the means of the Office are now ample, and there are needed many volumes of necessary works to complete series heretofore kept up, which must soon be puschased or be hereafter bought at a much greater cost, if they can be procured on any terms, and there is really no room for any additional volumes, if such were now on hand. The works consulted in this library are very many of them of large size and require corresponding space for their examination. It often happens that every table in the room now occupied by the library is more than covered with volumes for examination and this too in places which should not be open to the public at large.

The want of room for the mere deposit of books is so great that many of them are, of necessity, stowed in the halls, in other rooms, and even piled on the floors. This is an every-day inconvenience; add to this the want of room for consulting the volumes as above mentioned, and there will be found a very valuable public institution which is deprived of much of its real means of usefulness for want of proper space for the use of its advantages.

Deeming it to be my duty to call the attention of Congress to the matter of the indispensable necessity that exists for much more room in order to properly carry on the now great and rapidly-increasing business of this Office, I have, as briefly as I could, made the foregoing representations, in the confident hope that your honorable body will, at no very distant day, take measures to afford the relief which is so much needed.

All of which is most respectfully submitted.

(Signed) T. C. TEAKER.
Commissioner of Patents.

Important Astronomical Discovery.

M. Schiaparelli, Director of the Brera Observatory at Milan, has announced the elliptic elements of the orbit of the meteoric shower of last November, in a comparative view with those of the orbits of two late comets—that of 1862 and the first of 1866—pointing out the important coincidence of all their details, to a fraction of a degree in most cases. Thus, the revolution of the comet of 1866 is calculated as 33.18 years, corresponding closely to that of the swarm of shooting stars. Comparing with the great comet of 1862, Schiaparelli gives for the orbits of the shower and the comet respectively the following elements, the co-incidence of which will be found very striking:—longitude of perihelion, 343° 28′ and 344° 41′: longitude of ascending node, 138° 16′ and 137° 27′: inclination of orbit, 64° 3′ and 66° 25′: perihelion distance, 0·9643 and 0·9626: perihelion passage, August 10·75 and 22·9.

Le Verrier ("true to his antecedents," says the Paris correspondent of the *Chemical News*) has done M. Schiaparelli's discovery the honor of adopting it as his own, and reproduced it with some elucidation in a lecture at the Academy of Sciences January 21st. He also addressed a public letter on the subject to Sir John Herschel, which with the reply was published in the *Moniteur*, and all without the least allusion to Schiaparelli, who had published his comparative calculation in the observatory bulletin for Dec. 31st, and a complete mathematical theory of the phenomena in *Les Mondes* of January 25th.

M. Le Verrier is quoted to the effect that the tricennial shower is a swarm of asteroids coming toward us from the depths of space, at regular intervals, and returning toward the superior planets. A body coming from a distance, with great velocity at the moment when it attains the minimum distance of the earth from the sun, could not be fixed in an orbit of one or two years by the feeble action of the inferior planets. This truth finds a physical proof in the fact that the shower of falling stars which repasses the earth every thirty three years is not deranged in the configuration of its orbit, but returns at regular intervals. M. LeVerrier also assumes that the mass of shooting stars could not have been introduced and thrown into its actual orbit but by some energetic disturbance; and remarking that its orbit crosses that of Uranus, concludes that all the phenomena may be explained by the collision of a globular cluster with Uranus at about the year 126 of our era. The latter suggestion meets with doubt, and it is remarked as to the period, that passages quoted by M. Schiaparelli in his article, from the ancient Indian poems, seem to show that the November meteoric shower had been observed long before A. D. 126.

New French Telegraphic Machines.

One of the latest inventions in use, that of M. Neel, consists of a dial on an axis, lettered with the proper alphabet in a circle, moved by clockwork, and stopped at will by means of the electric current. The dial being covered by a screen with a single perforation, each letter is brought to the aperture as it is wanted, and read off at the receiving station. This instrument is so simple and requires so little practice, that it has been adopted in France for railway and postal purposes. A simple form of battery said to be very effective and economical, is in use on French telegraphs. It consists of a rod of zinc forming one pole, in a porous vessel which is enclosed by a carbon cylinder covered with crushed carbon and peroxide of manganese, constituting the other pole. Only one liquid—a solution of chlorhydrate of ammonia in water—is used. The carbon and manganese last a long time and are cheaply renewed. A curious device designed to utilize the whole velocity of the electric current, has been invented by MM. J. Vavin and G. Fribourg. As we gather it from an obscure description in a Paris letter, the system is about the following. The main wire is ramified at each end into eleven short isolated small wires. The elemental parts, eleven in number, of all the letters, are cut out from plate metal and ingeniously arranged (each in connection with one of the small wires) in a group in which any letter may be seen by suppressing the parts foreign to it. The prepared or conductive paper for sending dispatches is stamped with rows of this composite figure, and the letters of the despatch are formed by tracing the proper elements in each successive figure with insulating ink. The machinery at each end of the line (we infer) brings each of the eleven wires into and out of circuit in rapid succession and invariable order, conveying from each part of the traced character on paper at the sending station to the correspondent type in the group at the receiving station, a magnetic action or interruption, as such part is traced or untraced with the insulating ink, and thus automatically printing one letter at each revolution of the series. Another French machine invented by M. Alphonse Joly, "special agent of the administration of telegraphs," prints the despatch at both ends of the line at once, thus verifying, includes among its characters the figures and points, and transmits 120 to 180 letters per minute.

Editorial Summary.

THE number of vessels reported lost during the year 1866, was 554, valued at $13,975,000.

THERE were 2,407,000 of the new five cents coined at the Philadelphia mint in December last.

THE New World still leads the Old in telegraphy. America now has 90,000 miles of telegraph lines; Europe 60,000; India 3,000.

FLATTERY is the oil of the machinery of society. All are susceptible to it; and he that thinks he is not, flatters himself in the outset.

A QUICK PROCESS for getting drying linseed oil is given by Dr. Dullo: boil the raw oil for two hours with binoxide of manganese and hydrochloric acid.

SPAIN AND BRAZIL have abundance of coal, but import the article at heavy cost from England, for want of enterprise to work their own mines. It is believed that a coal field fringes the coast of Brazil from the river Platte to Cape St. Roque.

PUDDLING is performed in a number of English iron works, by an automatic machine driven by steam, closely imitating the movements of the puddling tool as worked by hand, and giving, as claimed, an economy of nearly half in the consumption of coal.

METEORITES—assuming them to be planetary specimens—show by their analysis that peridot, which is found in some of our lowest rocks, is, as Daubree, the investigator of this subject, describes it, the universal scoria, and that oxygen is also a universal element.

LIGHT SUBMARINE CABLES.—An English inventor proposes to give to telegraphic cables a buoyancy which will prevent their parting from strain in paying out, and facilitate raising them, by means of a coating of ground cork mixed with india rubber.

PHOTOGRAPHIC.—The Paris Gas Company has decided to manufacture alkaline sulpho-cyanides and especially the sulpho-cyanide of sodium, on a large scale, at the request of the Photographic Society. The price will be three francs the kilogramme, and sixty tuns can be produced yearly.

A MALLEABLE CAST IRON of great strength, toughness and hardness, is reported to be produced by a secret process by McHaffie, Forsyth & Miller, of Glasgow. It has been used under important contracts for propeller screws, mast tops, hawse pipes, etc., etc. The teeth of pinions cast by this process have been hammered down to the solid boss without cracking.

A HINT FOR THE PATENT OFFICE.—A correspondent complains of the difficulty of finding different models or even classes of models in the Patent Office, and suggests the improvement of having the localities of the several classes marked by conspicuous signs, and the subject, date and grantee of each patent stated in a neat and plain inscription over the model.

PUTTING OUT A FIRE.—During the process of extinguishing the fire in the colliery of Clackmannan, near Stirling, England, in 1851, about 8,000,000 cubic feet of carbonic acid gas were required to fill the mine, and a continuous stream of impure carbonic acid was kept up night and day for about three weeks. The mine extended over a surface of twenty-six acres, and had been thirty years on fire.

THE SILK COLLODION newly invented, has long been obtained, or something like it, by the Chinese, from the contents of the silk worm which has been prevented from spinning. The matter is found in a thickened mass or gum, and is made into a transparent varnish. It is also spun (as the gum is said to have been spun lately by a Frenchman in a still earlier stage of its formation in the mulberry tree) and forms a very strong thread, used for fishing lines and snells.

IMPROVEMENT IN WATCHES.—An English manufacturer has invented an arrangement of watch movements by which the full-sized balance wheel of the English whole-plate watch is carried in the thin flat case so much preferred for convenience, but hitherto excluding the perfection of structure and durability. A Mr. Barlow has patented a simple contrivance by which the only figures of the dial that appear are those of the current hour and minute. A perforated screen is made to revolve instead of hands over the dial.

PATENTS AND PROSPERITY.—The *Scientific Review* (London), commenting on the remarkable exhibit of our Patent Office, makes a suggestion to the effect that the relative commercial prosperity of different countries seems to bear an intimate relation to the encouragement and activity of invention, as indicated by the spirit of their patent laws and the number of patents granted. Witness England, France and America, progressive in laws and arts, in contrast with Switzerland, China and Japan, wedded to the ways of a younger and cruder age, as if the man should look back to boyhood for his model, and glory still to think, to speak, to act as a child.

SOUND AND COLOR VIBRATIONS.—It is calculated that the deepest note which the human ear perceives as a continuous sound, is produced by 16 vibrations in a second: the acutest by 48,000. The extremes of color are red and violet; the former given by 458 billions of vibrations per second, and the latter by 727 billions. The relative velocities of light and sound, and the relative refinement of the media through which their effects are conveyed, are illustrated by this comparison.

MOUNTAIN ATTRACTION.—The pendulum experiments connected with the great trigonometrical survey in India, have shown that, contrary to previous theory, gravitation is less powerful as we approach the Himalaya mountains; corroborating the Astronomer Royal's opinion that the strata below the mountains are less dense than those beneath the depressed portions of the surface. Nothing could be more probable, than that the upheaved portions of the crust should be the weakest.

THE PONTOON RAILROAD BRIDGE over the Rhine, or that part which rests on pontoons, is 768 feet long. The connecting ends of the shore approaches are adjusted to the rise and fall of the pontoons by a screw gear. The pontoons are coupled in sets of two or three, and each set can be readily removed for the passage of vessels and replaced. They are 65½ feet long, and sustain a roadway of about 40 feet in width, the central portion occupied by the rails, and the space on each side devoted to ordinary traffic. It has been in use about twenty months. The sinking of each pontoon under the locomotive is said to be only one-third of an inch.

ELECTRICITY AND ALTITUDE.—M. Matteucci has found that if the surface of the earth at different altitudes be connected by a conductor, a constant current of electricity will flow from the lower to the higher point; the intensity of the current increasing with the difference of the altitudes. Thus, between Florence and Turin, the deflection of the galvanometer from the current passing through it was from 15 to 20 degrees; between Pontedera and Volterra, from 20 to 25; and between Aoste and Courmayeur, from 40 to 50. Atmospheric changes, however, modify of course the effects, as do also diversities of latitude and geological formation. The aurora borealis and the variations of terrestrial magnetism are supposed to have an intimate relation with this distribution of electrical conditions.

A MONSTER SAW.—At No. 2 Jacob street, this city, we saw, a few days ago, a circular saw intended for the Paris Exhibition, which is said to be the largest ever manufactured. It is 88 inches, or eight feet four inches, in diameter, of one solid plate, from the works of Messrs. W. Jessop & Sons, England, and weighed, before finishing, 590 pounds. The saw is one of Emerson's patent, having movable teeth which are secured in the plate by V-shaped grooves with corresponding tenons and one rivet to each tooth. The thickness of the finished saw at the center is No. 2, Stubbs' wire gage, and at the edge, No. 5. The saw was made by the American Saw Company at their works at Trenton, N. J. It will be a prominent feature of American industry at the Paris Exposition.

A VALUABLE FIRE ESCAPE has been introduced in England in a form convenient for travelers, and as safe and easy to use as a flight of stairs. Within a thin metallic case only 7½ inches in diameter, are coiled on a pulley thirty feet of light, strong and flexible steel-wire rope or tape, passing out between rollers adjusted by a hand screw to any desired pressure, and terminating in a hook for fastening to a window seat. A chair for the body, formed of leather straps, is attached to the case, and the hook being secured to the window seat, the person seated in the chair may regulate or arrest at pleasure his own descent, by means of the screw. By using fine steel wire, woven into a tape, sixty feet might be coiled in a smaller case than that above described, making a perfect fire escape portable in every one's carpet bag.

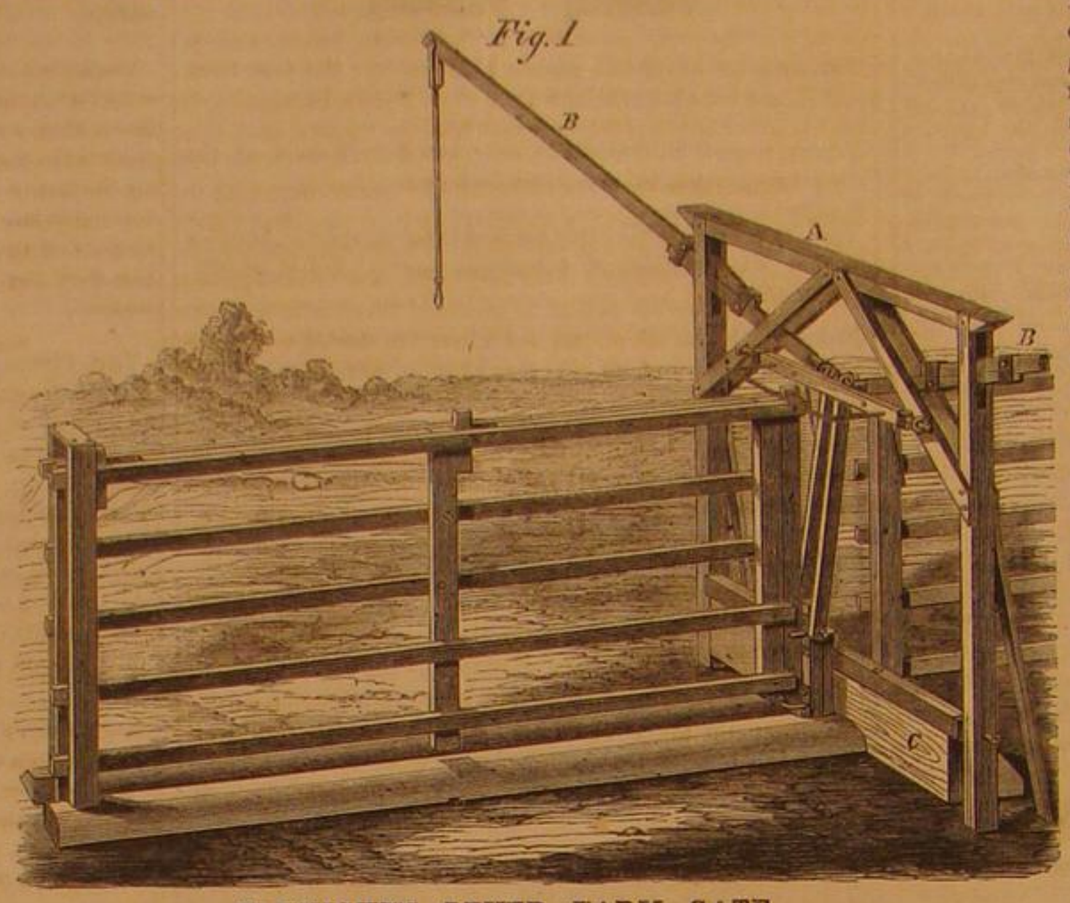
DOMESTIC ECONOMISTS may try the suggestion of covering the bottom of a fire grate with a plate of boiler iron or the like. Dr. Samuel Warren (author of "Ten Thousand a Year," and now recorder of Hull) asserts from experience that by this means one third of the coal may be saved with an increase of warmth. The iron plate evidently acts as a reservoir and radiator of the heat in the downward direction where it is most useful, and strengthens the combustion above it. The layer of ashes which usually receives the downward heat, absorbs it with avidity and scarcely radiates it perceptibly: as is proved by the fact that a grate is quickly burned out by an accumulation of ashes under and in contact with it, which without contact would be quite harmless. The capacity of ashes for "keeping" fire (*i.e.* heat) also proves that it should never be avoidably left in a position to absorb the heat, where active radiation is wanted. A fire clogged with ashes gives out, for this reason, palpably less warming effect than a clean fire, for the same amount of fuel. If the plated grate above suggested be not kept clear of ashes, the heat in the ashes will be largely withdrawn into the plate by contact, and thus utilized; but the plate or grate, whichever is uppermost, will be rapidly burnt out. The best economy of both heat and apparatus, is to keep the plated grate clear, and probably a further saving would be effected by allowing the hot ashes to be distributed upon a lower plate freely exposed to the atmosphere of the room and frequently cleared.

Improved Lever Farm Gate.

The gate seen in two positions in the engravings is one which when closed forms a portion of the fence as rigid and secure as the fixed fence itself. When opened it is entirely out of the way, so that the space occupied by the gate is left free. It is a pivot gate, the horizontal and upright bars being so pivoted at their intersection that by the action of a lever the gate may be folded together and dropped into a channel prepared for it.

A properly braced frame, A, supports two levers, B, one on each side of the gate, which engage at their inner ends with two upright bars pivoted at the lower ends with the gate post. Connected with these upright bars and turning on suitable pivots with them, is a horizontal box, C, weighted with stone to counterbalance the gate. Opposite the gate frame is an upright to hold the gate in position when closed. A horizontal bar on the main frame, acting as a latch, is operated by the levers to unfasten the gate, and when the gate is closed falls by its own weight into position and holds the gate securely. There are no posts or parts below the surface of the ground to be rotted off; no pit to give space for the action of weights, and to be filled up with ice in winter. All its parts are above ground, the gate when closed occupying a space no deeper than sufficient to hold the horizontal bars of the gate when they are folded together. The driver of a vehicle, or the equestrian, may, without alighting or relinquishing the reins or bridle, open and close the gate by the pendent rod at the end of the levers. If the channel should become filled with snow or ice, the gate can be easily removed by withdrawing a pin near the bottom and the channel be left clear to be cleaned. The attachments for working the gate appear to be of the simplest construction, not liable to become disarranged, and built for durability.

Fig. 1



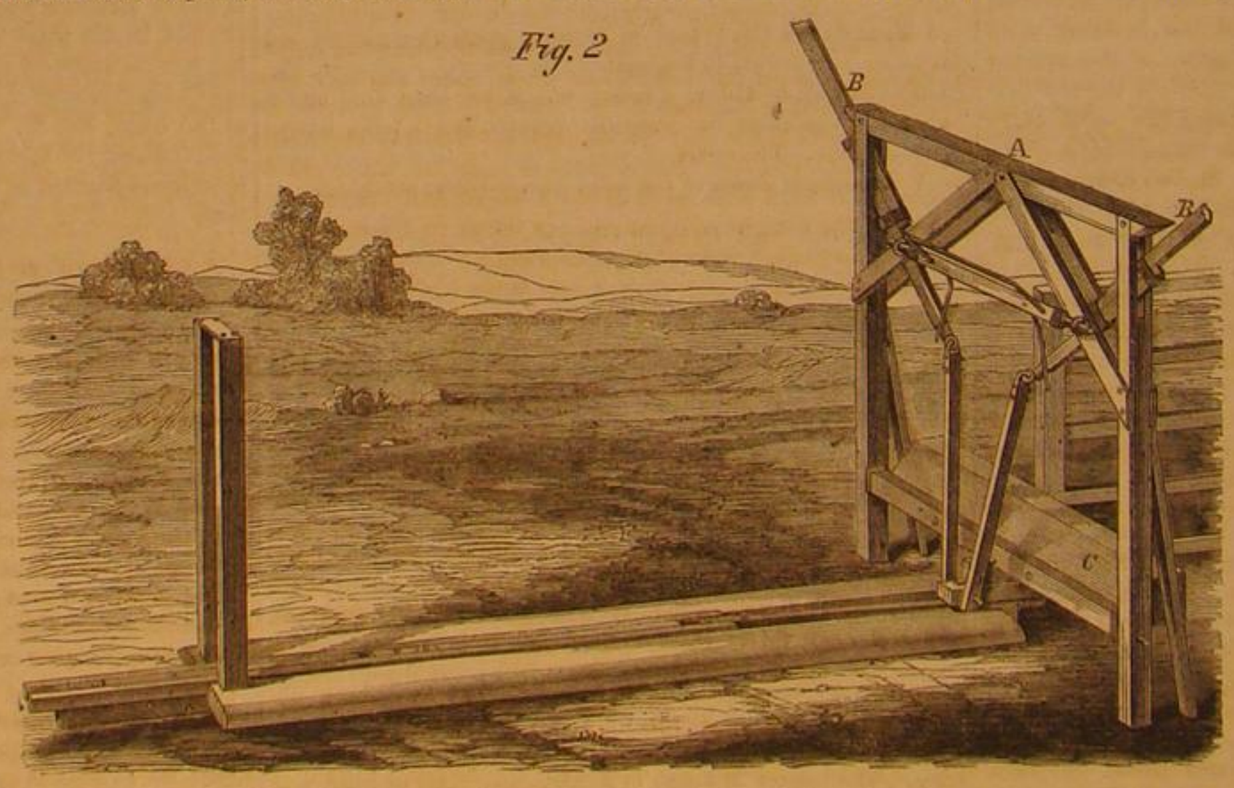
McKNIGHT'S LEVER FARM GATE.

This gate was patented Jan. 29, 1867, through the Scientific American Patent Agency, by George McKnight, of Hebron, N. Y., whom address for further information.

MANUFACTURE OF FOREIGN BEER.

English men, women, and children, commencing with the new-born babe who imbibes it in its mother's milk, drink on an average a barrel of beer each per annum, during life. They did so a hundred and fifty years ago when there were but six millions of them, and they do it now when they are twenty millions. Consequently the brewers of England have the task of producing annually among them 20,000,000 barrels of beer for home consumption, beside the immense export. It is therefore no wonder, or rather only the same wonder over again, that each of the twelve great breweries in London, among which it is difficult to say which is the greatest, occupies many acres of ground, employs men by hundreds and horses by hundreds, and stores its current product by the hundred thousand barrels. But at Burton-on-Trent, a large section of which is devoted to brewing, and presents to a bird's eye view the appearance of one vast brewery, space and facilities for the manufacture are more abundant than in London. The premises of one brewing firm (Bass, Ratcliffe, Grattan & Co.), cover 48 acres, eight of which are sometimes covered with beer three casks deep, worth some two and a half millions of dollars, waiting to be distributed to their customers and agencies. Their sales amount in one season to six and a quarter millions of dollars ($6,125,015); their malt tax to Government, $885,731; their workmen, 1,555, and clerks, 163. They reap (indirectly) 30,000 acres of land yearly of its crop of barley, yielding 1,280,000 bushels of malt. They consume 130 tuns of coal per day, and 8,000,000 cubic feet of gas per annum. And their business is extending at the rate of 200,000 bushels of malt per annum.

Fig. 2



The operations of another firm at this place (Samuel Allsopp & Sons) are scarcely less extensive. Both the names mentioned will be recognized as leading and celebrated brands the world over. The brewery of Allsopp & Sons is said to be probably the most perfect and complete establishment ever erected. Their premises cover fifty-two acres. Their counting house is a hundred and twenty feet square, subdivided by glass partitions, and handsomely furnished, with every department thoroughly systemized, including even a post office, and a department of chemists, whose duty it is to subject the beer to known tests at every stage of manufacture in order to secure its ultimate perfection. Duplicates of every utensil employed in the manufacture are kept on hand, so that no time may be lost by accidents. Every one of their 400,000 casks (which they make for themselves) has its number and its account kept, so that its present whereabouts and past history can be told in a moment.

In the establishment of Barclay, Perkins & Co., in London, —another household word all over the world—the larger storing vats contain 5,000 barrels each. Their stables contain 120 horses weighing from 1,700 to 1,900 pounds each. The malt houses are situated in the country; yet the city establishment covers twelve crowded acres. They bring up their sons to the business—five of them at present—by an apprenticeship of four years, during which they live on the premises in a building erected specially for them, rise at four o'clock in the morning or earlier as circumstances require, and upon occasion take the places of any of the clerks who may be sick or on leave, so as to become familiarized with every detail. Everything, and especially every moment of time, is economized and appropriated with rigorous system.

A peculiarity of the London beer business is that the brewers to a large extent own or control the alehouses, and the retailers are their tenants, dealing only in the article manufactured by them or in non-competing articles. A large sign displays the brand—"Barclay, Perkins & Co.'s *Entire*," for example. The price per barrel is about $7 33 for ordinary porter, and for ale $7 78. The retail price is 1½d. (say 2¾ cents) per glass, a full half pint, or 4d. (7$\frac{4}{10}$ cents) per quart.

The taxes are laid on the malt, except a trifling license duty of three pence a barrel on beer, substituted in 1862 for the duty on hops. The excise duty on malt is 2s. 8½d. per bushel yielding half an English barrel (about 22 American gallons) of beer, making the whole duty equivalent to 94 cents on an American barrel; which rate it has not exceeded for the last 44 years, except in 1854 and 1855. Nearly one-tenth the expenditure of the British Government is paid by beer; but a much larger proportion is borne by (British) spirits. Together, the liquors pay nearly one-fourth the whole cost of the general government.

It is a noticeable fact in the experience of British taxation, that while no increase that has ever been made in the rate of taxation on spirits has, in the long run if at all, reduced the consumption, the taxation of malt liquors has been sufficient at some points to diminish the demand very seriously. This result illustrates very strongly a fact by which it is undoubtedly explained: *i. e.*, that no such unconquerable passion is excited for beer as for ardent spirits, and hence the former will be dispensed with when it becomes too expensive, while no sacrifice is too great for the devotee of ardent spirits to make to his idol. Congress should bear these plain facts in mind, and keep a tax on ardent spirits simply as high as it can be made practicable to collect.

It is said that almost every householder in good circumstances keeps a barrel of malt liquor on draft in his cellar. The average Englishman, drinking as we said his average barrel of beer per annum from birth to death, drinks less than three quarts (·645 gallon) of spirits per annum. In Ireland and Scotland, the principle though not the exact proportion is reversed: owing, some suppose, to a heavy excise imposed upon Scotland by the English in 1707, which suppressed the consumption of beer and brought whiskey into its room. In Ireland, the manufacture of porter was introduced only at the dawn of the present century. Consequently the brewing interest is insignificant in those parts of the United Kingdom, comparatively, and yet it is not so to our conception of things.

For instance, the celebrated porter brewery of Guinness, Son & Co., Dublin, which has given a leading brand to the cosmopolitan market, is reckoned by the proprietors to rank about the fourth in extent of production in Great Britain. The wealth as well as the liberality of the concern may be inferred from the fact that its senior gave at one time $726,000 for the renovation and enlargement of the Protestant Episcopal Cathedral in Dublin. The still larger gift of his son, Rev. Henry Grattan Guinness, who gave himself as a gratuitous evangelist throughout the English-speaking world, is fresh in the memory of every one in this country.

In Scotland, the brewers are famed for a superior quality of ale, of great gravity and strength. "Scotch Ale" is a department of the trade in both hemispheres. The Scotch brewers are also successfully meeting the increasing demand for a lighter ale, competing in their own market and to some extent even in the English, with the famous breweries of Burton-on-Trent. Yet the whole production of malt liquor in Scotland and Ireland together is but one tenth of that of the United Kingdom. That of London is about one sixth of the whole.

In regard to peculiarities of manufacture, a few items may be added. The prejudice against American hops is rapidly disappearing: a portion of them are now used in nearly all the large breweries. The superiority of British beer is due in great part to the extreme care taken by the brewers in the selection of their barley and the manufacture of malt. They pass it through screens and fans, separating the lighter grains as food for cattle and using only the best grain for malt. Ample time is given the barley on the floors, to germinate, and the drying is very careful and perfect. It passes over a screen when thrown from the kilns, and the separation of the rootlets is thus more thoroughly effected while warm and crisp than afterward. Immediately after this, it is placed in bins and covered four inches deep with the rootlets to protect it from moisture. The malt floors are tiled with what are called ferro-metallic squares.

The heavy Scotch ale is manufactured, in some breweries at least, only in fall, winter and spring, when it can be fermented at a low temperature. The famed clearness of the Burton ale is attributed to the calcareous composition of the water used. The manufacture of porter and ale, in Barclay, Perkins & Co.'s establishment, are as distinct processes as if there were two distinct breweries. The mash tuns are commonly of iron, but in Allsopp's new establishment the receptacles and utensils for mashing, fermenting and finishing their beer are of wood; and at another celebrated brewery, that of Truman, Hanbury, Buxton & Co., many of these vessels are beginning to be made of slate, which gives high satisfaction on account of its cleanliness and durability.

The above data are mainly derived from the report of the Commission of the American Brewers, sent over in 1865 to obtain accurate information of the excise laws of Europe relative to malt liquors, to be presented to the United States Internal Revenue Commission.

German Beer.—Beer, as we have seen, is a great thing in Britain, but in the Saxon mother country (or as we Americans should call it, grandfather land), it is a sort of all-in-all. Its consumption is largely increasing in all the German and kindred countries, notwithstanding the competition of the cheap indigenous wines. In Bavaria, famous for beer, the incredible statement is made by the Brewers' Commission that the consumption is a hundred-fold greater than it was twenty years ago. We are tempted to assume that they meant to say a hundred per cent instead of a hundred fold. Up to 1811 the business of brewing was an aristocratic privilege, confined to the nobility and clergy—the latter being allowed to brew for their own use. In 1785 this monopoly had been relaxed so far as to allow the people to brew for their own use, but not to sell beer. Now, the government puts forth its power to protect and stimulate the manufacture, and provides the people with beer almost untaxed, and even at cost, with its own royal hands. A rise in beer is dangerous, like a rise in bread in Paris of old. A riot resulted in 1847 from an advance of 1¾ cents per quart on account of a partial failure in the barley harvest. The King's Brewery, at Munich, under

the control and management of the Government, furnishes to the people without profit a light beer at four cents per maas containing a little over a quart. So great and vital a public interest is the supply of cheap beer! The monks of St. Francis, in the same city, still have their brewery, in admirable order, and famed for the excellence of its beer. A workman's allowance of beer, at least in the breweries, is seven quarts per day. We can easily believe that there is no room for intoxication. The manufacture is superintended at certain points by government officers, not only for revenue purposes, but also to secure the standard quality. A brewer's claim upon a retailer for beer sold, has precedence of all others, at law. In Vienna, the consumption of beer is nearly 2½ barrels a year per head of the whole population. In a city of Saxony called Crimmitzschau, the success and prosperity of the beer brewing is regularly and publicly prayed for in the Lutheran churches.

The system of brewing in favor throughout most of the German states is that of Bavaria. One of the peculiarities gives the well-known general name *lager* (cellar) to the German beverage. It is cooled and kept in vast cellars, sometimes 40 feet deep, and filled in with ice. This is indispensable to the preservation of the "low-hopped" beer in favor with Germans. As much as 10,000 tuns of ice are thus used at once in a single establishment. The malting of the barley is also conducted in cellars, the floors of which are composed of smoothly-worn blocks of stone. The malt is dried on kilns of perforated iron plates, one above another; the germinating barley being permitted to wither somewhat before being placed on the kilns, and being let down from upper to lower kilns all through the series, as it proceeds in drying, which is accomplished in twenty-four hours. This rapid drying is preferred to the slower process used in other countries. The fermentation is downward, instead of upward as in England. In Austria, Prussia, Saxony, Wurtemberg, Baden, and other states, as well as Bavaria, a similar system of brewing is general, and the quality of the "lager" is considered excellent. It is lightly taxed and zealously encouraged by Government. The tax is generally little over 30 cents per American barrel.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

What Proof is there in Science that the Earth was once in a Molten or Fluid State?

MESSRS. EDITORS:—Our acquaintance with the present known laws of nature, compels us to believe that, instead of the earth having been once in a molten state, it was nothing more nor less than a fluid body of water, holding in solution at that time all the materials which were to form its future solids; and, that its internal heat was first generated by chemical and electrical action; also, that the same laws are still in operation, viz., new compounds are continually forming in the bowels of the earth, while old ones are being decomposed. These things we will endeavor to explain by the following facts and deductions, viz.:—

1. Granite, as a solid, contains in its composition, almost all the ingredients which form the other rocks. And it is not even probable that a complex mineral like granite, was the first solid rock which was formed on the earth. Because chemical experience proves conclusively, that simple compounds are always first in the order of nature, and then these simple combine with other simple compounds to form complex ones. Therefore, it is a question in science whether granite was the first species of rock formations, as we cannot tell whether the other rocks were subsequently formed from granite, or whether granite was formed by fusion from the various other rocks. One thing is certain, however, viz., that water, in connection with heat and pressure, has been, and still is, the principal cause of the formation of rocks; and which is a positive proof that water must have existed before the rocks were formed.

2. The petrifactions of wood and other substances, the formation of coal, the deposits in steam boilers, etc., and the beautiful stalactite ornaments of nature found in caves, are evidences that water, even now, contains in solution the materials which produce such effects. Therefore, a correct knowledge of the various operations of water in nature, is the true key to her chemical laboratory.

3. The solution of rocks is fully established by chemical experiments. This discovery, long known to chemists, proves beyond a doubt, that quartz and flint were originally in a fluid state. And this is strong evidence of the original fluidity of the earth, and of the very slow process of the formation of its solid portions.

4. The earth, as a solid or liquid mass, could not exist in an incandescent state; because such an intense heat would decompose it. Such a theory is, therefore, contrary to the known laws of philosophy and chemistry.

5. If the theories of those who maintain the opinion that the earth was once a molten mass be true, then we should have evidence of such a fact in the earth's contraction by cooling, as it would diminish in size; by which means there would be a perceptible change in the time of its diurnal and annual motions. For its orbit must be contracted likewise, or it will have to make more diurnal revolutions to complete the circuit of the year in the same time. But such is not the case even to the sixtieth part of a minute, as demonstrated by the calculations of eclipses and transits.

6. Iron, steel, gold, silver, copper, brass, tin, lead, zinc, etc., are soluble in acids. The alkalies also perform the same office to the minerals, and the materials which compose these acids and alkalies are found in the earth.

7. The solubility of these metals and minerals then, is only the reduction of them to their original state, before the solids of the earth were formed. The electrotype process is likewise a positive proof of the deposition of metals from fluids. Such facts then, are strictly in accordance with the principles we adopt in relation to the original fluidity of the earth.

8. The human body is a fine specimen of the laws of internal heat in the bowels of the earth, as the blood, in order to preserve health and life, is kept up to a uniform standard of temperature in all climes. Here, then, is a beautiful law, which performs its functions in the temperate, the torrid, and frigid zones. And why may not the internal heat of the earth be governed by a similar one? Chemical action is going on continually in the earth, as well as in the human frame, and its identity is preserved in a similar manner.

9. It is a rule in chemistry that when liquids become solids, heat is given out, and when solids become liquids, that heat is absorbed.

10. When, therefore, the solids of the earth began to be formed by crystallization, a chemical and an electrical action commenced, and heat was produced. These laws are continually acting and reacting upon each other, even in the present day. And where the action is greatest, there will be earthquakes, volcanic eruptions, and a gradual rise of continents. And this internal chemical heat, when at its maximum, must have a greater or less influence on climate. It is not confined to any particular locality, but manifests itself wherever the necessary materials for its chemical action are found. The internal heat of the earth then, is a chemical effect.

JAMES QUARTERMAN.

New York City, Feb. 14, 1867.

How to Clear Vessels of Water.

MESSRS. EDITORS:—As a public benefit, I wish to give your readers a description of two devices that are successfully used on the western rivers, for clearing the hulls of steamboats and other vessels of water, without manual labor in pumping.

1st. If the vessel is a steamboat, lay a two-inch gas pipe with one end resting on her bottom planking, in the lowest part of the hull—which is usually right under the boilers—and the other end projecting through the hull as close to the water line as will be safe.

Then lead from any part of the steam pipes or reservoirs, another pipe about half an inch in diameter, furnished with a stop cock, and insert its open, but slightly contracted end just into the end of the large pipe that rests on the floor. Whenever this end is below, or partially below water, by turning on steam through the small pipe the water will be ejected overboard with surprising rapidity, and the vessel can usually be kept clear by using steam only, when it would be otherwise wasted by blowing off. Of course the principle is the same as that of the Geffard Injector and the steam pump.

For a portable pump for clearing vessels along side, (as barges attached to steam tugs) the large pipe may be laid down, simply resting one end on the bottom and the other overboard, and the steam be injected through a rubber hose with a properly shaped nozzle.

The second device for clearing vessels of water can only be used in those of light draft, and when under way at a speed proportioned to the draft.

It consists in *boring a hole through the bottom of the vessel to et the water run out.* But in order to make the water run out instead of in, a tube made of sheet metal, and shaped something like a sugar scoop at one end, must be inserted in the hole, and project through the planking a few inches, with the open side of the scoop-shaped end turned aftwards, so that the vessel by its motion in the water produces a vacuum behind the tube, and the water in the hull will rush in to fill it. In this way a vessel going six miles an hour with the water in the hull not more than two feet below the surface outside, can be emptied faster than if it were on dry land and a hole of the same size bored in its bottom. This arrangement might also be permanently attached to any vessel, stopping up the hole with a plug whenever dry, or when not under way. It will most certainly work under the above conditions, and has been often tried on the Mississippi. I have known a steamboat to start out from her landing and take a circle around and back again, to clear her barges by this method, and prevent their sinking. C. B.

Testing of Steel During the Proces of Manfuactures.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of the 24th of Feb. you say that there is difficulty in ascertaining the quality of the ingots made of the crude molten iron by the pneumatic process, and suggest a mode to ascertain the different grades and quality of the ingots for the purposes intended before rolling or forging. But the mode you suggest is much too tedious and expensive for practical purposes. There is no difficulty in detecting the two grades—high and low—of the manufactured ingots by the pneumatic process under the Shunk patent, before the operation of rolling or forging is commenced. The quality of each ingot is readily detected by a small fracture or corner of the metal broken off for examination. The same mode is practiced to detect the different quality of the ingots made by the "pot process" for the manufacture of fine tool steel, and which is always necessary to be done before the ingots are forged into the kind of article desired. A skilled workman who has gained sufficient skill in the pneumatic process will, at the first glance of the eye, see the quality of the ingot by the fracture of the metal, whether it is high or low steel. Hussey, Wells & Co., of Pittsburg, who make one thousand ingots of fifty pounds each daily by the "pot process" for fine-tool steel, test every ingot before forging, in the mode above suggested, and the whole operation does not require more than a minute of time to each ingot. The low or semi-steel is always selected for the manufacture of the T-rail bar, locomotive tire, car axles, boiler plate, and armor plate, and is now being used for wagon and buggy tire, and also in the manufacture of machinery, the cost of the manufacture being about the same as bar iron. The harder kinds of ingots—those that contain the greatest amount of carbon—are selected for other purposes, such as plow plates, spring steel, hammer steel, and all the ordinary uses for smith work.

The semi-steel rail bar, made by the pneumatic process, is perfectly homogeneous and free from the flaws and defects, so common in the iron T-rail which is manufactured from the cheapest and lowest grade of metal, and is always destitute of fiber in the fracture of the bar, and much more liable to break in frosty weather than the steel rail. The semi-steel T-rail made by my pneumatic process possesses ductility and tensile strength five times greater than the iron T-rail in use. The steel rail contracts much less in cold weather than iron, owing to the perfect refinement and purity of the metal effected during its conversion by the air-blast process, and is therefore less liable to break in frosty weather than the iron rail so much inferior in quality. C. SHUNK.

Looking Two Ways for Monday.

MESSRS. EDITORS:—I have often heard of people looking two ways for Sunday, but never before I saw your article in your last number, of their looking two ways for Monday. Now, dear Messrs. Editors, unless you are quizzing your one hundred thousand readers, allow me to correct so grave an error as you have fallen into concerning the length of Monday. For wise reasons, that dates might not be confused, the day everywhere begins at 12 o'clock midnight, when people are or ought to be in bed and the business for the day closed. Allow me to illustrate. Suppose you telegraph your friend in London this Monday evening at 9 o'clock, and he receives the message in one hour, it will be 2 A. M. on Tuesday, allowing five hours difference of time (which it is nearly), and he may answer your note, which you will receive at 11 P. M. on Monday. If your friend was at the antipodes and had a line that would carry a message in about one minute he might ask you at 1 o'clock A. M. on Monday morning, "What's the news in New York to-day?" and you would have to answer, "Oh, no news to-day: I am just sitting down to my Sunday dinner at 1 P. M. Good by. All well."

Now, Messrs. Editors, allow me to ask a question. A vessel sails from New York in the morning, counting every day, and when the captain arrives in China he finds himself a day behind time. How is it when he comes back? Ahead or behind? Or if a man start from New York on Monday at 12 midnight and goes west around the world in 23 hours, he keeps ahead of Tuesday. If he goes east where does he meet Tuesday and how does he get back to Monday?

A. HOPKINS.

[Our correspondent needs to put on his thinking cap. The day is only twenty-four hours long at any given place (meridian of longitude): we have not suggested otherwise. East of the day line, the reckoning is all the time one day in advance of the west. Just as soon as you cross the day line, whether going east or west, you come into a new day. When you cross the day line going east you gain a day, and when you return you lose it. If you start at 12 P. M. Sunday, going west at the rate of "around the world in 23 hours," you immediately get back into Saturday. You will find Sunday when you reach the day line, and you will have no Tuesday until you get to the day line for the second time. If you start at 12 P. M. Sunday, going east at the same rate, you will not find any Tuesday until you reach the day line for the third time.—EDS.

Explosion of Boilers--A New and Simple Preventive.

MESSRS. EDITORS:—Noticing in one of your recent numbers an article on boiler explosions, and thinking the subject rather badly handled, I conclude to give, through your very valuable paper, a few hints of my own on that much misunderstood subject. I think, likewise, I have originated and adopted an efficient remedy for most of the difficulty. But of that anon. In an experience of about eighteen years, and with pretty close observation of causes and effects, I think I have demonstrated that boiler explosions result from two common, plain and simple causes, and if there is any mystery about the matter with me, it is that explosions are not many times more numerous. The first of these causes is simply the severe tests boilers are a subjected to daily and hourly in ordinary usage, not intentionally, but from want of knowledge of causes and effects. To explain: it is and always has been a common practice in feeding or supplying boilers to discharge the feed pipe into the under side of the after end of the boiler, or into a receiving drum, which discharges in the same place. This feed water, though always intended to be comparatively hot, is not always so: on the contrary, it is sometimes tolerably cold. Now all boilers under a pressure of steam are fully expanded, and as a matter of course, if supply or feed water is discharged comparatively cold, as it is usually, on the bottom shell of the boiler, it must produce a sudden contraction of the part so cooled, and if the iron is not very soft and tough the sheet will tear apart, sometimes in the middle, sometimes in thee lap between rivets. This I have known very many times to the extent of ten to fifteen inches. This you will see is a good start for an explosion, provided, of course, the boiler is carrying a fair working pressure of steam, and as is almost always the case, the iron in two thirds of the circumference of the shell is no better than that already broken.

The second great cause is the carbonized, hardened, brittle condition of that portion of the shells of boilers exposed to a very intense heat, and this heat, as is usually the case, generated with coal more or less impregnated with suiphur. Under these circumstances boilers in use from six months to two years always become more or less carbonized or hardened

and brittle, and will not stand the test of sudden contraction by cooling parts, as above described. It sometimes happens that iron in new boilers, or parts of them, is more or less hard and brittle, and of course in a measure liable to the same misfortune under the same circumstances as before described. Now when we add to the other two causes, and in combination with them, the carrying by engineers of all the pressure allowed by law, and sometimes a good deal more, it is certainly not strange that explosions so frequently occur, for we have here all the causes in combination to produce that effect, and the wonder, as I before stated, is that explosions are not many times more frequent. I am satisfied, however, that very many explosions have occurred with only an ordinary working pressure, and mainly from the first two causes, namely, sudden contraction of parts of the shell, and the hard and brittle condition of the iron.

I promised a remedy, and here it is. Some year and a half since I was repairing a boiler that had been blown up by the explosion of another alongside of it. We found the iron so hard and brittle that we could not punch or bend without breaking it. Finding it impossible to do anything with it in that state, and knowing I could not make it any worse, I suggested to Mr. Webb, my foreman, the idea of annealing it, which he did, and with the most signal success: nothing less than completely restoring the iron to a uniform soft and tough state, and I think better than it ever was before. Since that time I have annealed all the boilers I have used, with the same success. This annealing process is simple, cheap and safe, loosening not one seam or rivet, and consists merely of draining boiler dry when in the furnace, then firing up with dry wood until the boilers are barely red hot, then cooling as gradually as possible, and the thing is accomplished. In conclusion I will say that all new boilers, no matter how good the iron, should be annealed. It will in any case give to all the plates a uniform toughness and temper. I will say further, that with careful superheating of feed water before it can touch the shell of the boiler inside, and with the annealing process, which should be repeated every six months, boiler explosions will be things of the past. This sudden contraction of parts of boilers is caused sometimes by cold water, or cold blasts of air coming in contact with the outside shell, with more or less the same effect. Of course care should be taken to keep water well over the flues, to prevent them from heating and collapsing. And now, hoping you will speedily give this nut to your numerous readers—among whom are the *savans* of the age—to crack, as well as for those using boilers to profit more or less by, I am very respectfully yours,

Beardstown, Ill. C. S. Ebaugh.

Why Ice Is Slippery.

Messrs. Editors:—I do not agree with your answer to your correspondent A. D. C., Mass., in No. 7, present volume of the Scientific American. I believe that "why ice is slippery" can be explained scientifically, or at least is worth inquiring into. First, Is ice slippery at all? I believe that should be the question. Now my theory, right or wrong, is that ice is slippery only by coming in contact with certain things and not with others. For instance, ice is exceedingly so when in contact with iron or steel especially if polished, less so with wood, less so again with india-rubber, leather etc., and not at all with straw. Now why do these materials have a different action on ice? I think that we must look for an answer into the different properties of each of these things.

For instance, iron is a good conductor of heat, wood is not, and so on of all things, in various degrees. Therefore all which are good conductors will, in coming in contact with ice make it slippery, and others will not. Take the blade of a knife and lay it on a piece of ice; it will sink into it. Take a piece of wood of the same size as the blade, and add to it a weight, to give it the same specific gravity, and it will take more than double the time to sink as deep, if it sinks at all. Why is this? Simply because the steel receives from the surrounding atmosphere a certain amount of heat which it conveys directly to the ice and melts it; while wood does not, or at least takes a longer time in doing so. But you will ask, what has all this to with our subject? Why, Mr. Editor, according to my theory it does this. (By way of illustration.) Start on ice with a pair of skates. The runners at once melt the ice, in a slight degree it is true, but yet it melts. Melted ice is water, a very small quantity no doubt, but quite sufficient to act between the runners and the ice, as lubricating oil does in machinery.

No doubt you have heard of a system of railway actually working in France, not far from Paris. It is an experiment by a certain ex-general, I believe, and consists, as far as I can remember, in letting a sheet of water run between the rails and the runners of the locomotive, so as to neutralize the friction. If so, then you have iron made slippery, and yet iron is not slippery of itself. P. Jeanne.

Brooklyn, N. Y.

[Our correspondent's criticism is hardly fair. Our answer had in view that slipperiness which is an ultimate property. The practical improvement of the property by the use of a lubricator, water or oil, or by any other device, is quite another matter.—Eds.

The Tempering of Steel Tools.

Messrs Editors:—In your issue of Feb. 16th, I notice an article from correspondent "V." in which he gives the manner of tempering steel tools for various purposes, stating the color that the surface of the steel assumes. Now I think his rule will not hold good in all cases, as I find that the coloring depends altogether upon the amount of polish given to the steel after it is hardened. So far as my experience goes, I find that the higher the polish the higher the color should be left.

For instance, take a piece of steel and harden it, then give it a bright polish, and for a wood-cutting tool, it only requires drawing to a pale straw-yellow, while the other side which is not polished at all, will be deep blue. I think that there can be no definite rule given for all to go by, unless we can have a standard rule for the polish to be given to the hardened surface. Such a rule I think is impossible, and the best way is for each steel worker to go by his own experience. It is a fact among steel workers that when one goes into another's shop and sees the color that he leaves his tools, when he tries to imitate the other, his tools will not stand although he may give them the same shade of color. The reason is, I think, one gives the tool a higher polish than the other. If any of your correspondents can give a standard rule to polish by, so that every worker can give the same polish, I should like to hear from them and so would others.

Kingfield, Me. W. L. Dolbier

The "Algonquin" and "Winooski."

Messrs. Editors:—Your correspondent "S. H. W." in the Feb. 23d, issue of the Scientific American, in alluding to the trials of the *Algonquin* and *Winooski*, calls to mind an important fact in favor of the *Algonquin*, which, if noticed in any report or controversy upon the subject, a constant reader of your paper has never seen. As it was not the point in question it was probably neglected rather than overlooked. The fact alluded to is that the *Algonquin* used very much less steam than the *Winooski*, showing that, as the fuel used in each did not greatly differ, the generating power or capacity of the boilers of the *Algonquin* was economically deficient. The general tenor of discussion and comment in the papers would impress the public mind that neither possessed much advantage over the other and the object of this communication is to draw attention to the economy of steam in the *Algonquin* due to the expansive principle adopted therein. Writing from recollection, the quantity used was about one-third less than in the *Winooski*. E. M. Chaffee.

Providence, R. I.

A Dead Hand.

One of our western exchanges contained, a short time ago, the details of a singular case of paralysis or something similar. It seems that a young man, by way of exhibiting his muscular power, struck his fist through a heavy panneled door, and from that time forward the hand has been numb. The account says:—

"In a few weeks the hand began to wither and the fingers to shrink up, and now they present a curious appearance. The hand is wholly useless, and of a dead-looking gray color, as if no blood circulated in it, and has shrunk to nearly one half the size of the other hand. The nails are black, but still retain their hold upon the flesh. They have not grown any since the blow was given. Upon cutting the hand a little blood will stand in the wound, but it does not bleed like a fresh cut. There is no sign of mortification in the hand. The dead feeling reaches only a few inches up the arm. Wilder has no power over the hand and cannot close it. The bones of the fingers seem to have shrunk with the flesh, and to have softened to a substance resembling gristle. Several surgeons have examined the hand and declare that they never saw or heard of a case similar to this."

We remember a circumstance somewhat analogous to this which occurred some thirty years ago. A number of boys had been annoying a neighbor by throwing stones against his door. He rushed out and dealt one of them a blow on the arm between the elbow and wrist. The blow slightly discolored the skin, but from that night the arm was useless and assumed the appearance of a dead limb. We knew the young man for more than ten years after the occurrence, but no change ever took place in the condition of his arm. It remained in size a boy's arm, and in appearance and feeling dead.

Foreign-built and Home-made Machinery.

We have received a communication from Manchester, Va., in relation to the letter we copied in our issue of Feb. 2d, which attempted to prove the superiority of foreign cotton and woolen machinery over that of American manufacture. We have not room for the communication in full, but present its more salient features. The writer says:

Having been a constant reader of your paper ever since it was first started by Rufus Porter twenty-five years ago, except during the late war, when it could not be had here, I felt satisfied that an article like that you copied in the issue of Feb. 2d from a North Carolina paper would not escape the notice of the readers of the Scientific American without reply and such correction as it called for, better than I felt able to do; yet thinking the statement that I am about to make even at this late hour may add something to assist in setting public opinion at the South aright, I venture to appear before your readers, knowing no better medium to bring the subject before the mechanics and manufacturers of this country. I was pleased to read in your paper of Feb. 23d the able articles of several correspondents and successful manufacturers, although their modesty forbids them styling themselves "best manufacturers in the country," and an impartial public will see that they have established the fact beyond a doubt that American mechanics and American machinery are not surpassed by European. While the proofs and references they bring forward are ample, yet many more could be added. The author of that article in the North Carolina paper asserts the same thing that I am about to show, and I want his Southern friends to note it. He boasts of the extra quantity of work done on his cards, and of all the goods made being sold, their agents in Baltimore reporting not a yard left. While his letter would convey the idea that it was the result of using that European machinery, the facts do not sustain this idea. Would your readers believe it, that those very cards which produced this large quantity of work were built by Alfred Jenks & Son, Bridesburg, Pa., before the war, and every loom in the same establishment is American, except one solitary, rough, unsightly English loom, which answers to the description given by your correspondent, Mr. Hooper, of Baltimore, of European machinery generally, in your issue of Feb. 23d? I visited this factory that the gentleman has the charge of some three months ago, and know what I state. I saw some nice machinery from Massachusetts, some from Richmond, besides the bulk built in Pennsylvania. This English loom was pointed out to me, also a picker from Germany, and some machine from Belgium. Any of your readers that wish to satisfy themselves in regard to these statements can do so, if they think the game worth the ammunition, by visiting the factory. It will be found not quite a thousand miles from Fredericksburg, in this State.

The letter in question bears the evidence on its face that it was intended for the eyes of Southern capitalists about going into manufacturing, and needing machinery. It is well your paper gave it publicity and that the assertions therein were contradicted. I would say to my Southern friends, even if I am not the "best practical manufacturer" south, that I have had some experience, and I would advise them to examine well and get practical men who fully understand the wants of this section of our country to assist in selecting, and my idea is that we can do better by getting late improved American machinery than by going abroad and buying in four or five countries by piecemeal. Some European machines may be had cheaper than our mechanics can turn them out; but "why?" ask some. Contrast the condition of the European mechanics and operatives generally with our American mechanics and the question is more than answered.

The Sudden Expansion of Prussia has raised her commercial marine from 1,665 vessels to 10,202, of 1,293,138 tuns; exceeding that of France by over 300,000 tuns, and making her the second commercial power of Europe.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Refrigerator.—William Law, New York City.—This invention has for its object to so improve the construction of refrigerators that the bottom of the ice chamber may not be liable to be injured by an accidental blow of the ice pick.

Molding Pulley.—William Neemes, Pittsburgh, Pa.—This invention has for its object to furnish an improved process for casting pulleys, by means of which they can be cast accurately and much faster than by the ordinary process.

Portable Fence.—Eli York, Windsor, Ill.—This invention has for its object to furnish an improved self-supporting portable fence, quickly and easily put up and taken down, and readily transported from place to place.

Cheese Vats.—O. Sage, Willington, Ohio.—This invention has for its object to furnish an improved cheese vat, by means of which the heat applied to the milk box may be regulated as desired, and the performance of the various operations necessary in the preparation of the curd, greatly facilitated.

Heat Extractor or Stovepipe Drum.—G. H. Hammond, Oneonta, N. Y.—This invention has for its object to furnish an improved apparatus for extracting the heat from the smoke and other products of combustion passing off through the stovepipe, and which would otherwise be lost.

Life-preserver Removable Berth for Vessels.—John J. Clyde, Williamsburgh, N. Y.—This invention consists in so constructing the berths of steamboats and other vessels that they may be removable, and may be water-tight so that they may be used as life preservers to float their occupants; and so that by attaching several of said berths together, a strong serviceable and buoyant raft will be formed.

Ladies' Dress Comb.—F. A. L. Cassidey, Newnanville, Fla.—This invention consists in attaching to the ends of the body or back of ladies dress combs, two wing or side combs, to more securely hold the hair or head dress in place.

Water Filter.—Frederick Schickle and Evermont Randals, St. Louis Mo.—This invention relates to improvement in water filters for filtering and purifying muddy water, and consists of pipes and chambers so constructed and arranged that the muddy water shall pass from a receiving chamber or reservoir through a filtering body of sand, gravel, charcoal or other suitable porous and purifying compounds, into a supply chamber, from which the pure water is drawn off for use by a connected pipe and faucet.

Apparatus for Making Vinegar.—Wendelin Weis, St. Paul, Minn.—The object of this invention is to arrange an apparatus whereby alcoholic liquor may be converted into vinegar in the shortest possible space of time.

Constructing Houses.—John Parks, Joliet, Ill.—This invention consists in constructing buildings in such a manner as to make them strong and to require but a small amount of lumber in their construction, also making the walls air-tight and providing ample ventilation from the cellar to the top of the building.

Door Fastening.—John Decker, Sparta, N. J.—This invention relates to a portable door fastening such as are designed for travelers to fasten or secure the door of a bed chamber on returning. This object is to obtain a fastening which will be simple in construction, capable of being readily applied and one which will effectually secure the door and without marring it or the door frame.

Machine for Pressing Leather Seams.—William May, Binghamton, N. Y. The object of this invention is to construct and arrange a machine whereby leather seams of any description, whether straight or curved, whether used for boots or shoes or for saddles or for any other article whatever, may be pressed neatly and without trouble, said machine being of simple construction and cheaply made.

Hoisting Apparatus.—A. R. Lemen, Kalamazoo, Mich.—This invention consists in so constructing an apparatus that it may be used for elevating heavy weights by the application of a small amount of power.

Sulky Plow.—O. P. Dils, Falmouth, Ky.—This invention consists in a peculiar construction and arrangement of parts, whereby both the plow and the carriage or sulky part of the device are allowed to conform perfectly to the inequalities of surface over which they may pass and an implement of light or easy draft obtained.

Seed-dropping Attachment for Hoes.—A. F. Large, Chicago, Ill.—This invention relates to a seed-dropping attachment for hoes already patented. The object of the present improvement is to simplify the original patented device, economize in the construction, and at the same time retain all the advantages it possesses.

Mounted Swivelling Boot Tree.—Reuben L. Lewis, Worcester, Mass.—This invention consists in the arrangement of a laterally-adjustable heel plate whereby the counters of boots are pressed out, said heel plate consisting of two parts which are hinged together and which are operated by a differential screw so as to be adjusted on boots of any size; and the invention also consists in the manner of attaching and operating the adjustable back, whereby the same can be adjusted to a great number of different-sized boots.

Cutting Threads on Bolts, etc.—Francis Schweizer, New York City.—This invention relates to a machine whereby screw threads can be cut on two bolts at the same time without using more power than would be requisite to cut a thread on one bolt.

Paint.—Henry W. Bradley, New Berlin, N. Y.—This invention relates to a new composition for paint whereby a very cheap consistent and glossy paint is manufactured and one which will dry faster than the ordinary paints generally do.

Clock Alarm.—John Decker, Sparta, N. J.—The object of this invention is to obtain a simple, cheap and portable clock alarm which may, whenever required, be applied to a clock by any one in a moment of time and without any difficulty whatever.

Burglar-proof Lock.—Adam Leich, Brooklyn, N. Y.—This invention consists in applying three checks to the bolt of the lock in such a manner that the whole three of the checks will require to be operated upon by the key at the same time and held in a position free from the bolt, while the bolt is moved by the key. The invention also consists in combining with the three checks aforesaid, a partition plate so arranged as to prevent the bolt and checks being operated upon except by a proper key.

Anti-rheumatic Compound.—Jacob Schmoll, New York City.—This invention relates to a liquid compound which is intended particularly for the purpose of counteracting rheumatic and similar attacks and which when rubbed on the afflicted part, affords almost instantaneous relief.

Spring Cuff.—Isaac Levine, New York City.—This invention relates to a cuff which, instead of being made in the form of a closed cylinder as usual, is cut open at one side and provided with a coiled spring which allows the hand to pass freely through the cuff, and which after the hand has entered causes said cuff to clasp the wrist tightly and to produce a good fit.

Fan Blower.—Franz Engel, Camden, N. J.—This invention relates to a fan blower which is based on the principle of the archimedian screw. The screw, which is formed of two steep spiral flanges resembling a double screw thread, is fitted in a cylinder from the bottom part of which extends the spout or blast pipe. The upper part of the screw which projects above the cylinder is provided with a cylindrical jacket so that by revolving said screw the air is caught and forced out through the spout or blast pipe with consider able force.

Agricultural Fork.—Thomas Beale, New Milford, Ill.—This invention relates to a fork for spading up the earth, digging esculent vegetables and roots, and has for its object ease of labor and a greater facility in manipulating the implement.

Car Coupling.—Ezra Staples and W. W. Gould, Skowhegan, Maine.—This invention consists in constructing a safe and effectual apparatus by which railroad cars may be easily coupled together and uncoupled without danger to life or limb.

SECURING TIRES ON THE WHEELS OF VEHICLES.—Andrew C. Barnes, Albia, Iowa.—This invention relates to an improved manner of securing tires on wheels without the aid of the bolts usually employed for that purpose.

CHURN DASH.—A. B. Hutchins, Patchogue, N. Y.—This invention consists in constructing a churn dash in such a manner that it will be rotated by an up and down movement in the operation of churning and the cream thereby subjected to a violent agitation which will cause the butter to be produced within a very short period of time.

COTTON CULTIVATOR.—W. McCracken, Bainbridge, Ind.—The object of this invention is to obtain a cotton cultivator which will dispense with much labor hitherto required, and it consists in the use of a plow and scraper arranged in a novel way, and also in a hoe arranged and applied in such a manner as to operate automatically under the draft movement of the device, and in a direction transversely with the row of plants for the purpose of thinning out the latter at regular and proper intervals.

SELF-OILING AND SELF-ADJUSTING BEARING FOR MACHINERY.—Thomas S. Brown, Poughkeepsie, N. Y.—The object of this invention is to obtain a bearing for the shafting of machinery which will be self-lubricating and self-adjusting, and also be capable of adjusting itself in line with the shafting, in case the bearings be not set perfectly in line with the shafting in adjusting machinery together.

WATER FILTER.—George Waite and John Watts, New Orleans, La.—This invention consists in forming the filter and cooler in such a manner that the weight of the water shall be exerted to force the lower portion upward after it has passed through the filtering material.

PISTON PACKING.—John Askwith, Chicago, Ill.—This invention consists in the formation of the joint of the packing ring, and in the provisions made for keeping it expanded to the cylinder steam tight, and in a central position.

REVOLVING WAIST BLOCK.—William T. Adams, Baltimore, Md.—The sheave around which the sheet or other rope is passed is journaled in a disk which is permitted to rotate to keep the axis of the sheave at right angles to the direction of the rope. The sheave is journaled within the rotating disk and projects from each of its faces so as to deliver a rope which passes around it without impediment, both ends in the same direction or near it.

SELF-CLOSING AND SELF-LOCKING RAILROAD SWITCH.—Judson F. Jones, Washington, D. C.—The switch lock holds the switch upon the main track except while forcibly and temporarily held upon the turn out. When the switch lever is released the spring returns the switch to the main track, the locking bar automatically engaging with a tooth of the switch bar; the locking bar cannot be disengaged except by the key which elevates it, and is released for subsequent engagement by the descending switch lever.

STEAM ENGINE.—George I. Washburn, Worcester, Mass.—This engine has two double acting pistons, each operating by itself in its steam cylinder and attached to a piston rod which carries a valve of any suitable construction operating in its own chamber. Each valve controls the action of the steam upon the double acting piston in the opposite cylinder and not that piston to which it is attached. A valve upon the eduction port or in the exhaust pipe, opening outwardly, closes the aperture against the reflux of exhaust steam.

TWEER.—Daniel S. Loy, Gracehan, Md.—The air from the bellows entering the blast chamber acts upon a wing and actuates the valve which closes the lower aperture of the chamber. When the blast ceases, the valve opens, discharges the cinders and admits the passage of air to the fire. Different forms of blast plates are used as caps fitting upon the rim which bounds the upper end of the blast chamber and the cinders are conducted by an adjustable pipe in such direction as may be suitable for their discharge.

SASH-CORD ATTACHMENT.—Carlos Swift, Mount, Carroll, Ill.—This invention relates to an ingenious, simple and effective device for attaching cords to window sashes.

WASHING MACHINE.—Mark Newland, Parton, Ohio.—This invention consists especially in the combination of the double spring connecting rod, by which the rubber is operated with the rubber frame and with the crank shaft.

CORN-CAKE MACHINE.—C. C. Harriman, Warner, N. H.—This invention has for its object to furnish a neat and convenient machine for cutting out cakes of uniform size and thickness in batches of one hundred, two hundred, or more, as may be desired.

SEED PLANTER.—A. Bennett, Rockford, Ill.—This invention relates to an improvement in the construction of corn planters, whereby one man or boy with a double team may drop the grain at regular intervals in two rows, opening the furrow, and rolling the seed after they are dropped at the same time, thus completing the planting in one operation by a self-acting apparatus.

CLOTHES FRAME OR RACK.—Benjamin Britten, Galena, Ill.—This invention consists in so constructing a clothes rack or frame, that it can be folded up into a compact shape, suitable for being encased within a hollow tube or cylinder, that when the said rack is drawn out serves as its standard and support.

MANUFACTURE OF IRON AND STEEL.—Charles Usher, Iowa Falls, Iowa.—This invention consists in a novel manner of plating wrought iron or steel with malleable iron.

CUTTER FOR TRIMMING WALL PAPER, ETC.—Henry C. Snow, Princeton Ill.—This invention relates to a cutter or implement for the trimming of wall paper more especially, whereby it can be trimmed with the utmost facility, accuracy, and rapidity.

LOCK.—James S. Porter and Russel Porter, Waterford, N. Y.—This invention consists in the combination with a lock of a pistol, in such a manner that when a key is placed in the lock and turned for the purpose of unlocking it, the pistol will be discharged, thus operating as an alarm.

FRUIT JARS, ETC.—G. W. Buffington, Mechanicsburg, Ohio.—This invention consists in a novel manner of securing an elastic web or band to the jar cover, in connection with a peculiar form of the neck of the jar, whereby many advantages are obtained.

BOOT AND SHOE.—Joseph C. Adams, New London, N. H.—This invention relates principally to the heel of a boot or shoe, and consists in making the heel of metal and hollow, with its under plate constituting the treading surface, secured to the main portion of the heel in such a manner as to be easily removed therefrom.

LOCK.—Zeno Kelly, New Bedford, Mass.—This invention consists principally in the application to the link or shackle bar of a padlock of a seal or seals in such a manner and in combination with any suitable arrangement of devices for locking or holding such link or shackle bar in the lock casing, that before the lock can be unlocked, said seal or seals must be broken, or, in other words, punctured by the insertion of the key or of any other implement into the lock for opening or unlocking the same.

BED SPRING FASTENING.—D. Manuel, Boston, Mass.—This invention relates to an improved device for fastening the lower end of spiral wire bed springs to the slats, and also for securing their upper ends to the frame bars in such a manner that the springs will keep their vertical position, and the whole frame may be raised without deranging or moving the springs.

GATE LATCH.—W. H. Kellogg, Du Quoin, Ill.—This invention relates to a device for a self-closing latch to a gate, which will open either way, and may be opened very readily, being more especially adapted to small gates that are often passed, and require a convenient as well as sure fastening.

WOOL PRESS.—Spencer C. Bond, Farmersville, N. Y.—This invention relates to a wool press, the press box of which is composed of two hinged wings and two sliding heads. The hinged wings compose the sides of the press box, and they connect by cords or chains with a lever, in such a manner that by depressing said lever the wings are turned up simultaneously. The movable heads are attached to rods which slide in a suitable recess in the platform or bottom of the press box, and said rods are connected to the bolts (threads of which are secured to a windlass or drum), in such a manner that by turning said windlass the heads are drawn together, and the operation of pressing is effected. By adjusting the cords or ropes in a proper position previous to putting the fleece in the press box, the operation of tying the packs after they have been pressed is materially facilitated.

FRUIT GATHERER.—John Frantz, of Joseph, Shelbysport, Md.—This invention relates to a machine constructed to gather apples, potatoes, or other fruit, from and off the ground,

SHAKING TABLES FOR CONCENTRATING ORES.—P. S. Buckminster, Gold Hill, Nevada.—This invention relates to an improvement in shaking tables for concentrating sulphurets and other heavier mineral portions of gold and other ores, and consists in a novel plan for constructing and arranging the grooves or riffles in the bed of the table, by which the operation of separation of the heavier mineral from the lighter earthy matters in the ore is rapidly and thoroughly performed.

LIFTING JACK.—Daniel Diver, Boone, Iowa.—This invention has for its object to furnish an improved lifting jack, designed especially for raising or leveling railroad tracks, but equally adapted to other uses.

MEDICAL COMPOUND.—Wm. B. Foster, Ridgeville, Ohio.—This medical compound is specially intended for the relief and cure of cholic, cholera morbus, cholera, diarrhœa, heart disease, rheumatism, white swelling, etc.

COMBINED BRIDLE AND HALTER.—J. McKibben, Lima, Ohio.—This bridle and halter is simple, convenient, and durable.

INVALID CHAIR.—John N. McMullen, West Liberty, Ohio.—This invention consists in the employment of a shaft arranged transversely under the seat of the chair, to which is connected a belt or belts whose ends, not being connected to the roller, are secured respectively to the back of the chair and to the bottom of the foot rest. Said roller being also provided with a toothed wheel having a crank, which, in connection with a pawl, enables the person occupying the chair to give both the back and foot rest the desired inclination.

DRAFT PIPE FOR LOCOMOTIVE ENGINE.—A. Pearsall, Atlanta, Ga.—The object of this invention is to equalize the draft through the boiler flues, thereby improving the effective operation of the engine.

BALE TIE.—Barry Coleman, Louisville, Ky.—This invention relates to an improved device for fastening the hoops of cotton or other bales, and consists in a single iron plate slotted in such a manner that the ends of a bale hoop may be readily passed through it, and secured so that they shall not slip.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Wanted.—Best wool carding and spinning machines and power looms. Manufacturers send circular and price list to C. Picard & Co., Nebraska City, Nebraska Territory.

Manufacturers of House-furnishing Goods (Hardware) will please send their address and circulars to S. W. Johnson & Co., Detroit, Mich.

Photographer, Box 5,830, New York Post-office, wishes to obtain the address of the person who has applied for a patent for discerning the presence of ghosts or spirits in a room.

N. Evinger, of Sandford, Vigo county, Ind., wishes to engage with scientific parties as inventor. Also to sell his foreign claim on a very useful machine, patent pending.

Wanted.—An agency for some desirable and salable patented article that will work well with the retail hat and cap trade. Address W., Lock Box 122. Erie, Pa.

E. Roth, New Oxford, Pa., wishes to know where he can get malleable casting done. Patterns furnished.

Evans's Patent Graduating Circular Hand Plane for finishing curved surfaces. Send for circular to F. H Webb, Hudson, N. Y.

Wanted.—A situation as foreman or to work by the contract by a practical machinist with good reference. Should like to go West Address Machinist, Box 665, Worcester, Mass.

Manufacturers of wood-turning machines of any kind other than the ordinary laths will please send cut and price to Geo. W. Sweet, Flint, Mich.

Rouse & Dean, Dubuque, Iowa, wish to correspond with manufacturers of lead-pipe machinery.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

O. J. F., of Mich., asks:—Of two portable engines having the same amount of fire surface, one having 20 three-inch tubes 58 inches long and the other 16 three-inch tubes 72 inches long, which is the most efficient, or is there any appreciable difference in their efficiency? Ans: The 20 tubes present 24 inches surface more than the 16 tubes, and as the engines are portable, depending upon natural draft, we should prefer, in selecting an engine, the one with the shorter tubes, and think it would be more efficient.

D. S. McD., of Ill.—Water when frozen expands. As the sap, etc. in green wood is largely composed of water, freezing green timber will expand or burst it. Trees in exposed situations sometimes crack by intense cold. Freezing green wood is not analagous to seasoning it.

A. P. R., of N. Y.—A fly wheel acts as a fly wheel whether it is used as a pulley or not. See reply to W. K. of Ind., in No. 11 SCIENTIFIC AMERICAN.

C. B., of Conn.—We have seen the hammer you speak of in use and like it. If you wish for particulars see SCIENTIFIC AMERICAN Vol XV pages 134 and 383.

W. A. W., of L. I.—We think better results will accrue if you use salt rather than brackish water in your boiler. The latter is apt to induce foaming. Why not distil your salt water and use it fresh? Your communication appeared in No. 10.

P. G., of Ill.—Round twisted belts of leather are manufactured so that they will not stretch more than flat belts. They have a solid longitudinal core of leather, untwisted and stitched to the outer envelope. They are very superior. Belts of only one quarter of an inch or less in diameter are cut from the solid leather. Gut belts of this size are better.

G. W. T., of R. I.—Rollers on shuttles for weaving were used to our recollection twenty-five years or more ago, but were rejected for the simpler form of smooth bottoms. We do not think rollers are an advantage.

J. G. S., of Minn.—We do not advocate the indiscriminate use of oil on taps. Sometimes a clean tap will work better in cast iron than one with oil. Much, however, depends upon the way in which the tap is made. If it has a good clearance it may work better without any lubricator. You may be sure that a tap with too much thread will not cut a screw thread but only jam the thread.

M. R., of Conn.—For making black lead crucibles, mix two to four parts of black lead with one part of clay. The ingredients should be finely powdered, thoroughly mixed, and after being got into the desired form by molding and pressure, must be thoroughly dried. The crucible is finally baked in a close oven. The quality of the crucible depends mainly on the freedom of the black lead and the clay from iron and lime.

W. E. B., of Ill.—The average boiling point of petroleum burning oil is about 550 deg. Fah.

C. B., of Mich.—If you take a sheet of raw rubber and soften it with naphtha till it becomes softened, you may succeed in getting it into the form you desire. After being thus molded it may require some days for the solvent to evaporate and the rubber to become hard.

M. B. L., of Ill.—Hydrogen in most of its chemical relations is like the metals. But it lacks the physical and sensible properties which are commonly considered to be characteristic of metals. We have never seen a definition of a metal which could include hydrogen.

H. W. H., of N. Y., has a new silver watch. He says "spots of yellow rust begin to show themselves on the inside of the case. What is the cause?" We suggest that this watch like the celebrated razors, was made to sell. If we knew that it was a relic of some gift enterprise or mock auction, we should test those yellow spots for brass. Silver and gold now-a-days like some other virtues are only skin deep. The vitality of jewelry is generally due to galvanism.

J. S., of Ill.—The mineral you send is very fine sand and is sometimes used under the name of tripoli for polishing metals. Genuine tripoli, however, is composed of infusorial siliceous shells.

J. G. N., of Vt.—Small articles of steel generally receive their final finish by tumbling with small scraps of leather.

J. L., of Ill.—The pasting up of millstones may be due to the grain being too moist, or to the stone being too fine. The remedy in each case seems evident.

J. V., of Ala.—The optimeter is an instrument for determining the focal length of spectacles suitable to those who are to use them. An object of any convenient size as a line drawing or a paragraph of printed matter is set up, and the person whose eyes are to be tested places himself where the object can be distinctly seen. The distance from the eyes to the object will determine the focal length of the spectacles. But as this distance will vary with the size of the object, the person who is to use the device must determine by a few preliminary experiments on different persons, the relation between the distance and the focal length. The simplest form of the instrument is one tube sliding within another. The outer tube is stationary and has an object on its end. The inner tube slides in the outer and is graduated in inches. To operate it, look into the inner tube and slide it forward or back till the object is seen most distinctly. The focal length of the required spectacles may now be read off from the graduation. When the graduation is properly made, the instrument is quite useful for those who make it a business to fit people with spectacles.

J. C., of Conn.—A solution of rubber in turpentine or naphtha is called rubber cement and is sometimes useful in mending rubber goods but it does not adhere very well to vulcanized rubber, and the joint is always weak.

O. C., of Mass.—Ice is crystallized water. In the act of crystallizing, the particles are rearranged or polarized so as to occupy more space. This is all the explanation which is given of the fact that water expands in freezing. Water will not be expanded any the less when frozen in a vacuum, and your bottle of water tightly corked, and frozen under the exhausted receiver of an air pump will burst.

H. B. S., of R. I.—"1. What do we understand by the essence of matter? 2. What is the limit of our knowledge of the nature of matter?" (1.) The essence of matter may be defined as that which remains of matter after abstracting its properties; or as that to which the properties of matter are attached. This is a very excellent definition, but who understands the essence of matter? (2.) In the present condition of science we know nothing of matter or the nature of matter beyond or behind its essential properties. Is a knowledge of what is behind the properties so very desirable? There is abundance of knowledge which is both desirable and attainable.

A. W., of Ky.—Messrs. Hoe & Co. make a press that prints on both sides of the sheet at the same time, but the lightning press so known only prints one side at a time.

D. O., of Ill., sends us a long and somewhat ingenious essay with the intent to prove that electricity is the explanation of gravitation, heat, light, chemical action, and in short of almost everything. Such speculations are not new. They seem to be based upon an imperfect notion of what electricity really is.

A. C. R., of N. Y.—You will probably succeed in removing the smell of the gas from your gutta percha and other tubes by immersing them in a weak solution of per manganate of potash.

G. T. M. L., of N. Y. says:—"A little roasted pure coffee eaten without further preparation, will immediately relieve that species of indigestion which causes sourness, or broiling of the stomach."

E. C. G., of Ind.—A galvanized telegraph wire will last longer than a plain wire, whether above or under ground. The time that the buried wire will endure, depends upon the nature of the soil. An acid or salt soil might use it up in a few weeks while in loam or sand it would last for years.

D. M., of N. Y.—When steam is let on to the engine, the pressure being relieved, the water begins to boil violently. In such circumstances an extraordinary amount of steam is generated, and the steam gage for a moment indicates increased pressure. The case may be illustrated by a simple experiment. Provide a glass flask with a good cork. Boil water in the flask, press in the cork, and after the heat has continued for a moment, slightly loosen the cork, and it will be evident that at the instant of loosening, the pressure is increased. If the experiment be dexterously performed, the flask may be burst by this paradoxical pressure.

W. F. D., of Mass.—You may easily distinguish vulcanized from raw rubber. Raw rubber is softened and dissolved by benzole, gets stiff and hard by cooling to 32°, and the finger nail when pressed on it leaves a permanent impression. Per contra, none of these things happen with good vulcanized rubber. Moreover, vulcanized rubber when burned gives a sulphurous odor.

J. N. H., of Mich.—No exact position has been fixed for the meridian from which the day should start. If it is ever established by statute (which is probable) it is likely that the same meridian will be continued from year to year, and thus the beginning of the year will be reckoned from it also.

PATENT OFFICE DECISIONS

BEFORE THE BOARD OF EXAMINERS-IN-CHIEF OF APPEAL.
ELISHA FOOTE for the Board.

The claim must cover the precise novelty of the invention.—Application for a patent for improvement in breech-loading fire-arms.

The rear part of the applicant's breech block is composed of two arms. The upper one extends back to a socket that forms the joint on which it turns. The lower one is shorter and fits when the block is in position to close the bore against a fixed shoulder on the breech. The block is thus supported at both the top and bottom against the force of the explosion, and at the same time it can be dropped down, turning in the socket before mentioned, until the upper arm strikes against the fixed block and thus unloosies the bore for the insertion of another charge.

This arrangement gives solidity to the structure and much simplicity and apparent practicability, and we do not find it in any of the references given.

The first claim is liable to a construction that would render it entirely too broad. It is for the breech, C', constructed as described, etc. This is about the language which would have been use by the person who first invented a breech adapted to a movable block and who did not intend to confine himself to a particular form. And in this broad sense the claim seems to have been understood by the Examiner in charge. Had it been specified for the peculiar construction of the breech, C', having the shoulder, M, as described, a different conclusion might have been arrived at by the Examiner.

His decision in reference to this claim is affirmed, with the recommendation that the applicant be allowed to amend and present it for re-examination.

Application for a patent for an improvement in engraving.

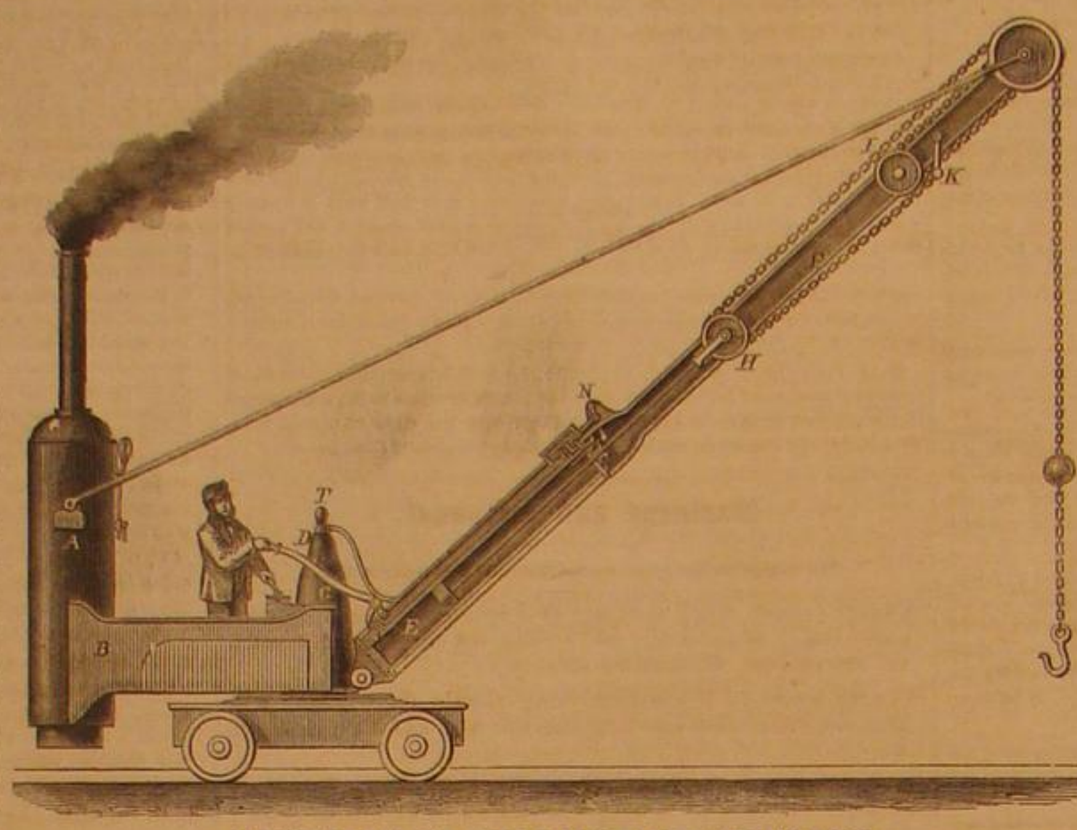
The applicant claims his process of engraving substantially as described. In his argument he admits that a part of the process is old, and consequently he has omitted to comply with those provisions of the statute which require the applicant to particularly specify and point out the part, improvement or combination which he claims as his own invention or discovery. Curtis, in his treatise on patents (see 131), says in reference to this provision:—"This involves the necessity in all cases where the patentee makes use of what is old, of distinguishing between what is old and what is new. He is required to point out in what his invention or discovery consists; and if he includes in his description what has been invented before without showing that he does not claim to have invented that, his patent will be broader than his invention, and therefore void."

The Examiner was therefore right in rejecting the application as it was presented. The applicant has submitted to us an amendment intended to remedy the defects alluded to. This we have no power to receive. Our powers are those of review only—to determine upon the validity of decisions made.

The application must go back to the Examiner for him to investigate the new questions presented, before we can have anything to do with it. The Examiner's decision is affirmed, with the recommendation that an amendment be allowed.

Portable Steam Crane.

Steam cranes have within a few years come largely into use at manufactories of heavy machinery, in dock yards, and at other points where their lifting services are often required; but usually they are permanent fixtures, and the weight to be lifted with, that of the jib, is counterbalanced by the action of guys or the holding force of a firm standard. In the one herewith represented, which is the invention of Mon. J. Chretien, a description of which we find, in the London *Mechanics Magazine* the boiler and tender serve as a counterpoise to the weight to be lifted.



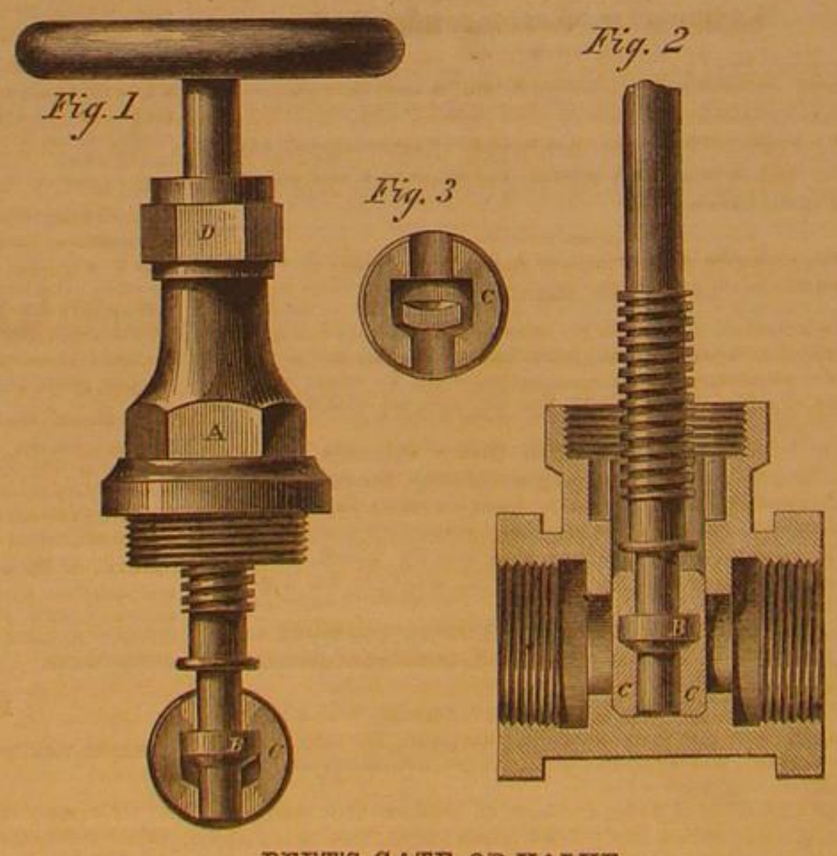
A CONVENIENT PORTABLE STEAM CRANE.

A is the boiler suspended from the rear of the tender, B, carrying the fuel and water. The jib, F, of the crane is of iron and hollow, containing the steam cylinder, E, in which works a piston connected to a pair of pulleys, H, over which the hoisting chain passes, one end being secured to the jib at K, near the intermediate pulley, I. The steam is admitted at N, and the double tie bars, G, connect the point of the jib and the boiler. The lever for regulating the action of the steam is shown at D and a dynamometer at T.

By this crane it is claimed the weight of the load can be denoted, and the utilization of the hollow of the jib as a steam cylinder appears to be novel and useful. No further explanation seems to be required to give a pretty correct idea of this machine. It seems to be compact strong, and readily managed. It has been and is still extensively used abroad and gives good satisfaction. We invite the attention of our manufacturers and others interested to this device. We should think the builders would find a ready market for their machines.

Improved Gate or Valve.

The accompanying engravings illustrate one of the most perfect gates for steam, gas, and liquids we have ever seen. It seems almost impossible that it should get out of order and it does not in any manner interfere with the direct flow of the fluid. Outwardly it resembles a T-connection to a pipe, there being no protuberance to accommodate the valve. The stem of the valve is tapped through the upright, A, in the usual manner, and is furnished near the lower end with a projecting collar, B, on which are suspended discs, C, by suitable recesses on their inner faces, seen plainly in Fig. 3. These discs are enough larger than the aperture through the pipe and gate to give a bearing all around their circumferences when seated against the walls of the valve, as seen in Fig. 2 A perspective view of the upright, hand-wheel, stem, and one disc is given in Fig. 1. A vertical sectional view of the valve taken longitudinally, with the stem, and both discs is shown in Fig. 2; and Fig. 3 is a disc showing its inner face. By the action of the stem on turning the hand-wheel these discs are raised or depressed, they being suspended on the stem by its collar engaging with the semi-circular recesses on their inner faces, and prevented from separating from the stem by the walls of the passage in which they move. The lower face of the collar, B, and the lower portion of the recesses in the disks are made slightly conical, so that after the discs have reached the bottom any further pressure on them by the screw of the stem, forces them apart and firmly against the walls of the valve, thoroughly closing the apertures of the pipe. The conical collar, therefore, acts as a wedge aided by the pressure of the screw. It will be seen that both sides of the pipe are closed by this means, making this a back pressure valve as well as a direct acting gate. When the discs are raised, a free passage, without change of direction, is made through the valve for the steam, water, or gas, of the full size of the pipe. The stem is packed in the usual manner by the screw gland, D.



PEET'S GATE OR VALVE.

The joints formed bv the faces of the discs and the walls of the valve meet the force of steam or gas at right angles, obviating the wearing or filing action of the steam, which in other gates, in time, affects the security of the joint. A single joint closed by the action of a screw cannot be opened without exposing the valve to this cutting by the steam. The closing power in this valve being applied to the center of the discs, the operation is always uniform and the joints perfect all round. In fitting this gate to pipes, the shell, being virtually solid, no amount of wrenching can disturb the joints of the discs. It is well known to mechanics that the change of direction given the steam in the ordinary globe valves and gates occasions a loss of its force and more or less condensation. This is impossible with the gate under consideration as no change of direction or retardation of force can occur, the passage being as direct and unobstructed as in the pipe.

This improvement was patented through the Scientific American Patent Agency January 1st, 1867, for the United States, and in Great Britain. Further information may be obtained from the patentee, Samuel J. Peet, 33 Beekman street New York City.

THE GAS QUESTION.

We have received from the city of Boston a voluminous document on the manufacture and inspection of gas, being the report of a special committee appointed by the Common Council to inquire whether it would be expedient for the city to build works for supplying its citizens with gas at a minimum cost. The investigations of this committee have more than a local interest, for their purpose was not merely inquiry into the quality of the gas furnished by the existing Boston company, or its prices as compared with those of other cities, but rather to consider the subject in a general way and base their conclusions on general principles. As the result of their labors, many facts of interest to the community at large have been brought to light, that otherwise would have still remained among the unpublished trade secrets. Many of the witnesses called were those holding important positions in these corporations, all well versed in the details of their management, and hence the information often inadvertently given is of much value.

It appears that there are four hundred and sixty towns in the United States where gas works are located, the consumers numbering nearly eight millions. The amount of gas produced every year, it is estimated, would fill a gas holder six hundred and eighty acres in extent, and three hundred and thirty feet high. The amount of capital invested in these companies is now over fifty-five millions of dollars. The stock is always above par, and is held by rich corporations who furnish consumers with gas at high and excessive prices. The city of Boston is not the first in taking stand against these monopolies. Detroit and St. Louis are now agitating the subject of protecting public interests by furnishing their citizens from city works. Philadelphia and Chicago are making their own gas. Cincinnati has purchased her gas works at a cost of two and a half millions of dollars, and careful estimates show that if consumers are charged two and one half dollars per thousand feet, in eight years the city will realize, over and above the first cost, half a million of dollars.

The enormous profits of the existing gas companies, was a fact made apparent to the committee as the investigation proceeded, and led them to the conclusion expressed in the report, that water and artificial light, as the two great necessities of a city, should never be sold at a profit, nor ever be in the hands of a private corporation. The evidence showed that the existing company of that city has made, and is making, twenty-five per cent profit on every thousand feet of gas sold to the city or citizens, and has cleared during the thirty-three years of its existence, upwards of three millions of dollars. Nor is this an exceptional case: the same may be true, or even fall below the truth, in regard to all companies in cities throughout the country.

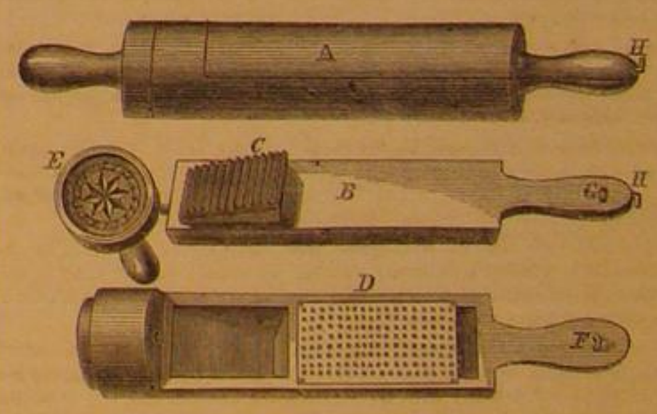
In regard to the actual cost of making gas, it was testified that during the year 1865 the average price of coal in twelve principal cities was $11·39 per gross tun: add to this $4·70 per tun as the price of labor and of the lime used in purifying, we have $16 as the total expense for converting each tun of coal into from 8,000 to 9,000 cubic feet of gas, the cost for each thousand feet being $1·88. This statement was admitted on all hands to be a fair estimate, yet the Manhattan company of this city professes to be doing a ruinous business because compelled by their charter to supply all consumers at $2·50 per thousand feet, while prices of the other companies of this city and vicinity range from $3·25 to $4.

After summing up the mass of evidence detailed at length in the pamphlet before us, the opinion of the committee was given decidedly in favor of making the gas supply a public function. For sanitary considerations, and on account of the inevitable decline in the value of real estate surrounding gas manufactories, it was recommended that the contemplated new works be located beyond or at some distance from the densely populated districts of the city. As it was not deemed advisable that the proposed change be made at present, owing to the high price of labor and material, the committee further urged the appointment of an inspector of gas and gas meters, whose duties shall be the regulation of gas companies and the better protection alike of the city and consumers generally.

We see no reason why the proposition of the committee should not be carried out in every city and town where it is profitable to manufacture gas. If it will pay individuals, the authorities are warranted in the conclusion that they might also undertake the gas supply without loss.

IMPROVED COMBINATION CULINARY UTENSIL.

The implement shown in the engraving may be styled the cook's *multum in parvo*, as it is a combination of not less than six different instruments used in the preparation of food. At A, it is seen simply as a rolling pin, which can be separated into three parts, as seen by the division lines on A, and by the parts in the other figures. B is a beef-steak pounder, the plate, C, of metal being inclined at a convenient angle for use. D, is a grater for nutmegs, horse radish, etc., the plate of which is secured by a pin latch at each corner, by turning which the plate can be removed and another, coarser or finer, substituted. The plate does not cover entirely the aperture in the rolling pin, but a space is left at one end to receive the



grated spice. E is one end of the roller, which screws on the pin, and when separated is a butter print, as seen. The parts longitudinally separated are held together by a dowel pin at the end of the steak breaker that engages with a corresponding hole in the rolling pin, and by a staple, F, fitting into a recess, G, and secured by the spring pin, H. This combination is the subject of a patent procured through the Scientific American Patent Agency, Nov. 13, 1866. For state and county rights address the patentees, Richardson and Williamson, corner of Ohio ave. and Bidwell street, Alleghany City, Pa.

The Good Old Times.—A catalogue of great European frosts has been published, from which it would seem as if the glacial period in Europe need not have been indefinitely remote in the past, after all. Some of the experiences of the Middle Ages have not been matched since, in this line. The last time the Thames was frozen over at London, was in 1838. This has occurred four times in the present century, viz., in 1813, 1820, 1823, and 1838. From elder times, we have notice of only very remarkable frosts, which in the eighteenth century occurred six times, viz., in 1708, April of 1709, 1716, 1740, 1788, and 1794. At the second of these dates the Mediterranean froze at Genoa and Leghorn, in the third the Thames was used as a solid pavement from Nov. 24th to Feb. 9th, and during the same term, to a day, in 1413. In 1063, the Thames was frozen over for more than three months, and in 1334 a frost continuing 80 days froze the rivers in Italy. In 1622, the Hellespont was frozen.

SCIENTIFIC AMERICAN.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ Messrs. Trubner & Co., 60 Paternoster Row, London, are also Agents or the SCIENTIFIC AMERICAN.

VOL. XVI., No. 12....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, MARCH 23, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

*George Peabody and his Gift to the London Poor	181	The *Algonquin* and *Winooski*	186
The Earth Worm	182	A Dead Hand	186
The Dental Profession	182	Foreign-built and Home-made Machinery	186
Gleanings from the Polytechnic Association	182	Recent American and Foreign Patents	186
Trial of Horse Hay Forks	182	Answers to Correspondents	187
Report of the Commissioner of Patents	182	Patent Office Decisions	187
Important Astronomical Discovery	183	*Portable Steam Crane	188
New French Telegraphic Machines	183	*Improved Gate or Valve	188
Editorial Summary	183	The Gas Question	188
*Improved Lever Farm Gate	184	*Improved Combination Culinary Utensil	188
Manufacture of Foreign Beer	184	Speculations on the Future	189
What Proof is there in Science that the Earth was once in a Molten or Fluid State?	185	The Rights and Wrongs of the Patent Office	189
How to Clear Vessels of Water	185	Mistaken Economy and Poor Materials	189
Testing Steel During the Process of Manufactures	185	"Ozone"	189
Looking Two Ways for Monday	185	Voluntary Police Association	190
Expansion of Boilers—A New and Simple Preventive	185	Influence of Sound upon Flame	190
Why Ice Is Slippery	186	Patent Claims	190, 191, 192, 193
The Tempering of Steel Tools	186	Extension Notices	193
		*Improved Cultivator	196
		The Hydraulic Press	196

CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK ROW, and not at No 39. Our reason for making this announcement will be made to appear by reference to a notice published on page 172, last number, under head of "Police Intelligence."

SPECULATIONS ON THE FUTURE.

The able Editor of *Engineering* follows up a review of the more recent achievements in the arts with an outline of those which seem to be indicated as next in order. Farming must become a branch of engineering, with its recognised professors and professional authorities, and advanced means of improvement. Little or no waste land must be left in England. Besides steam plowing, underdraining, sanding clay and claying sand, and sewage irrigation, the agricultural engineer is to saturate the soil with carbonaceous and nitrogenous elements by penetrating it with the products of the combustion of slack coal led through the land in flues. Land will yet be made to possess almost unlimited power of production.

We must dismiss the lumbering system of "trains" for high-speed traffic, and resort to a single vehicle combining engine, tender and carriage, in which fifty passengers may go at an average rate of sixty miles an hour at moderate cost, and with but forty or fifty tuns of total weight in motion. (The obstacle to rapid traveling on railroads at present, is the great weight and unsteadiness of the vehicles, involving an enormous waste of power and increase of risk at high speed). As for goods traffic, except express freighting, we must go back to and modernize water carriage, penetrating all parts of the country with a water system, of rivers and canals, for steamboats of 250 tuns burden. A new class of ocean steamers must be had, 500 to 600 feet long, twin-screwed, and driven at the rate of 16 miles an hour, making the Atlantic passage in an average of eight days. The only requisites wanting to success in such steamers, are a full line with regular and frequent departures, and a profitable reduction of fares. A single ship like the Great Eastern can never be filled up, because nobody wants to wait for her to the end of a month or six weeks, when inferior steamers are sailing every two or three days.

In regard to motive power, thousands of readers would be astonished if it were now published *who* has said that the days of steam are already numbered, and that hot air is to become the great motor (pending the subjection of electricity to the yoke).

Probably few have formed any conception of the immense change in building which is to follow the recent perfecting of artificial stone. It has been exposed to every conceivable trial, by boiling, freezing, acids and foul gases, with some four years practical use, and appears to be unalterable—an almost incomparable stone, in all the artistic forms and colors that may be desired, at a cost less than that of brick. Hydraulic elevators are referred to as destined to supersede the use of stairs, to a great extent and to a vast saving of weary, slow and unprofitable toil.

One of the grandest improvements that must now be imminent, is the perfection and general adaptation of the Bessemer process, for the conversion of all kinds of iron direct from the blast furnace into bars and castings of steel, with mechanical treatment of whatever character in the melted condition. Mr. Bessemer himself has made excellent tin plate sheets, which would fold like a newspaper, one fold across another, without cracking at the corner,—merely by pouring the contents of a crucible of melted steel between a small pair of rolls without any other working whatever!

In warfare, the day of piston shot and gigantic guns is coming. A 20-inch shot will be fired from a 40-inch gun; a shot of a tun weight, with an initial velocity of 1,600 feet per second from a charge of 450 lbs., with but little greater destructive strain upon the metal of the gun than in the old fashioned cast-iron ordnance, and with an effect of ninety-million foot pounds, sufficient to punch a 20-inch hole in a good wrought iron plate 28 inches thick, and to go through any now existing iron-clad like a wicker basket! There are (says the writer) clear and demonstrable principles on which such guns may be constructed. In the field also, great changes are before us, not only in rifles but in bullets, in which the explosive principle is yet to be applied with all its terrible efficiency.

THE RIGHTS AND WRONGS OF THE PATENT OFFICE.

The Report of the Commissioner of Patents, which we republish in this paper, is important enough and short enough to be read by everybody, and we could especially wish it read by every member of Congress. Eloquence could add nothing to the almost pathetic facts which make up this unadorned statement, or one would be tempted to wish the Commissioner had taken the opportunity to urge the just complaint of the Inventors more at large. In the first place, there is the tabulated history of the institution, in figures, for thirty years. And what does it show? Why, that the Inventors of the country, wealthy only in genius and enthusiasm—"poor, but making many rich"—have built up unaided this national monument, illustrious already in other lands, out of their own pockets have largely overpaid all its expenses and erected a magnificent building for its use, and at this day, with a surplus of $264,125 of their money in the hands of the Government, their important business lies neglected month after month, with fees pre-paid and interests often perishing by delay—because other departments have taken possession of the Patent Office building and crowded its legitimate business almost out of it, in a stifling corner where it cannot be transacted.

And this injustice and cruelty are aggravated every day with the increasing activity and beneficence of the inventive genius which is thus encouraged (!) by the United States. The cash received from inventors last year amounted in round numbers to half a million dollars: the application fees exceeded those of 1865 by nearly fifty per cent, while the caveat fees exceeded by nearly two hundred per cent, and the total receipts by more than forty-two per cent! At the present rate it is calculated that the applications the present year will rise to TWENTY THOUSAND. How is the business to be done? Without prompt provision for more room and force it *cannot* be done.

The plain question is: Gentlemen of the Senate and House of Representatives, do you intend to TAX INVENTION, and that retrospectively, for the benefit of the general treasury, or do you intend to give that great element of public welfare simply free and fair play, on paying its own expenses? But taxed or untaxed, inventors claim at least the common rights of men—that when services are agreed on and paid for, they shall be performed and not neglected. Name your price, gentlemen, but in the name of common honesty let the work be done.

MISTAKEN ECONOMY AND POOR MATERIALS.

Every successful manufacturer, particularly the builder of machinery, well understands that it does not pay to employ poor material any more than to turn out poor workmanship; yet it is too often apparent that men will jeopardize their reputations as workmen by using materials whose only advantage is a slightly reduced cost. In machinery this practice is reprehensible, for not unfrequently life as well as property is at stake, and not always is the end desired—diminished cost—reached, the poor material sometimes being really no cheaper than a better quality. The saving effected by the use of cast iron crank shafts and connecting rods on a small steam engine is very slight, while the danger of fracture and disaster is great. Strength, lightness, proportion, and durability are all sacrificed to the saving of a few cents or dollars. Even the reputation of the builder is risked and his character impaired for this paltry consideration.

A few days ago we saw a turbine wheel the upper boxes of which were held against the vertical shaft by wedges of cast iron. These wedges were perhaps ten inches long by two and a half wide and one inch thick at the heavy end. Certainly they cost a trifle less than they would if forged from wrought iron, but in moving the machine one of them had broken off and probably the other would follow on the next removal. The purchaser would be compelled to replace them by forged wedges or wooden ones, which really would be preferable to those of cast iron. The shafts of grindstones for shop and farm use may be well enough, if properly proportioned, made of cast iron, but who would not be willing to pay more for one forged from tenacious wrought iron? Many who purchase such articles do not know the difference between wrought and cast metal, and it is these who are imposed upon. Their confidence in the dealer or the maker once shaken, they shun them thereafter, and then the maker or seller suffers.

Undoubtedly there are many cases where cast iron is fully equal to wrought, where either may be used, but the practice so common of substituting the inferior material for that best adapted to the work to be done is carried to a ridiculous extent, sometimes the extra work on the inferior article making its cost fully equal to that of the better material. There can be no true economy in this, and neither is it good economy to pursue this plan even when a trifle of the first cost may be saved. Sooner or later the wares of such workmen become a drug in the market, while the conscientious manufacturer will in time build up a reputation which will prove of more value to him than his money capital.

The market is full of miserable counterfeits "made to sell." So-called plated ware, revealing the base material before the gloss of newness has disappeared; brass jewelry, corroding at the first touch of moisture; tin ware, thin as vanity and soon eaten through and through; wooden ware gaily painted with evanescent water colors to go at the first handling; indeed, so common has become the practice of employing poor materials that it is absolutely difficult to obtain a good article, as tin ware, for instance. Surely a reform is needed, and he who will in any of these departments of industry manufacture and put into the market a really good article at a fair price and profit, will find a return in the support of an appreciative and humbug-ridden public.

"OZONE."

This is one of the comparatively recent articles in the repertory of science, having been introduced thereto only about twenty-five years ago. As its name is more and more frequently occurring in chemical notes and disquisitions, to the mystification of most persons not professionally read in such matters, it has seemed good to us that the lay readers of the SCIENTIFIC AMERICAN should not be any more mystified in the matter than are the *savans*; and that is undertaking to give them only a very little knowledge indeed, with perhaps a slight addition of plausible conjecture.

That which may be said of this important but obscure substance, is included under three divisions—its history, its nature, and its uses. It was discovered by Schönbein, who named it from the Greek participle ozón, *smelling*, by which property it first announced itself to us. The peculiar odor, like sulphur or phosphorus, attendant upon a copious evolution of electricity, natural or artificial, had been observed to be attended also by certain chemical effects, such as the decomposition of iodide of potassium. In 1840, Schönbein announced that precisely the same evidences of a mysterious chemical agent appeared at the positive pole of the battery (if of platinum) when water was decomposed by electricity, and moreover that he had intercepted the agent and confined it in a bottle. Ten years later, he had discovered that it was evolved in the slow combustion of phosphorus and of ether, and might be detected in the atmosphere as the result of electric changes. Faraday took it up, and subjected its supposed properties to a strict test by first passing it through a solution of potash to arrest any possible acid which might have been the chemical re-agent, and finding the chemical effect still the same, established its distinct character beyond suspicion.

We will describe the usual test, by which any one may measure the indications of ozone in the atmosphere at a particular locality or season, and thus obtain important evidence, perchance, on the question of salubrity. A strip of soft unsized paper, or muslin, after being starched in the common way, is dipped in a solution of iodide of potassium. No substance common in the atmosphere, except ozone, attaches itself to potassium energetically enough to break its union with iodine. But wherever the test paper is exposed to the influence of ozone, the potassium is attracted and united to the latter, so that the iodine is set free, and its native violet color appears in the starch, which first turns brown, and on being moistened shows different shades, from pinkish white and iron gray to blue, according to the amount of ozone in action. A standard chromatic scale, covering ten degrees of color, has been made, with which the tints of the wetted test paper may be compared, and the relative proportions of ozone in the atmosphere thus measured.

The wonderful delicacy of this chemical action is realized by considering that the characteristic odor is perceptible when the air inhaled contains but $\frac{1}{200000}$ part of ozone, and yet the four lower shades of the test, at least, are obtained from the ordinary odorless atmosphere! This effect from such inappreciable quantities suggests also the marvellous power of the agent, which impresses us still more forcibly on finding that (if we may credit a statement we have seen) an intermixture of $\frac{1}{5000}$ part of ozone in atmospheric air renders it quickly fatal to animals breathing it. To the human respiratory organs it is highly irritating, and produces catarrh, in proportions far below the "smelling" point, and this, with its presence in all wholesome air, seems to intimate that it may be the true excitant of animal life.

To our second inquiry—what is it?—chemistry as yet answers vaguely. At first it was supposed to be a new element, afterward a superoxide of hydrogen, and it has been settled but lately that oxygen is another of those substances, as carbon and boron, which exist in a trinity; ozone being one extreme, antozone the opposite, and the common form of oxygen, the mean. In the peroxide of barium, for instance, it is found that the metal has been oxidized or rusted by ozone; while in the peroxide of manganese there appears evidence of antozone, or an oxygen which acts differently from both that combined with barium and that found in air or water. The most remarkable indication of the nature of this element, is the fact that pure dry oxygen is entirely converted into ozone by a silent current of electricity, and then, by a continued application of electric sparks, or by a moderate heat of 450 to 500 degrees, it is entirely re-converted to oxygen; as indeed it may be, in whatever manner it has been produced.

Finally, what are its uses? It is oxygen *par excellence*: that king among elements which subdues them to the par-

poses of nature and life, exalted by electric force to a hight of aggressive energy which consumes decay and corruption, and seems to attack the sensitive tissue in living organisms with a stimulating power that imparts through every organ the sense of refreshment and invigoration attendant upon the "clearing [ozonizing] of the atmosphere" by a thunder storm. Its gradual disappearance from the atmosphere marks the approach of malignant epidemics, such as Asiatic cholera, and its appearance is the signal for their abatement. Dr. Moffat's observations of the ozone in the atmosphere before and during the cholera epidemics of 1853 at Newcastle and 1854 at London, established these coincidences with the greatest precision. The south wind that springs up at length, after such a stagnant and sickly season, and brings what we call purifying thunder showers, is proved to be an ozonized wind, and directly the starched paper in the wind feels the action of the liberated iodine and begins to change color, the epidemic begins to abate.

The putrid matter that may be collected from the exhalations of animal or vegetable decay, a very little of it, will kill a dog. The only conceivable way to neutralize this poison in its aëriform state (at least, without suffocating all creatures that breathe) is to oxidize it by the wonderful energy of an imperceptible ingredient of ozone. Its action, when it comes on the life-giving wind, is instantaneous, universal, and complete. The air of regions proverbially healthy, as highlands and seacoasts, and wherever the circulation of the atmosphere has freest course, is found to be the most abundantly charged with ozone. Its presence gives the night air its stimulating power, so much courted by writers and lovers of pleasure. The exhilarating breath of winter is laden with it above all seasons of the year except that of May; and autumn, when all nature begins to decline, parts with the ozone until its minimum is reached in cheerless November. What shall we do to woo back this Life-Angel, in the time and place of mortal need? We know how to warm a cold place, light up a dark one, moisten a dry one, fertilize a barren one, and provide ourselves in a thousand ways against defect or excess of the elements, and must advancing science still leave us dependent helplessly on the movements of nature for vital air?

VOLUNTARY POLICE ASSOCIATION.

The Society for the Prevention of Cruelty to Animals has indirectly extended its beneficence to a class of creatures whom railroad men at least appear to regard as strictly within the scope of its terms—the animal Man. The bill offered by the society to the legislature of New York, forbidding two-horse omnibuses to carry more than twelve, and two-horse cars more than twenty-four passengers, is a measure of mercy to man and beast.

We hope this kind of good work may go on, and branch into various development. Even in strongly governed European countries, it is found that many outrageous abuses, not directly taking life or property, can be brought to the bar of justice only by voluntary police association. In this country we are full of such abuses. We are strangers to the sensations associated with clean and orderly streets, unobstructed sidewalks, regulated and responsible public service, from government down to common carriers, and a hundred other things which older governments recognize among the ends of their existence, and "subjects" expect as their unquestioned right.

The London Street Reform Society has just issued its prospectus, proposing to collect and publish facts, expose abuses, agitate reforms, enforce and improve existing regulations, and take a general oversight of street arrangements, vehicles, traffic and sanitary matters. Such a society would find a magnificent field of public beneficence in the city of New York. We have our Citizens' Association, it is true, which has done and is doing incalculable good: but there is only too much room for others of less general character, besides the humane society to which we at first alluded. It seems evident that henceforth voluntary associations for public improvement and reform are to be the medium for the public spirit of our more thoughtful and influential citizens. They owe a participation in local public affairs, both to themselves and the public, and happily this way of getting at it is as effective as it is personally unobjectionable. Through such mediums they constitute themselves a "third house" to the legislature, and at the same time a third arm to the executive.

We should like to see an able, influential, deliberative and resolute street-reform society. Such a body might examine the subject of street franchises from top to bottom—from the highrailwaymen who claim to own the roadways in fee simple, down to the packing-box gentry, auctioneers, hucksters, builders, ash-boxes, etc., that maintain their "nine parts of the law" by immemorial custom on the sidewalks. Who knows but that the popular and legislative mind might in time be educated up to the principle that highways and all their appurtenances are naturally public property and must ultimately be free to all, for their proper purposes and therefore for no other?

Influence of Sound upon Flame.

Prof. Tyndall's recent experiments upon "sounding and sensitive flames," to which we referred last week, open a very interesting line of inquiry. Every one may have observed that a slack current of incandescent gas goes up from its outlet in slow combustion and smoke, with a diminishing diameter and a sluggish, wavy vibration, to a considerable relative hight, not apparently obstructed by the resistance of the atmosphere. On the other hand, a jet of the same gas under pressure impinges upon the atmosphere with a velocity which causes it to be thrown back and shortened vertically and widened horizontally, while its combustion is intensified, its brilliancy hightened, its smoke consumed, and its vibrations grow more violent—that is, become coincidently accelerated and shortened—as the velocity of the jet is increased by pressure, until they produce a roar. As the velocity further increases, the roar rises in pitch, and the vibrations are so intensified as to render the flame comparatively fixed and steady. If the jet be confined in a tube or lamp chimney, its velocity relative to the air is increased by the draft of the air through the tube, and the effect is in some respects similar to that of pressure, but its vibration may be so modified as to produce a tense, defined or musical sound. This naturally seems to be the result of embodying the vibration (so to speak) in a fixed and firm medium, the tube, from which it is given in definite and uniform waves to the external atmosphere. But the experiments of Prof. Tyndall suggest that the reflection of the vibration from the tube to the flame is the essential means, operating to re-inforce as well as to steady the primary vibrations to the sounding pitch: while the length of the inclosure gives them length, as well as a longitudinal current and impetus (as in the discharge of a shot through a tube) to sustain their passage or rather prolongation through the air. The evidence is this—and here is the fact of which Prof. Tyndall's curious experiments are phenomena—that the vibrations of a flame are re-inforced by coincident vib ons from other sources, as musical instruments and other onorous objects, receiving an increase of energy which is manifested alike in the volume and sound of the flame. For instance, a jet in a tube, which is not up to the pitch of sonorous energy by itself, may be instantly re-inforced in its vibration either by the right note from any foreign substance or by changing its position in the tube, at once begins to sound the same or a harmonious note, and when thus started will continue to sound. At the same time, the extension of the flame is contracted by the re-inforced vibration, in a similar manner as by increased pressure, and sudden, *i. e.* short sounds, produce the short effect called a start or jump, in the flame. We quote the further effects exhibited in Prof. Tyndall's late lecture:—

Pass a steadily-burning candle rapidly through the air, you obtain an indented band of light, while an almost musical sound heard at the same time announces the rythmic character of the motion. If, on the other hand, you blow against a candle flame, the fluttering noise produced indicates a rythmic action. When a fluttering of the air is produced at the embouchure of an organ pipe, the resonance of the pipe re-inforces that particular pulse of the flutter whose period of vibration coincides with its own, and raises it to a musical sound. When a gas flame is introduced into an open tube of suitable length and width, the current of air passing over the flame produces such a flutter, which the resonance of the tube exalts to a musical sound. Introducing a gas flame into this tin tube three feet long, we obtain a rich musical note; introducing it into a tube six feet long, we obtain a note an octave deeper—the pitch of the note depending on the length of the tube. Introducing the flame into this third tube, which is fifteen feet long, the sound assumes extraordinary intensity. The vibrations which produce it are sufficiently powerful to shake the pillars, floor, seats, gallery, and the five or six hundred people who occupy the seats and gallery. The flame is sometimes extinguished by its own violence, and ends its peal by an explosion as loud as a pistol shot. The vibrations consist of a series of partial extinctions and revivals of the flame. The singing flame appears continuous; but if the flame be regarded in a mirror which is caused to rotate, the images due to the revivals of the flame are separated from each other, and form a chain of flames of great beauty.

A flame may be employed to detect sonorous vibrations in air. Thus, in front of this resonant case, which supports a large and powerful tuning-fork, I move this bright gas-flame to and fro. A continuous band of light is produced, slightly indented through the friction of the air. The fork is now sounded, and instantly this band breaks up into a series of distinct images of the flame. In this glass tube fourteen inches long, a flame is sounding: I bring the flat flame of a fish-tail burner over the tube, the broad side of the flame being at right angles to the axis of the tube. The fish-tail flame instantly emits a musical note of the same pitch as that of the singing-flame, but of different quality. Its sound is, in fact, that of a membrane, the part of which it here plays. Against a broad bat's-wing flame I allow a sheet of air, issuing from a thin slit, to impinge. A musical note is the consequence. The pitch of the note depends on the distance of the slit from the flame.

Before you now burns a bright flame from a fish-tail burner. I may shout, clap my hands, sound a whistle, or strike an anvil; the flame remains steady and without response. I urge against the broad face of the flame a stream of air from the blow-pipe. The flame is cut in two by the stream of air. It flutters slightly, and now when the whistle is sounded the flame instantly starts. A knock on the table causes the two half-flames to unite and form for an instant a flame of the ordinary shape. By a slight variation of the experiment, the two side-flames disappear when the whistle is sounded, and a central tongue of flame is thrust forth in their stead. Passing from a fish-tail to a bat's wing burner, I obtain this broad steady flame. It is quite insensible to the lowest sound which would be tolerable here. I turn on more gas: the flame enlarges, but it is still insensible to sound. I enlarge it still more, and now a slight flutter of its edge answers to the sound of the whistle. Turning on a little more gas, and sounding again, the jumping of the flame is still more distinct. Finally I turn on gas until the flame is on the point of roaring, as flames do when the pressure is too great. I now sound my whistle; the flame roars and thrusts suddenly upwards eight long quivering tongues. I strike this distant anvil with a hammer, the flame instantly responds by thrusting forth its tongues. Another flame is 18in. long, and smokes copiously. I sound the whistle; the flame falls to a height of 9in., the smoke disappears, and the brilliancy of the flame is augmented. Here are two other flames. The one of them is long, straight, and smoky; the other is short, forked and brilliant. I sound the whistle; the long flame becomes short, forked and brilliant; the forked flame becomes long and smoky. As regards, therefore, their response to the sonorous waves, the one of these flames is the exact complement of the other. Here are various flat flames, 10in. high, and about 3in. across at their widest part. They are purposely made forked flames. When the whistle sounds, the plane of each flame turns ninety degrees around, and continues in its new position as long as the whistle continues to sound. Here, again, is a flame of admirable steadiness and brilliancy, issuing from a single circular orifice in a common iron nipple. I whistle, clap my hands, strike the anvil, and produce other sounds, the flame is perfectly steady. Observe the gradual change from this apathy to sensitiveness. The flame is now 4in. high. I make its hight 6in.; it is still indifferent. I make it 10in., a barely perceptible quiver responds to the whistle. I make it 14in. high, and now it dances briskly the moment the anvil is tapped or the whistle sounded. I augment the pressure, the flame is now 16in. long, and you observe a quivering which announces that the flame is near roaring. I increase the pressure; it now roars, and shortens at the same time to a height of 8in. I diminish the pressure a little; the flame is again 16in. long, but it is on the point of roaring. It stands as it were on the brink of a precipice. The whistle pushes it over. Observe it shortens when the whistle sounds, exactly as it did when the pressure was in excess. The sonorous pulses, in fact, furnish the supplement of energy necessary to produce the roar and shorten the flame. This is the simple philosophy of all these sensitive flames.

Here, again, is an inverted bell, which I cause to sound by means of a fiddle-bow, producing a powerful tone. The flame is unmoved. I bring a half-penny into contact with the surface of the bell; the consequent rattle contains the high notes to which the flame is sensitive. It instantly shortens, flutters, and roars, when the coin touches the bell. Here is another flame 20in. long. I take this fiddle in my hand, and pass a bow over the three strings which emit the deepest notes. There is no response on the part of the flame. I sound the highest string; the jet instantly squats down to a tumultuous bushy flame, 8in. long. Some of these flames are of marvelous sensibility; one such is at present burning before you. It is nearly 20in. long; but the slightest tap on a distant anvil knocks it down to 8in. I shake this bunch of keys or these few copper coins in my hand; the flame responds to every tinkle. I may stand at a distance of 20 yards from this flame; the dropping of a sixpence from a height of a couple of inches into a hand already containing coin, knocks the flame down. I cannot walk across the floor without affecting the flame. The creaking of my boots sets it in violent commotion. The crumpling of a bit of paper, or the rustle of a silk dress, does the same. It is startled by the plashing of a raindrop. I speak to the flame, repeating a few lines of poetry; the flame jumps at intervals, apparently picking certain sounds from my utterance to which it can respond, while it is unaffected by others. In our experiments down stairs, we have called this the vowel flame, because the different vowel sounds affect it differently. I utter the words boot, boat, and beat in succession. To the first there is no response; to the second, the flame starts; but by the third and fourth it is thrown into violent commotion; the sound Ah! is still more powerful, the vowel sounds characterised by the sharpest overtones being the most powerful excitants of the flame. If the most distant person in the room were to favor me with a "hiss," the flame would be instantly shivered into tumult. This hissing sound contains the precise elements that most forcibly affect the flame. The gas issues from its burner with a hiss, and an external sound of this character added to that of a gas-jet already on the point of roaring is equivalent to an augmentation of pressure on the issuing stream of gas.

An Alloy which exhibits a golden yellow color, is readily forged like iron, and easily worked by the file, consists of 4·06 parts iron, 55·33 parts copper, and 41·8 parts zinc



ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING MARCH 5, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the Scientific American, New York.

62,517.—Apparatus for Washing Fibrous Substances.—William Adamson, Philadelphia, Pa.

First, I claim the use for washing fibrous material of two troughs and one supply of water, which first passes into and through the trough where the last washing is conducted, and thence into the trough where the first washing takes place, all substantially as set forth for the purpose specified.

Second, The adjustable pipe, J, arranged for the withdrawal of the dirty water from the trough beneath the perforated shield, F, substantially as described.

Third, The trough, B, with its rollers, P.

Fourth, The combination of the said rollers, P, with the endless band, T, of slats

Fifth, The endless band, T, in combination with the rollers, y y.

62,518.—Sand Emery and other like Paper.—William Adamson, Philadelphia, Pa.

I claim sand or emery paper saturated with a solution of gum elastic or gutta percha and naphtha, or other equivalent solvent, and for the purpose described.

62,519.—Peat Machine.—Edward Atkinson, Brookline, Mass.

First, I claim the combination of plowshares, a, cutting blades c, and conical screw, constructed and arranged to operate substantially as and for the purpose set forth

Second, The yielding or expanding outlet or delivery tube, arranged to operate substantially as and for the purpose set forth.

62,520.—Button-hole Sewing Machine.—W. B. Bartram, Norwalk, Conn.

First, I claim reciprocating the plate, E, on a straight line, at right angles to the line of movement of the forward feed by means of the switch cam, A, switch, B, and jog bar, D, constructed, arranged, and operating as and for the purpose set forth.

Second, In combination with the sewing mechanism of a "Wilcox and Gibbs" sewing machine, the switch cam, A, switch, B, arm, C, jog bar, D, or their equivalents, and the plate, E, for the purpose set forth.

Third, The combination of the switch cam, A, switch, B, switch bar, C, and jog bar, D, substantially as and for the purpose set forth.

Fourth, The combination of the switch, B, jog bar, D, shoulder, I, and set stop screw, H, or its equivalent, for the purpose set forth.

Fifth, The combination of the switch, B, and jog bar, D, with the set screw, H, stud, L, or their equivalents, for the purpose set forth.

Sixth, The feeding dog, O, pivoted to the feed bar, as described, in combination with the reciprocating plate, E, substantially as and for the purpose set forth.

Seventh, The guide plate, U, in combination with the straining slide, W, and the serrated plates, V V', substantially as and for the purpose set forth.

62,521.—Composition for Building Material.—Sylvester Bissell, Hartford, Conn.

I claim a composition for building materially as and in the proportions described.

62,522.—Feed Rack.—John W. Blanchard, Rutland, Wis.

I claim the arrangement of the board, n, for conveying the feed, and the roof boards, o and p, opening in the manner described, in connection with the rocks, e and f, and trough, g, for the purposes described.

62,523.—Barber's Chair.—N. W. Bonney (assignor to himself and O. Davis), Lewiston, Me.

I claim the frame, b c, having the arm, h, projections, e, and pivots upon which the same is made to swing, as described, in combination with the spring, g, constructed as set forth, all arranged and applied in the manner and for the purpose specified.

62,524.—Horse Rake.—William L. Bostwick, Ithaca, N. Y.

First, I claim the combination of the three-forked lever, I, connecting rod, H, and hand lever, G, substantially as and for the purposes set forth.

Second, I claim the pressure bar, F, provided with the hanging staples, P, three-forked lever, I, connecting rod, H, and hand lever, G, all arranged and operating materially as and for the purpose set forth.

62,525.—Hand-pegging Machine.—J. Hamilton Brown, Watertown, Mass.

I claim, First, Operating all the moving parts of the machine, as well as the machine itself, when periodically fed along or over the shoe, from a single cam shaft, by which said movements are timed and regulated, substantially in the manner and for the purpose set forth.

Second, So combining and arranging an awl and peg driver as that both shall operate in a vertical line without lateral motion, and through separate holes in a nose piece at the base of the machine, and at separate times, by means of cams and springs, so arranged that the greatest resistance or force of the separate springs shall not be exerted at the same time, substantially as and for the purpose herein set forth.

Third, Feeding the machine over the shoe, and cutting off the peg from the strip or bolt of the peg wood by one and the same vibrating instrument, so that these two operations may be perfectly timed and regulated as and for the purpose set forth.

Fourth, The feeding mechanism for moving the machine over, on, or around the shoe or boot, composed of foot, through which a nose piece furnished with separate holes for the awl and peg driver, passes, in combination with a pivoted lever and point working through the awl hole to draw the machine along, substantially as described.

Fifth, Moving back or setting the feeding device preparatory to its feeding the machine along and whilst the awl is in the sole, and allowing the feed to take place after the awl is withdrawn from the sole and is still rising, so that the force exerted in withdrawing or raising the awl shall aid in bringing the feeding foot close to the sole, and thus by impact make the feed more certain and accurate, substantially as described.

Sixth, The arrangement by which the feeding of the machine along the sole takes place after the awl hole is made, and before the peg driver descends substantially as and for the purpose described.

Seventh, The arrangement by which the driving of the peg takes place whilst the awl is ascending, and the machine close down upon the sole, so that the peg shall be driven entirely down, and not project above the surface of the sole, substantially as and for the purpose set forth.

Eighth, Combining with a portable hand-pegging machine that moves around the boot or shoe that is being pegged by it, a cup or box for carrying around with the machine a bolt or coil of peg wood that is fed into the machine by drawing upon the end of the strip or ribbon, and without the use of any pushing device, substantially as described.

62,526.—Toilet Glass.—Robert H. Brown, Detroit, Mich Antedated Feb. 20, 1867.

I claim the combination and arrangement of glass, 3, the folding frame, 2, and the folding glass, 1, operating as and for the purpose specified.

62,527.—Metallic Stuffing Box Packing.—Joseph F. Chuse, Litchfield, Ill.

First, I claim the packing, b, and its enclosing casing, b2, when constructed substantially as and for the purpose set forth.

Second, The combination and arrangement of the packing rings, b and b2, and the spring, c', substantially as set forth.

Third, The packing rings, b b2, in combination with enclosed perforated casing, B, substantially as set forth.

Fourth, The packing rings, b b', when constructed and arranged substantially as set forth.

62,528.—Twine Cutter.—James Madison Clark, Chester, Conn.

I claim the knife, K, in combination with the tongue, I, and spring, S, for the purpose herein set forth.

62,529.—Washing Machine.—H. C. Covert, Fayette, N. Y. Antedated Feb. 23, 1867.

I claim, in combination with the rubbers, B C, having opposite reciprocating motions, and having plane rubbing surfaces, the arrangement of the jointed arms, a b, and levers, K, made to be inserted or removed from the box at pleasure, by means of the bearings, n, and buttons, o, the whole arranged and operating as herein set forth

62,530.—PAPER CUTTER.—Cyrus Cropper, Cincinnati, Ohio.

First, I claim the knife operated laterally to and fro at the same time it is descending, by means of a cam or eccentric working in a slot in one end of the knife bar, substantially as and for the purpose herein set forth.

Second, The rack and pinion for the purpose of drawing down and raising the knife, substantially as herein set forth.

Third, The adjustable joint, a, in the rod, O, for the purpose of regulating the position of the knife, C, substantially as herein set forth.

62,531.—CLOCK ALARM.—John Decker, Sparta, N. J., assignor to himself and Charles W. Wardwell, Brooklyn, N. Y. Antedated March 1, 1867.

I claim the spring with cylinder attached, in connection with the cord and weight, all arranged so as to be capable of being applied to a clock to operate substantially in the manner and for the purpose specified.

62,532.—DOOR FASTENING.—John Decker, Sparta, N. J., assignor to himself and Charles W. Wardwell, Brooklyn, N. Y. Antedated Feb. 20, 1867.

I claim the door fastener herein described, the same consisting of the rod, A, spurs, a a', semi-circular continuation, B, continuations, C and D, constructed and operating substantially as described for the purpose specified.

62,533.—BUCKLE.—Thomas B. De Forest, Birmingham, N. Y.

I claim the combination of the clasp, B, constructed with the slot, d, and bar, f, with the frame, A, when the clasp, B, is above and the bar, f, below, or vice versa, so that the strap or band drawing against the bar, f, draws the clasp, B, upon and so as to hold the strap, substantially in the manner herein set forth.

62,534.—FRAME FOR SUPPORTING STOVES ON VESSELS.—A. M. Duburn and J. Keith, Chicago, Ill.

We claim the combination of the standards, B, suspenders, C, platform, E, and arms, H, substantially as and for the purpose set forth.

62,535.—SNOW SCRAPER FOR LOCOMOTIVES, ETC.—C. C. Elliott, Esconawba, Mich.

I claim the springs, C, arm, D, and notched bar, E, and spring, F, in combination with the scraper-carrying shaft, B, when applied and operating substantially as described for the purpose specified.

62,536.—ATTACHING STOPPERS TO BOTTLES.—John J. Echleman (assignor to himself and James Riley), Philadelphia, Pa. Antedated Feb. 16, 1867.

I claim an expanding or elastic ring, D, and a chain, a, in combination with the stopper, B, substantially as and for the purpose described.

62,537.—MACHINE FOR CLEANING AND PURIFYING BONE BLACK.—R. Ticken and F. L. Williams, Philadelphia, Pa.

First, We claim the box, B, with its diaphragm screen, K, openings, g and d, in combination with the blower, E, and trunk, I, when constructed and arranged substantially as described.

Second, We claim the dust-collected boxes, M and N, constructed and arranged substantially as described.

Third, We claim the combination of the blower, E, diaphragm box, B, trunk, I, and collecting boxes, M and N, constructed and arranged substantially as described.

62,538.—FILTER.—Henry Flad, St. Louis, Mo.

I claim my improved filtering apparatus, constructed of a removable feed tube, c, and inclined or convidal supporting plate, b, a removable feed reservoir, B, and outer inclosing vessel, A, combined and operating substantially in the manner herein set forth.

I claim also the combination of a check valve, c1, chain and supporting bar, c2, with the upright feed tube, c, of a self-feeding filtering apparatus constructed and arranged substantially as herein described.

I claim, also, syphon, d, and float, z, in combination with feed tube, c, of an improved filtering apparatus, constructed and operating substantially in the manner herein set forth.

62,539.—ICE CRUSHER.—F. F. Fowler, Upper Sandusky, Ohio.

I claim an ice crusher composed of a box, with holes or openings in its bottom, formed by transverse ribs, a follower, guided to work therein, and a lever to operate said follower, the whole being combined to operate substantially in the manner and for the purpose herein described and represented.

62,540.—CRESSET OR BARREL HEATER.—William B. Geddis, Rochester, N. Y.

First, I claim the cresset stove, A, having an air chamber, B, flues, c c, and supply pipe or pipes, b b, for giving the sides of the stove a uniform heating power, in connection with a single smoke pipe, I F'3 F2 F', f, or e, E F, f, or both, substantially as and for the purpose herein set forth.

Second, In connection with the stove, A, the barrel cover, H, and adjustable pipe, F3, constructed in one piece, and making suitable connection with the section, L and pipe, F2, substantially as and for the purpose herein specified.

Third, The stove, A B, b c c, pipes, E F F' F2 E3 f, cover, H, and counter balances, K K, all constructed and arranged substantially in the manner and for the purpose set forth.

Fourth, The construction and arrangement of the pipe, F F', F2, and F3, in such a manner as to perform the double office of a smoke pipe and crane as herein set forth.

62,541.—CHILD'S SLEIGH.—Adolph H. Gloss, Philadelphia, Pa.

I claim a board or platform, A, having two parallel runners, in combination with the arms, D D', and their blades, e e, when the latter are inclined as described for the purpose specified.

62,542.—NUTMEG GRATER.—John A. Hooper, South Berwick, Maine.

I claim the combination of the reciprocating cylindrical grater, B C, provided with flanges, a a, the holder, A A', the follower, F, and spring, m, when constructed and operating substantially as and for the purpose specified.

62,543.—SPRING FOR CARIAGE.—John M. and Eugene Ingold, Alleghany, Pa.

First, We claim making elliptic or ellipsoidal springs of one or more leaf or leaves, each leaf extending all around the springs, until its extremities nearly or quite touch each other, so as to form an unbroken curve around the extremities of the major axis of the ellipse, and thus dispense with the welding of the leaf or leaves, substantially as hereinbefore described.

Second, The arrangement of the eaves of an elliptical or ellipsoidal spring, consisting of two or more leaves, and constructed as hereinbefore described, without welding, so that the joint at the extremities of each leaf of the spring shall be lapped or carved by the next contiguous leaf of the spring, the joints of the leaves being alternately placed at a near one or other of the extremities of the inner axis of the ellipse, substantially as and for the purposes hereinbefore described.

62,544.—SWITCH.—Judson F. Jones, Washington, D. C.

I claim the combination of the switch lever, F, cog wheel, E, cogged bar, D, with incline, d, gravitating locking bar, K, removable key, J, and trigger, L, operating as described and represented.

62,545.—DOOR LOCK—Frank F. Landas, Lancaster, Pa.

First, I claim the two-legged twin bolts, one upon the other, held by a pivot, F, each having a raised flange, C and D, and projecting feet, x and y, and c and d, in combination with the double acting spring, e, all arranged in the manner and for the purpose specified.

Second, I also claim the guard chamber, J J, surrounding the keyhole, with its perforations, for the headed pins, z z, in combination with the flanges, c and D, on the lower leg, of the twin bolts, arranged and operating in the manner and for the purpose specified.

Third, I also claim the twin bolt fastener or lever, U, in combination with the prolonged flange, D, on the lower twin bolt, when applied in the manner and for the purpose set forth.

Fourth, I also claim the construction of the key, N, with its projecting pins, n n, in combination with the headed pins, z z, and guard chamber, J J, all arranged and operating in the manner specified.

62,546.—METHOD OF TEMPERING CIRCULAR SAWS.—John Lippincott, Pittsburg, Pa.

First, I claim a platform for sustaining circular saws above the floor of the tempering furnace, constructed to support by contact the central portion of the saw, only thus leaving the marginal portion of the saw free from contact with the platform, or with the floor of the furnace, substantially as described.

Second, The iron carriage, constructed substantially as hereinbefore described, for introducing the saw plate into the furnace, supporting and adjusting the same during the process of drawing the temper, and for withdrawing it from the furnace when the tempering process is completed.

62,547.—TWEER.—Daniel S. Loy, Gracehan, Md.

First, I claim the valve, E, in combination with the weighted lever, F, and wing, H, substantially as and for the purpose described.

Second, I claim the vibrating wing, H, arranged and supported in the manner described, in combination with the valve, E, and blast pipe, B, as and for the purpose explained.

Third, In a tweer constructed as herein described, I claim the cap plate or shield, K, formed and applied in the manner and for the purpose specified.

62,548.—CLAMP FOR MAKING BROOMS.—H. B. Lyon and G. M. Hopkins, Albion, N. Y.

We claim the screw, S, the follower, D, and the recess, J, in combination with the jointed frame, O, having the slot, F, the screw, K, and the clamp, G, as and for the purpose specified.

62,549.—HOISTING MACHINE.—Henry Malley, Chicago, Ill.

I claim the general arrangement and combination of the reverse pulley, 15, standards, 1, shaft, 9, with the wheels, P Q, tie, n, and shaft, r, when used to operate the ratchet, S, and rack, t, and slide, X, as and for the purpose set forth.

Second, The sectional guides, I, in combination with the cross-tie, H, and elbows, m, substantially as described and set forth.

62,550.—PAPER WEARING APPAREL.—Thomas W. Mann, Holyoke, Mass.

I claim articles of paper wearing apparel, when folded or plaited, and backed or strengthened throughout its entire surface, substantially as herein described and set forth.

62,551.—METHOD OF ATTACHING HUBS TO AXLE BOXES.—Thomas C. Maris, Athens, Ohio.

First, I claim the cap, A, with its ribs, "b b," substantially as above described and set forth in my specification.

Second, I claim the cap, E, in combination with the box, C, and screw thread, as substantially described.

Third, I claim securing the hub to the box, C, by means of caps, A and E, when one of said caps is rigidly attached to the box and the other adjustable substantially as described.

Fourth, I claim constructing the cap, "A," with one or more of its ribs hollow, for the purpose of introducing oil to the spindle, substantially as described.

62,552.—UNITING SCYTHE AND SNATH.—David W. Marston, Lebanon, N. H.

I claim a straight scythe shank when the said shank is connected to the heel of a snath by means of the transversely recessed and slotted plate, A, the shanked ferule, B B, the pivot bolt, C, and the holding bolt, D, substantially in the manner herein represented and described.

I also claim the combination of the transversely recessed and slotted plate, A, and the shanked ferule, B B', with each other, and with the heel of a snath, by means of the pivot bolt, C, and the holding bolt, D, substantially in the manner herein represented and described.

62,553.—SPIKE MACHINE.—William W. Martin, Alleghany City, Pa.

First, I claim the slide clamps, I and I', when used in combination with the dies, 2, on the roll, B, as herein described, and for the purpose set forth.

Second, The friction roller, e, when used in combination with the side clamps, I and I', as herein described, and for the purpose set forth.

Third, The flanges, J and X, on the roll, C, when used in combination with the roll, B, and slide clamps, I and I', as herein described, and for the purpose set forth.

62,554.—HOOK AND EYE.—James B. Martindale, New Castle, Ind.

I claim the hook, A, when constructed and arranged to operate in combination with the eye, B, substantially as set forth.

62,555.—PENCIL POINT PROTECTOR.—George Merritt, New York City.

First, I claim the metal piece, A A1 A2, and the spring, B, adapted to operate together upon the end of an ordinary wood pencil, substantially as and for the purpose herein specified.

Second, I claim the combination of a rubber eraser, D, with the metallic portion, a a1 a2, so as to give the proper erasive property to the exterior, and also to contribute by its contractile force to the clasping of the metallic portion upon the wood of the contained pencil, substantially as herein specified.

Third, I claim the scalloped and flaring mouth, a b, on the wings, A1 A2, of the metallic pencil point protector, substantially as herein specified.

62,556.—STEAM ENGINE.—John H. Mills, Boston, Mass.

First, I claim the combination with a series of sectional boilers, of the team cylinders, under the arrangement herein described, so that either cylinder alone, or both together, may be used with the full power of steam generated by the said boilers, or so that the smaller cylinder shall exhaust into the larger, substantially as set forth.

Second, The pipe for connecting the two cylinders, arranged so as to pass through the combustion chamber or fire pot of the boilers, substantially as shown and specified.

Third, The arrangement of the boiler, B, consisting of the bent pipe, H, and connecting pipes, c, operating together as shown and described.

Fourth, The arrangement of the inner trunnions of the steam cylinders, in such manner that the steam may pass directly from one cylinder to the other through the said trunnions, as and for the purposes set forth.

62,557.—DAMPER FOR FLAT IRON HEATER.—George R. Moore, Lyons, Iowa.

I claim the application of the damper, D, or its mechanical equivalent to the fire chambers of heaters having an annular chamber for a flue from the fire chamber to the smoke pipe, and substantially in the manner and for the purposes herein set forth.

62,558.—APPARATUS FOR DEFECATING SORGHUM JUICE AND OTHER LIQUIDS.—Daniel B. Neal, Mount Gilead, Ohio, assignor to himself and Kingsland, Allen, & Clark. Antedated Feb. 17, 1867.

Firstly, I claim a series of trays or shallow troughs, B, arranged with one end of each tray or trough deeper than the other, and otherwise constructed so that the fluid fed into the deeper of the topmost trough, will find an exit at the shallow end, and so on through the whole series.

Secondly, I claim the construction and combination of the trays, B, and the windlasses, C c, and C' c', substantially as described.

Thirdly, I claim the reservoir, D, when constructed as herein described, and combined with the trays, B.

62,559.—STOVE PIPE DAMPER.—William V. Perry, Burnett, Wis.

I claim the damper herein described, consisting of plate, A, intermediate between the flange plates, B B, provided with the revolving valve, E, the whole arranged and operating in connection with handle, F, and rod, C, substantially as set forth.

62,560.—COTTON BALE TIE.—Joseph W. Petty, New Orleans, La.

I claim the combination of the two ends of an iron band, when used for banding cotton, when provided with the openings, a b, substantially as described, for the purpose set forth.

62,661.—DIRECTION LABEL.—George E. Pevey, Lowell, Mass.

I claim inserting a fibrous material substantially as described, and for the purposes fully set forth.

62,562.—OILER.—F. P. Pfleghar and William M. Shollhorn, New Haven, Conn.

We claim the method substantially as described, of constructing oilers.

62,563.—INSECT TRAP-LANTERN.—Richard W. Pitman, West Point, Iowa.

I claim an insect trap, composed of a frame work of slats encircling a light, and constructed substantially in the manner and for the purpose herein set forth.

I claim, also, the combination of a water receptacle with the slotted frame work encircling a light substantially in the manner and for the purpose herein set forth.

62,564.—FIRE ESCAPE LADDER.—M. P. Prewitt, Elkton, Ky.

First, I claim a fire escape ladder composed of H, shaped section, jointed or connected together by links, substantially as and for the purposes shown and set forth.

Second, The combination with the top section of the ladder of the combined cross brace, and round or handle projecting from the face of said section, as shown and described.

62,565.—BOLT AND RIVET MACHINE.—John C. Reed (assignor to himself and Samuel E. Hutchinson), Cincinnati, Ohio.

First, I claim the block, B, in combination with the sliding head, Q, cam, C, and screw shanked wedge, S, arranged substantially as described.

Second, The described arrangement of stationary and movable clamp jaws, G and H, cross head, I, toggle, K K k, screw shanked wedge, M, and tightening nut, N, for the purpose set forth.

Third, In the described combination the screw threaped heading gage, 2 the screw shanked wedges, X and 11, and set set screws, v and 12, for adjustment of the length of stroke of the heading punch, substantially as set forth.

Fourth, The arrangement of sliding head, W, knuckle, W, sliding step, 4, and vibrating shoe, 7, substantially as described.

62,566.—MACHINE FOR GRINDING METAL PLATES.—Asa R. Reynolds, Auburn, N. Y.

I claim, First, moving a bed that carries an article to be faced to a grinding stone, upon concave ways, for the purpose of preventing the rounding off of the edge first brought into contact with the stone, as set forth.

Second, I also claim adjusting a bed, at both of its ends, to the wear of a grinding stone by means of the journals and bearings, a b, at one end, and set screw, c, at the other end, substantially as described.

62,567.—MOP WRINGER.—L. F. Rollins (assignor to himself and James Nealey, Jr.,) Bangor, Me.

I claim the wringer, as constructed, with cranked rod, d, the adjustable clamp, e, and connection, b, all constructed and arranged to operate substantially as and for the purposes specified.

62,568.—STEAM GAGE.—Peter Schofield, Philadelphia, Penn.

I claim the detachable disk, D', its elastic diaphragm, F, and cross piece, E, in combination with the outer casing, A, the whole being constructed and arranged as described.

62,569.—CARRIAGE GUARD.—F. B. Shaw, Boston, Mass., assignor to Silas S. Shaw, Bath, Me.

I claim a carriage guard made of India rubber, or its equivalent substance, as and for the purpose specified.

62,570.—SEWING HORSE.—Isaac A. Smith, of Connellsville, Penn.

I claim the adjustable lever, D, provided with the screw, m, and used in connection with the extension, B' and C', of clamping jaws, said lever and jaws being constructed, arranged, and operating substantially as herein described and for the purpose set forth.

62,571.—WASHING MACHINE.—Jost Stengel, Croton, Mich.

First, I claim the pendent wash boards, B', provided with alternate rubbers, D, and spaces, and hinged or pivoted to the shafts, E, in combination with the adjustable rubbers, G, and case, A, arranged and operating conjointly as and for the purpose set forth.

Second, The shafts, B E, and arms, F, in combination with the side pieces, C, rubbers, D G, and case, A, arranged and operating as and for the purpose set forth.

62,572.—MACHINE FOR SHARPENING SAWS.—Charles Taylor, St. Johns, New Brunswick, assignor to himself, James Harris, Bartlett Lingley, and Henry C. Lovell.

I claim a vibrating carriage with a movable fulcrum, in combination with a clamping plate, hinged horizontally to hold the saw and permit it to be turned on edge, with facility, for examination and pointing of the teeth without removing it from the clamping plate.

I also claim the arrangement of the forked lever, x, traversing carriage, z and lever, b, for moving the saw and adjusting it to the grinding stone, substantially as described.

I claim making the fork of the lever, x, adjustable to adapt it to the size of the operator or attendant.

62,573.—WASHING MACHINE.—Jas. Thompson, Vevay, Ind.

I claim the combination of the yielding rollers, B C, fly arms, D, treadle, F, and controlable pressure boards, H, all constructed and arranged to operate as and for the purposes set forth.

62,574.—HOE.—Theodore R. Timby, Saratoga Springs, N. Y.

First, I claim, as an article of manufacture, a hoe with an angular cutting edge, as herein described and represented.

Second, The hook-shaped abutment, C, in combination with handle, B, and hoe, A, as set forth.

62,575.—SASH LOCK.—John B. Tinker (assignor to himself and J. L. Beazan), Buffalo, N. Y.

First, I claim a sash lock having two stops, A A', with cogs or teeth, b, on one end, which mesh with corresponding cogs or teeth, c', made in the case, C, and standing upon an incline, constructed, arranged, and operating in the manner and for the purpose substantially as herein described.

Second, The combination and arrangement of the spring, D, with the stop, A A', in the manner and for the purpose substantially as set forth.

Third, The combination of the projecting pin, h, made on the stops, A A', with a groove, h', made in the case, for the purpose substantially as described.

62,576.—HAND-HOLE PLATE FOR STEAM GENERATORS.—H. A. Towne, Chicago, Ill.

I claim the arrangement and combination of the T-bolt, E, hollow nut, G, and hand-hole cap, C, substantially as described and set forth.

62,577.—HOT-AIR FURNACE.—Charles W. Trotter, Rochester, N. Y.

I claim the peculiar construction of the radiator, e, with center partition, x, the sliding plate, p, and also the damper, w.

62,578.—REVOLVING CHIMNEY TOP.—Frederick Villard, Mt. Eaton, Ohio.

First, I claim the arrangement and combination of the plate, A, constructed substantially as described, with the rods, B, and anchors, C, when used on the masonry of a flue or chimney for the purpose of giving stability to the same, as set forth.

Second, The combination of the spindle, G, and collar, H, with the step, F, and socket, E, constructed, arranged, and operating substantially as and for the purpose set forth.

62,579.—RIB KNITTING LOOM.—Benjamin Wainwright, East Boston, Mass.

I claim the combination, substantially as described, for effecting the endwise movement of the needle frame, B, such combination consisting mainly of the ratchet, D, its series of cams, g g g, or cammed wheel, F, the lever, K, and its pawl, m, the lever, E, the connection rod, G, the spring, N, the weight P, and the arm, I, and its T-piece, M, the whole being applied to the frame, B, its carrier, C, and the loom frame, A, substantially in manner and so as to operate as and for the purpose specified.

62,580.—MACHINE FOR SHRINKING TIRES.—Christopher H. Wakefield, Montpelier, Vt.

I claim the combination as well as the arrangement of the movable carriers, B B, connected as described, and their operative mechanism or rods, o o, with the self-adjusting jaws, d e, cammed lever, C, and the slider, D, the whole being made to operate together substantially in manner and for the purpose as hereinbefore specified.

62,581.—APPARATUS FOR FERMENTING MALT AND OTHER LIQUORS.—Geo. Wallace, Cincinnati, Ohio.

First, I claim the water chamber, D, by which the temperature of the liquor in vats or tanks, A and B, can be regulated during fermentation.

Second, The application of the two-way cock, H, by which the fermentation of each vat or tank may be regulated, or if a surplus amount of gases is generated, allows it to escape through pipes, G.

Third, The open tubs or vat, C, containing water, which allows the non condensing gases to escape, yet prevents the atmosphere from getting in the vats or tanks, A and B.

62,582.—FILTER AND COOLER.—James C. Whitehill, St Louis, Mo.

First, I claim the arrangement of the removable reservoir, A, having a non-conducting bottom, a, the clear water and ice chamber, K, the adjustable tube, B, the joints or coupling, C, and tube, D, the whole constructed and operating substantially as shown and described.

Second, The arrangement of the chamber, K, surrounded by non-conducting material, the removable filter bed, H I, the chamber, E, the tube, D, the coupling, C, the adjustable tube, B, and removable reservoir, A a, the whole constructed and operating substantially as shown and described.

62,583.—OBTAINING OIL FROM PARAFFINE, ETC.—S. Lloyd Wiegand, Philadelphia, Pa.

I claim the process of treating bituminous substances by means of the gases as hereinbefore described or in any equivalent manner and subsequently extracting the oil and paraffine by pressure or displacement in the manner hereinbefore set forth, and described, irrespective of the particular form of the apparatus in which the operation may be conducted.

62,584.—SWAGE.—James Williams and Isaac Short, Amelia, Ohio.

First, We claim a swage consisting of the bed plate, A, fixed anvil, B, movable jaws, C D, and grooves, E e F f, all arranged and operating in the manner herein set forth.

Second, In combination with the anvil, B, and movable jaws, C D, we also claim the bars, C H, cam, I, and springs, K K K' K' or their mechanical equivalents as and for the purpose set forth.

62,585.—CIDER MILL.—Levi Wilson, Springfield, Ohio.

First, I claim the combination with a mill for grinding fruit and a press placed below the same, the intermediate sliding board, K, arranged to operate independently of the motion of the press and substantially as set forth.

Second, The mill for grinding fruit and a press for the same, when the two are built with separate frames, and the mill placed over the press in such manner that the mill frame and mechanism may be moved on the press frame, connecting or disconnecting the mechanism of the mill and that of the press, substantially in the manner set forth.

Third, The arrangement of the adjustable shaft, A, bevel pinion, O, wheel, N' sleeves, N, screw, M, and press heads, L, substantially as set forth.

Fourth, The heads, L, and beds, L', of the press when respectively constructed with corresponding inclined faces and with open slats in each through which the juice may freely flow with the action of the press, substantially as set forth.

Fifth, The combination of the screw, M, intermediate sliding frame' springs, P, and press head, L, arranged to operate substantially in the manner and for the purpose set forth.

62,586.—ATTACHING CARRIAGE THILLS.—Thomas H. Wood, Monroeville, Ohio.

I claim the key, C, springs, D, in combination with the arms, F, wrists, E, and link, A, constructed and arranged substantially as and for the purpose set forth.

62,587.—BOOTS AND SHOES.—Joseph C. Adams, New London, N. H.

I claim the parts, A B, supporting post, D, and shank, H, made or cast in one piece, in combination with the independent bottom plate, C, as and for the purpose specified.

62,588.—REVOLVING WAIST BLOCK.—Wm. T. Adams, Baltimore, Md.

I claim the waist block sheave, E, journaled within the rotating disk, B, and projecting from its opposite faces for the purpose and substantially in the manner described.

62,589.—ADJUSTABLE RUNNER TO BE ATTACHED TO CHAIRS, ETC.—Alexander Adamson, Washington, D. C.

I claim the construction of the adjustable metallic runners in combination with the sockets and brace rod, to be attached to a chair or small carriage for the purpose herein set forth.

62,590.—PISTON PACKING.—John Askwith, Chicago, Ill.

I claim the ratchet piece, E, the spring, f, and the set screws, h, in combination with the ring, C, as and for the purpose set forth.

62,591.—MACHINE FOR TEMPERING SAWS.—Elias C. Atkins, Indianapolis, Ind.

I claim the sections, H H H H H H, in combination with the sliding bar, G, and bed, I, constructed and operated substantially as set forth.

62,592.—WASHING MACHINE.—Ira Avery, Tunkhannock, Pa.

First, I claim the hollow chambered beater, B, with its adjustable rubbers, m, so applied that portions of the fabric may be contained within the beater while the remaining portions thereof are being subjected to the rubbing and beating action, thereof, substantially as set forth.

Second, The rod I, arranged in a semicircular groove formed in the under side of the bottom bar, h, of the beater in combination with the hollow chambered beater, substantially as herein set forth for the purpose specified.

62,593.—METHOD OF SECURING TIRES ON WHEELS.—Andrew C. Barnes, Albia, Iowa.

I claim the combination of the lug, C, and fellies, B, as described, operating correspondingly with the groove, a, on the tire, A, in the manner substantially as and for the purpose specified.

62,594.—AGRICULTURAL FORK.—Thomas Beale, New Milford, Ill.

I claim a fork for agricultural purposes provided with a supplementa handle, G, applied or attached to the handle, B, by means of a swivel connection, substantially as shown and described.

62,595.—SEED PLANTER.—A. Bennett, Rockford, Ill.

First, I claim the arrangement of the seat, D, the supporting rods, b b, and the covering rollers, c c, combined and operating as and for the purpose described.

Second, The seed boxes, E E, combined with the adjustable feeding slides, 11, the plows, e e, and the levers, 1 n p, for operating the feeding slides, substantially as herein described.

Third, The shifting concentric rim, w, with the cams, q q, in combination with the rim, w' and the shifting devices connected with them, arranged substantially as and for the purpose herein set forth.

Fourth, The lever bar, H, in combination with the draft pole, G, for raising and lowering the hind end of the frame, A, arranged substantially as and for the purpose herein described.

62,596.—Instrument for Marking Animals.—James S. Bodle, Mecklenburg, N. Y.

First, I claim a stamp or brand formed with an adjustable frame, and movable letters combined and arranged to operate substantially in the manner set forth.

Second, The combination of the frame, A A' with lugs, A2 and A3, threaded stem, B2, and notched movable letters, C, substantially as set forth.

62,597.—Wool Press.—Spencer C. Bond, Farmersville, N. Y.

First, I claim a wool press composed of two hinged wings, C, and two sliding heads, G G', in combination with the lever, D, and windlass, H, all constructed and operating substantially as and for the purpose set forth.

Second, The slotted slide, E, with its head, G, in combination with the single slide, F, with its head, G' constructed and operating substantially as and for the purpose described.

62,598.—Paint.—Henry W. Bradley, New Berlin, N. Y., assignor to himself and B. Van Horn, Bennetsville, N. Y.

I claim, First, As an improved article of manufacture a paint compound which is composed of the ingredients, or their respective equivalents, and in the proportions herein set forth.

Second, The substitution for a certain quantity of oil in paints of boiled rice, substantially as and for the purpose herein set forth.

62,599.—Attaching Door Knobs to their Spindles.—Charles B. Bristol, New Haven, Conn.

I claim the use of the inclined plane, g, in combination with the screw, h, and the neck of the knob, A, when they are constructed, connected and made to secure the knob, A, in the desired position on the spindle, substantially as herein described and set forth.

62,600.—Clothes Dryer.—Benjamin Britten, Galena, Ill.

I claim the combination of the tubes, A U, with the flanged rings, F T, and arms, G S, as herein set forth for the purpose specified.

62,601.—Lubricating Device.—Thomas S. Brown (assignor to himself and John P. Adriance), Poughkeepsie, N. Y.

I claim the chamber, D, in the part, b, of the bearing, C, through which extends the tube, F, communicating with the passage, c, in combination with the plug, E, and journal, A, arranged and operating substantially as herein described and for the purpose specified.

I further claim the plug or stopper, E, of the oil chamber, D, grooved at its under side in combination with the tube, F, and passage, c, in the bearing, substantially as and for the purpose specified.

62,602.—Shaking Table for Concentrating Ores.—S. S. Buckminster, Gold Hill, Nevada.

I claim the riffles, b b, running diagonally across the bed of a shaking table in combination with openings, c c, at one end and the adjustable slides, d d, for concentrating gold and other ores, arranged and operating substantially as herein described.

62,603.—Fruit Jar.—G. W. Buffington, Mechanicsburg, Ohio.

I claim the combination and arrangement of the plate, A, elastic band, E, mouth of jar, D, curved inward so as to form a seat for the cover, A, substantially as herein set forth for the purpose specified.

62,604.—Burglar Alarm.—Russell Bunher, Hudson, Wis.

I claim combining an alarm mechanism, substantially as described with a door latch in such manner that by moving said latch the cord, c, will release the trigger, d, from the scape wheel and cause the alarm to strike, substantially as herein set forth.

62,605.—Water Wheel.—Michael Carpenter, Moscow, Iowa. Antedated Feb. 25, 1867.

In combination with the guides, D, and gates, E, I claim the wheel with the vertical radially-disposed buckets, I, and hub, G, and orifices, K, the parts being severally constructed and the whole arranged for use, substantially in the manner set forth.

62,606.—Comb.—F. A. L. Cassidey, Newnansville, Fa.

First, I claim the side or wing combs pivoted to the ends of the body of the main comb, substantially as herein shown and described and for the purpose set forth.

Second, The combination of springs, C, with the main comb, A, and side combs, B, substantially as herein shown and described and for the purpose set forth.

62,607.—Carriage-axle Adjuster.—Jonathan Childs, West Troy, N. Y.

I claim a carriage-axle adjusting instrument formed of the bar, G, in combination with the block, F, the adjusting screw, S, with its nut levers, J and K, and the clamps, M and N, substantially in the manner set forth in this specification.

62,608.—Metallic Blind-slat Clasp and Pivot.—George R. Clark, New York City.

I claim the metallic clasp, a, and pivot, h, combined for blind slats, as a new article of manufacture.

62,609.—Life-preserving Berth.—John J. Clyde, Williamsburgh, N. Y.

I claim the combination of the removable berth, D, having keel, d6, and provided with ring bolts, G, line, H, seat, I, and paddle, S, secured to the berth and adjusted to be used for the purposes described when the berth is launched and forms a raft, substantially as specified.

62,610.—Cotton-bale Tie.—Barry Coleman, Louisville, Ky.

I claim the rectangular tie plate, A, having the square and diagonal-sided slot, a, when applied to bale hoops for securing the ends, arranged substantially as herein described.

62,611.—Method of Treating Hides and Skins for Tanning.—Isaac C. Colton, Buffalo, N. Y., and Albert M. Hastings, Rochester, N. Y.

First, We claim the treating and preparation of hides and skins for tanning by the combined action of hydraulic or hydrodynamic and pneumatic pressure, or by either mode of pressure separately, in combination with rotary motion or internal agitation or movement of the contents or materials to be operated upon while under pressure, by the means and substantially as above described.

Second, The tanning of hides, skins, and leather by the combined or separate use of hydraulic or hydrodynamic and pneumatic pressure in a closed cylinder in combination with rotary motion or internal agitation or movement of the tanning liquors and hides or skins while under pressure, by the means and substantially as above described.

62,612.—Method of Bleaching and Dyeing Yarns, Cloths and other Textile Fabrics.—Isaac C. Colton, Buffalo, N. Y., and Albert M. Hastings, Rochester, N. Y.

We claim the bleaching and dyeing of cloths, yarns, and other textile fabrics, by the combined or separate use of hydraulic or hydrodynamic and pneumatic pressure in a closed vessel or cylinder in combination with rotary motion or internal agitation or movement of the liquors cloths and fabrics while under pressure, by the means and substantially as above described.

62,613.—Car Coupling.—R. A. Cowell, Cleveland, Ohio.

I claim in the draw head, A, formed with an enlarged chamber in the upper part, the hook, c, in connection with the ordinary link and the cam, h, operated by a crank and rods, all constructed and arranged to operate as shown and described.

62,614.—Center Board for Sailing Vessels.—Washington F. Davis, Boston, Mass.

I claim a center board composed of two or more sections, A B C D, so arranged as to slide within or upon each other in a manner and for a purpose substantially as set forth.

62,615.—Sulky Plow.—O. P. Dils, Falmouth, Ky.

I claim the arrangement of the draft pole, E, and bars, F C, with the land and furrow wheels, D K, respectively attached, the brace rods, O P, and plow beam, A, for the purpose of forming a new and improved sulky plow, as set forth.

62,616.—Lifting Jack.—Daniel Diver, Boone, Iowa.

First, I claim an improved lifting jack formed by the combination of the ratchet hook, E, clevis or loop, F, and pivot block, C, with each other and with the lever, B, and fulcrum post, A, substantially as herein shown and described.

Second, The combination of the spring, G, with the pivoted block, C, and fulcrum post, A, substantially as herein shown and described and for the purpose set forth.

62,617.—Shutter Bolt.—Benj. K. Dorwart, Lancaster, Pa.

I claim as a new article of manufacture a shutter bolt when composed of two twin plates, A A', each provided with a raised conic flange, B, notched at base for the reception of the horizontal bolts, D D', in the manner and for the purpose specified.

62,618.—Wood-turning Lathe.—Lucius H. Dwelley, Dorchester, Mass.

First, I claim the combination of the shaft, F, with the cam, M, traversing thereon and revolving therewith, lever, 19, and sliding spindle, K, with its tool or tools, substantially as described.

Second, I also claim the combination of the shaft, F, with the cam, J, traversing thereon and revolving therewith, and the vibrating cutter holder, v, with its cutter, u, for the purpose set forth.

Third, I also claim the combination of the shaft, F, with the cam, J, traversing thereon and revolving therewith with the severing cutter, s, as described.

Fourth, I also claim the automatic feed mechanism consisting of the cam, E, rocker arm, D, spring, i, or its equivalent, toothed bar, C, pawl, k, and gage, r, in combination with the traversing carriage, B, when such carriage carries all the tools required to turn, bore, and sever the spool from the stick, substantially as described.

Fifth, I also claim the combination of the auger, 17, slotted cylinder, 21, with its cutter, 22, on its end, and set screw, 24, substantially as and for the purpose set forth.

Sixth, I also claim the mechanism consisting of the groved wheel, s, with its notch, j', and connections, substantially as described, for the purpose of arresting the motion of the cutting and boring tools at a stated position and also to arrest the feed at the same time, substantially as described.

62,619.—Composition for Roofing.—G. L. and C. H. Eagan, San Francisco, Cal.

We claim the composition for the manufacture of drain pipes, moldings, roofing, etc., the ingredients of which are prepared and combined in the proportions and manner substantially as herein described.

62,620.—Blower.—Franz Engel, Camden, N. J.

I claim the screw, C, provided with a jacket, C, at its end and operating in a case, A, from which extends a blast pipe, B, substantially as and for the purpose described.

62,621.—Boot-crimping Machine.—Henry Faus, Hayesville, Ohio.

I claim the iron rods composing the hinge-like arrangement providing for the mobility of the jaws, and the wedge-shaped key and gain cut in each jaw, for the purpose set forth.

62,622.—Medical Compound.—William B. Foster, Ridgeville, Ohio.

I claim the medical compound made of the several ingredients mixed together in or about the proportions, substantially as described.

62,623.—Fruit Gatherer.—John Frantz of Joseph, Selbysport, Md.

I claim the drum or cylinder, A, provided with grooves, a, and teeth or pins, b, in combination with the finger bars, H, and receptacle, J, all arranged and operating in the manner and for the purpose specified.

62,624.—Instrument for Paring the Hoofs of Horses.—S. D. Freet, McCutchenville, Ohio.

I claim an instrument for paring horses' hoofs, constructed, arranged, adjusted, and made to operate as herein set forth and explained.

62,625.—Car Coupling.—Merritt Gally, Marion, N. Y.

First, I claim the tumbler, T T' T", with cams, slots, and lever projections, combined and constructed as herein described.

Second, I claim the catch hook, R, with lever projection, R', in combination with the angular projection, z, of tumbler forming the compound drop latch, Z R, substantially as herein set forth.

Third, I claim the catch tooth, C, in combination with its counterpart mortice, C', substantially as described.

Fourth, I claim, in combination with the tumbler, T T' T", the fulcrum, F, for the purpose herein set forth.

62,626.—Mode of Attaching Handles to Table Cutlery.—Joseph W. Gardner, Shelburne Falls, Mass.

I claim securing handles to forks, knives, or other instruments, by condensing the metal portion of such articles in a groove formed in the handle, substantially in the manner herein described and represented.

62,627.—Stove-pipe Drum.—Geo. H. Hammond, Oneonta, N. Y.

I claim the construction, combination and arrangement of the disks, A E H K L M I F B, with each other, with the interior, intermediate and exterior cylinders, G J D, and with the short pipes, C, substantially as described and for the purpose set forth.

62,628.—Corn Cake Machine.—C. C. Harriman (assignor to himself and John Davis, 3d), Warner, N. H.

I claim the adjustable roller, C, provided with gear wheels, G, slotted supports, D, set screws, E, sliding board, B, cutter, I, beam, J, sliding between the uprights, H H, beam, K, and hand screw, L, when all are constructed and arranged as herein set forth for the purpose specified.

62,629.—Machine for Peeling Willow.—George Healey, East Woburn, Mass.

I claim the combination of a single wheel, a set of stripping jaws, and an endless belt, its supporting rollers, and a deflector, the whole being substantially as described and for the purpose set forth.

I also claim the combination of the two elastic or flexible lips with the single wheel, a set of stripping jaws, and an endless belt, its supporting rollers and deflector, as described.

62,630.—Wrench.—Sylvester B. Hill (assignor to himself and F. E. Drake), Chicopee, Mass.

I claim a wrench having the jaws, B and C, handle, A, and nut, D, constructed and arranged substantially as herein described.

62,631.—Tobacco Pipe.—Jean and George Hochapfel, Strasburg, France.

We claim the arrangement of the three passages, A a c, in relation to the bowl, D, none of said passages or openings going through, and all accessible from the outside, and forming passage, trap and nicotine chamber, as set forth and described.

62,632.—Block Former for Muffs.—Charles Hollwede and Julius Brzezinsky, New York City.

We claim a muff block composed of several pieces arranged and operated substantially in the manner and for the purpose as hereinbefore set forth.

62,633.—Churn Dasher.—A. B. Hutchins, Patchogue, N. Y.

I claim the dash, C, consisting of the rim, a, connected by the oblique arms e, to hub, b, and vertical plate, D, with rounded corners, rim, c, and opening, f, and fitted loosely on the rod, B, operating as described, substantially as specified.

62,634.—Water Meter.—H. J. Hyams, New York City.

First, I claim the combination with a fixed crank, S, of the revolving diaphragm measuring chambers, J, constructed and arranged for operation in connection with a foot valve, G, substantially as and for the purpose specified.

Second, The combination and arrangement, substantially as shown and described, of the revolving cylinder with its flexible diaphragms, foot valve and cistern, provided with a valve controlling the head or pressure to the measuring chamber, as herein set forth.

62,635.—Curtain Fixture.—E. M. Judd, Wolcottville, Conn.

I claim the stock, e, of the pulley, f, having a tooth, i, taking the teeth on the inside of the slide, a, in combination with the sliding clamp, g, for holding said tooth in its place, as set forth.

62,636.—Sealing Padlocks.—Zeno Kelley, New Bedford, Mass.

I claim, First, Applying a seal or seals to the end of the shackle suitably constructed therefor, so that to unlock it said seal or seals must be canceled or destroyed by the key, substantially as and for the purpose described.

Second, Constructing the shackle in such manner, in combination with any suitable arrangement of locking devices upon the inside of the lock, that the key for unlocking the lock when inserted therein will pass through the said shackle to break the seals, substantially as and for the purpose described.

62,637.—Gate Latch.—Wm. H. Kellogg, Du Quoin, Ill.

First, I claim the gate latch, c, in connection with the double bent lever, h h, the friction rollers, k k, and g g, and the spring, f and b, combined, arranged and operated substantially as and for the purposes herein described.

Second, I claim also the latch, c, in combination with the flat spring, b, for swinging and closing a gate, substantially as herein described.

62,638.—Wagon Brake.—D. J. Kirkman and E. H. Gray, Winchester, Ill.

We claim the bar, C, in combination with the serrated plate, F, stirrup, e, the rods, k k, the cleat, m, furnished with strap, i, and the bar, S, the whole constructed and arranged and operating as and for the purpose herein set forth.

62,639.—Apparatus for Amalgamating Gold and Silver.—Matthew Laflin, Chicago, Ill.

I claim, First, A kettle with partitions dividing it into compartments in the upper part but leaving it open at the bottom, substantially as described.

Second, The method of excluding the air from the lead by means of the covers, one or all of them, substantially as described.

Third, The improved scroll wheel, with one, two or more spiral plates, substantially as described.

Fourth, The screw and its casing, substantially as described.

Fifth, The combination of a scroll wheel and screw, substantially as described.

Sixth, The combination of a scroll wheel, screw and casing, substantially as described.

Seventh, The combination of a kettle, partitions and scroll wheel, substantially as described.

Eighth, The combination of a kettle, partitions, scroll wheel and screw, substantially as described.

Ninth, The combination of a kettle, partitions, scroll wheel, screw and casing, substantially as described.

Tenth, The combination of a kettle, partitions, and cover or covers, substantially as described.

62,640.—Table Cover.—Ebenezer G. Lamson, Shelburne Falls, Mass.

I claim a table fork made of wire substantially as herein described.

62,641.—Plow.—Ransom K. Laraway and Jarome Laraway, Battle Creek, Mich.

We claim the manner herein described of attaching the frame B', with gang plows attached, to the frame, B, attached to driving wheel, and of attaching to the same, plow, H, as described and set forth.

Second, The manner herein described of raising and lowering the frames, B', with plows attached, or single plow, by means of lever, C', pawl and ratchet, D and E, and flap, n, and chain, g, in the manner set forth and described.

62,642.—Seed Dropping Attachment for Hoes.—A. T. Large, Chicago, Ill.

I claim the seed box, B, with the box, C, attached, and provided respectively with the openings, b d, in combination with the slide, D, placed within the box, C, provided with the opening, c, and operated by the spring, I, and lever, G, all arranged and applied to the handle of a hoe, substantially as shown and described.

62,643.—Refrigerator.—W. Law, New York City. Antedated Dec. 31, 1866.

I claim the construction and arrangement within the walls, A, of the corrugated inclined plates, C, and bottom, H, in such a manner as to prevent the air that rises from the provision chamber, I, from having its moisture condensed by contact with the bottom of the plates, C, and dropping back into the said provision chamber, as herein set forth.

62,644.—Liniment for Cure of Foot Rot in Sheep.—Wm. H. Lawes, Somerville, N. J.

I claim a liniment made of the chemical ingredients herein specified and in about the proportions specified.

62,645.—Door Lock.—Adam Leich, Brooklyn, N. Y.

I claim, First, The catches or checks, C F G, applied to opposite sides of the bolt, B, in combination with the partition plate, E, arranged in relation with the bolt and the bar, D, of the catch or check, C, substantially as and for the purpose set forth.

Second, The wards, g, placed in line with or applied to the outer key hole, f, in combination with the partition plate, e, and the catches or checks, C F G, all arranged substantially as herein shown and described.

62,646.—Apparatus for Printing on Uneven Surfaces.—Alfred Leighton, London, Eng.

I claim the combined arrangement of a flexible elastic printing surface, a, with a chamber or vessel containing fluid which on being subjected to pressure is caused to act on the printing surface, substantially as described.

62,647.—Hoisting Apparatus.—A. R. Lemen, Kalamazoo, Mich.

I claim the combination and arrangement of the gear wheels as shown and described, in combination with the frame, when constructed substantially as described and for the purposes set forth.

62,648.—Cuff.—Isaac Levine, New York City.

I claim a cuff, A, provided with spring, B, and elastic retaining cords, a substantially as described.

62,649.—Boot Tree.—R. L. Lewis, Worcester, Mass.

I claim, First, A boot tree distended by means of a pin b, attached to an arm G, of the stretching rod D, which traverses upon two inclined planes, or slotted inclines, attached respectively to the front and back of the boot-tree substantially as and for the purposes herein shown and described.

Second, A mounted swivelling boot-tree, which is provided with an adjustable heel piece I, substantially as and for the purpose herein shown and described.

Third, The manner of operating the adjustable heel piece, by means of a differential screw i, and plates h h, substantially as herein shown and described.

62,650.—Medicine.—Ann Loosley, Philadelphia, Pa.

I claim the combination of the said ingredients, in the said proportions, thereby producing the said medicine, and which I propose to manufacture and sell as "Loosley's Infallible Cure for Whooping Cough."

62,651.—Wagon Tongue Supporter.—O. Higley, and S. Toothaker, Fredonia, Ohio.

We claim the springs a and c, constructed as described in combination with the tongue or thills C, hounds E E and axle B, for the purposes set forth and specified.

62,652.—Molasses Gate.—Theodore Mace, New York, N. Y.

I claim the screw r, passing through the lever e, in combination with the spring d, that surrounds the screw e, and is within a cup on the outside of the gate c, the parts being constructed and applied in the manner and for the purposes specified.

62,653.—Bed Spring Fastening.—David Manuel, (assignor to Willard Manuel), Boston, Mass.

I claim the cross bar holder c, consisting of the hooks d d, eye or bridge e, hooks g g, and h, constructed as described for the purpose of securing the base of the spiral wire bed spring B, to the slab A, as herein set forth.

62,654.—Mode of Ornamenting Mirrors.—Thomas C. March, London, Eng.

I claim the ornamentation of mirrors, etc., by affixing to the surfaces of the same by cement, glass knobs, beads, or mouldings prepared by grinding the face to be attached substantially as set forth.

62,655.—Stove Pipe Damper.—Moses S. Marshall, Melrose, Mass., assignor to himself and R. Wendell, Salem, Mass.

First, I claim the combination in a damper of the concave caps B B', central annular plate A, and circular plate C, substantially as and for the purpose set forth.

Second, The combination of the damper spindle and key when said parts are respectively constructed and the whole arranged as and for the purpose set forth.

62,656.—Blind Fastening.—W. C. Marshall, New York, N. Y.

I claim the latch e, and releasing lever g, in combination with the self-closing shutter A, constructed and operating substantially as and for the purpose described.

62,657.—Lamp Wicks.—Charles F. Martine, Boston, Mass., assignor to Soletta Oil Company.

I claim the combination of a straight stiffish, hand non-conducting core or thread with the loosely woven wicking used for lamps substantially as and for the purpose described.

62,658.—Boxes for Holding and Transporting Bottles.—John Matthews, Jr., New York, N. Y.

I claim the lower extensions or strips E or E', arranged below the upper compartments a, and constructed so as to form shelves or projections, c or c', on opposite sides and to constitute lower compartments, d, in combination with the cross strips forming the upper compartments of the box or case, substantially as specified.

62,659.—Mode for Pressing Leather Seams.—W. May, Binghamton, N. Y.

I claim the application of a treadle to a machine for pressing leather seams substantially as herein shown and described.

Second, The arm c', on the treadle E, in connection with the spring c and roller C, substantially as and for the purpose herein shown and described.

Third, The spring I, and the manner of regulating its pressure by means of the screw g, substantially as herein shown and described.

Fourth, The rest h, and clamp h', in connection with the pin l, and spring i, made and operating substantially as and for the purpose herein shown and described.

Fifth, The removable "clamp and holder" H, in combination with the fixed supports G, substantially as and for the purpose herein shown and described.

Sixth, The sliding bar F, to which the spring I, is secured when made and operating substantially as herein shown and described.

The rest h, which is so constructed that its lower edge will be parallel with its upper surface substantially as and for the purpose herein shown and described.

62,660.—Cotton Cultivator.—W. McCracken, Bainbridge, Ind.

First, I claim the scraper I, in combination with the plow, the former being placed at the rear of the latter and arranged relatively therewith substantially as and for the purpose set forth.

Second, The connecting of the share F, to the moundboards E, by means of the dovetail arms c, cleats d, and keys e, substantially as described.

Third, The manner of attaching the wheel C, to the beam so that it may be adjusted higher or lower to regulate the depth of the penetration of the plow as set forth.

Fourth, The combination of the hoe O, pivoted rod P, pendant arm i, secured to the coulter bar and cam L, operating in the manner and for the purpose specified.

62,661.—Cutlery.—Thomas McGrah, Sheffield, Eng.

I claim the securing of handles to the tangs of cutlery by means of sulphur substantially as set forth.

62,662.—Combined Bridle and Halter.—J. McKibben, Lima, Ohio.

I claim the combination and arrangement of the cheek piece G, of the halter, cheek pieces F, of the bridle attached to the rings D, by means of the snap hooks H, nose strap I, chin strap J, brow band A, crown piece B, and throat strap C, as herein set forth for the purpose specified.

62,663.—Invalid Chairs.—John N. McMullen, West Liberty, Ohio.

I claim the combination of the shaft F, belt G, toothed wheel A, with its crank b, and pawl e, with seat A, back B, feet rest C, and frame E, substantially as and for the purpose described.

62,664.—Cotton-seed Planter.—J. M. Merrymon, Indianapolis, Ind., and W. M. Dunn, Gurleysville, Ala.

First, We claim suspending the hopper, E, upon a pivot, or its equivalent, so that it may be vibrated for the purpose of agitating the inclosed seed.

Second, Placing the seed hopper of the seeding machine so that the feeding device, passing in at the bottom and out at the top, shall pass vertically beneath the contained seed.

Third, Agitating the seed hopper of the seeding machines by the passage of the feeding device through the same, for the purpose set forth.

Fourth, The cup, M, constructed and attached as described so that in passing over the upper roller, J, the seed will be thrown out as set forth.

62,665.—Retainer for Neck-ties.—James C. Merritt, New York City.

I claim a retainer for neck ties provided with opening, a a, for the reception of the necktie, and having an elastic connection secured to the retainer by means of lip, F, and provided with the button attachment, e g, substantially as described.

62,666.—Apparatus for Printing on Glass.—I. L. Miles, Charlestown, Mass.

First, I claim a roller or segment, D, to which are secured curved ways, a a', and a form of elastic type, X, in combination with inking rollers, c c, and a pressure roller, F, or their equivalents, the whole being arranged and operating substantially as and for the purpose described.

Second, The roller or segment, D, with its ways and type, in combination with two or more rollers, h h, substantially as and for the purpose specified.

Third, The adjustable stops or guides, b b, in combination with the roller or segment, D, substantially as and for the purpose set forth.

Fourth, The corrugated bands, F', in combination with, F, for the purpose specified.

Fifth, The roller, J, with its adjustable guides, c c, arranged in respect to the roller, D, substantially as described.

62,667.—Bag Tie.—Levi Morehouse, Barton, Wis.

I claim a clamp with curved arms, one of them slotted or cratched, and supplied with ratchet bar and spring, substantially as and for the purpose herein set forth and described.

62,668.—Molding Pulley.—Wm. Neemes, Pittsburgh, Pa.

First, I claim the box, A, slides, C, and pattern, B, in combination with each other, when constructed and arranged substantially as described and for the purpose set forth.

Second, The cast-iron case, D, for forming the outer side or face of the pulley, constructed as described, and used in conjunction with the sand molds made in box, A, substantially as herein described and for the purpose set forth.

62,669.—STRIGHTENING RAILROAD RAILS.—Franklin Nelson, Wyandotte, Mich.

I claim the sliding press drop, C, connected by a toggle joint with the crank, d, in combination with the vibrating roller frames, K K, constructed and operating substantially as herein described.

62,670.—APPARATUS FOR DISTILLING AND RECTIFYING SPIRITUOUS LIQUORS.—Marcus Newmann, New York City.

First, I claim the arrangement of the stills, A A', with heaters, B, and pipes, d d' c c', provided with suitable stop cocks, substantially as and for the purpose described.

The condensing chambers, I, and troughs, p, in combination with the pipe, q, and condenser, E, and still, A, constructed and operating substantially as and for the purpose set forth.

The extra injection pipe, t, in combination with the pipe, q, chamber, I, and deflecting plate, o, in said chamber, substantially as and for the purpose described.

62,671.—CORN SHELLER.—L. T. Newell, Springville, N. Y.

I claim, First, The combination of two or more concave wheels similar to G and G' when one or more of said wheels are made with the toothed concave surfaces deeper than the others, substantially as described.

Second, The weighted lever, H, provided with the movable piece, I, pin, K, and apertures, J and L, or the equivalent thereof, substantially as and for the purposes described and in combination therewith, I claim the spring board, P, when constructed and described.

Third, I also claim the shape and general arrangement of the wheels, G and G' by which I combine in one the shelling and gearing teeth.

62,672.—WASHING MACHINE.—Mark Newland, Dayton, Ohio.

I claim the double spring connecting rod, D, rubber, G, provided with rollers, K, grooved posts, E, cord, L, pulley, M, and treadle, O, when constructed, arranged and operating as herein set forth for the purpose specified.

62,673.—SASH SUPPORTER.—George Nimmo, Jersey City, N. J.

I claim, the sash or blind supporter formed of the convex retaining cap, d, and screws, e, combined with the india-rubber block, c, in the manner and for the purposes set forth.

62,674.—STRAW CUTTER.—Harrison Ogborn (assignor to himself and John W. Free), Richmond, Ind.

I claim, First, The adjustable knife, H, attached to the fly wheel in combination with the adjustable guide plate, G, attached to the frame, substantially as and for the purpose set forth.

Second, The combination of the adjustable knife, H, and adjustable guide plate, G, with the inclined plate, A' substantially as and for the purpose set forth.

Third, The eccentric notched cam, N, in combination with the springs, M, having projection, M' substantially as and for the purpose set forth.

Fourth, I claim the cam, G' in combination with the fly wheel, G, and bell crank, K, when respectively constructed and arranged substantially as set forth.

Fifth, The mode of securing the feed hands in their relation to the ratchets by projection and grooves, substantially as and for the purpose set forth.

Sixth, The devices for actuating and adjusting the feed hands by means of the adjustable cam, G, bell crank, K, adjustable feed hands, P and P' and adjustable plate, 2, substantially as described.

62,675.—HOSE COUPLING.—William John Osbourne and G. B. Massey, New York City.

We claim the tube, A, provided with the projecting lip, F, having the groove, n, formed therein, in combination with the tube, B, having the collar, E, provided with the flange, e, thereon when said parts are arranged to operate as and for the purpose set forth.

Securing the hose to the tubes by means of the inclined surfaces and the rings, b, constructed and arranged to operate as set forth.

62,676.—CONSTRUCTION OF HOUSES.—John Park, Joliet, Ill

I claim, First, The ventilators, F, in connection with the box or tube for the purposes and substantially as described.

Second, The bevelled lath when applied in the manner and for the purposes herein shown and described.

62,677.—ADDING MACHINE.—Volney Parks, Fort Wayne, Ind.

I claim, First, The two intermittently rotating disks, C and D, furnished on their peripheries with different series of numbers, in combination with each other and with the stationary indices, a, substantially as herein set forth for the purpose specified.

Second, The slides, F G, pawls, H, and ratchet wheels, E, arranged in relation with each other and with the disks, C D, furnished with the differing series of numbers, substantially as herein set forth for the purpose specified

62,678.—DIES FOR MAKING BELLS.—Andrew Patterson, Birmingham, Pa.

I claim the manner herein described of forming bells out of circular sheets of steel by means of the action of a series of dies of different shapes constructed and operating on the material, substantially as described so as to condense or thicken the outer portion of said sheets thus forming the bells with a gradual increased thickness from their apex or center to the base or mouth as described and set forth.

62,679.—MANUFACTURE OF PAINTS AND OTHER COMPOUNDS FROM BITUMINOUS SLATES, ETC.—William F. Patterson, Vanceburg, Ky.

I claim the use of powdered or ground retorted slate with any of the oils, hydrocarbons, or gums, for the purpose of forming a paint, paste, or plastic compound, and this I claim whether other material or colors be mixed with the retorted slate powder or paint, or whether calcined after it is retorted or not, substantially as described.

62,680.—DRAFT PIPES FOR LOCOMOTIVES.—A. Pearsall, Atlanta, Ga.

I claim, in combination with the exhaust pipe, F, and the draft pipe, B, having downwardly projecting lips, D, on its outer face, and opening, C, the upwardly projecting flange, E, on the inner face of the pipe, for the purpose described, substantially as specified.

62,681.—HARVESTER.—James Pine, Troy, N. Y.

I claim the use of an open sleeve upon which is suspended the gearing to drive the knife, and the attachment to hold the cutting apparatus when said sleeve is furnished with journal boxes, substantially as and for the purposes set forth.

I also claim the use of the swinging arm, P, when hinged at its rear end to the projecting portion, I, of the sleeve, and when said arm supports the gearing and cutting apparatus, substantially as described.

I also claim the use of the downward projecting arms or guides, Q Q', and the rearward projecting arm, L, in combination with the open sleeve, substantially as described and for the purposes set forth.

I also claim the combination of the hinge, V, the coupling piece, Y, and the lever, X, substantially as and for the purpose set forth.

I also claim the use of a graduated sector-shaped draught bar, when both the cord or chain and double tree or team are united to it above its pivoted point, substantially as and for the purposes set forth.

62,682.—MACHINE FOR MAKING NAILS.—A. M. Polsey, Boston, Mass.

I claim, in combination with the drawing and shaping die rolls and with the rolls, b c, between which the nail is passed, the movable blocks or pieces, e f, arranged to operate against and straighten the opposite edges of the nail, substantially as set forth.

I also claim, in combination with the rolls, b c, and the edge-straightening blocks, e f, the throat, l, operating in connection with the rolls to straighten the broad faces of the nail, substantially as set forth.

Also, in combination with the rolls, b c, and the straightening mechanism, the die projection, m, operating in connection with the edges of the groove, d, to shear or clip off the rough edges of the nail near the point, and also so formed as to chamfer the end of the nail, substantially as set forth.

Also, in combination with the rolls, b c, and straightening mechanism, the cutter, n, for pointing or finishing the point of the nail, substantially as described.

Also, in combination with the rollers, b c, and the straightening mechanism, the spring, i, for throwing the head of the nail from the groove, substantially as described.

Also, the arrangement of the straightening, chamfering, and cutting mechanism described, so as to automatically co-operate with the shaping and drawing die rolls, h, substantially as set forth.

62,683.—ALARM LOCK.—James S. and Russel Porter, Waterford, N. Y.

We claim, First, The pistol, C, hammer, G, latch, H, and trigger, L, when all arranged and combined within the interior of a lock casing, provided with a cover, G, and plug, F, substantially in the manner and for the purpose described.

Second, The cam, P, substantially as and for the purpose described.

62,684.—MACHINE FOR MAKING HORSE-SHOE NAILS.—Silas S. Putnam and Lucius H. Dwelley, Dorchester, Mass., assignor to S. S. Putnam & Co., New York, City.

First, We claim the combination of the several pairs of revolving dies connected by gearing, and otherwise arranged to operate successively and alternately on opposite sides of a nail blank, substantially as described.

Second, In combination with the foregoing, we claim a device for cutting off the blank, substantially as described.

Third, In nail-making machines, having a series of pairs of revolving dies operating substantially as described, we claim constructing the several pairs of dies, in the form herein described, for drawing down the blank in a rounded form during the first part of the operation and afterwards to the form proper for the nail, as specified.

62,685.—MACHINE FOR MAKING HORSE-SHOE NAILS.—Silas S. Putnam and Lucius H. Dwelley, Dorchester, Mass., assignors to S. S. Putnam & Co., New York City.

First, We claim the combination of the cams, with the spring hammers, constructed and operating substantially as described and for the purpose set forth.

Second, We also claim the rolls, H, and the feed mechanism, constructed substantially as described, in combination with the hammers, F G H I, operating substantially as described and for the purpose specified.

Third, We also claim the mechanism substantially as described, for cutting off the nail without moving the rod from its normal position.

Fourth, We also claim the mechanism, substantially as described, for cutting off the nail, in combination with the hammers, K L M N, and a device for holding them apart and out of the way of the cutters while the nail is being cut off.

Fifth, We also claim the combination with the hammers, K L M N, mechanism for cutting off the nail, feed rolls, R, and furnace, O, operating substantially as described for the purpose set forth.

Sixth, We also claim the hammer or former, N, brought up positively to the nail rod, in combination with the spring hammers, K L M, substantially as and for the purpose set forth.

Seventh, We also claim the cam wheels, F G H I, in combination with the hammers, K L M N, and a device for cutting off the nail, substantially as described.

62,686.—BROOM AND BRUSH HEAD.—George T. Reed, Philadelphia, Pa.

I claim a broom head composed of frame, A B C D, strips, wooden or metallic, a a' and C, and top piece, T, all combined together in the manner and for the purpose above described and set forth.

62,687.—DUMPING WAGON.—Warren Robinson (assignor to himself, J. H. Fairchild, and H. Farrington), Highgate, Vt.

I claim the construction of boxes, A, as herein described, and used with the frame, B B, in the manner and for the purposes herein set forth.

62,688.—CASTING PIPES.—George Rogers, Philadelphia, Pa.

I claim the use of the rings or chills, A A, in the manner and for the purposes described.

62,689.—POCKET-BOOK CLASP.—Henry Ropes, Brooklyn, N. Y.

I claim, in a clasp for purses, pocketbooks, etc., the construction and arrangement of the slot, C, which takes the catch, and catch, A, substantially as described, to allow of automatic expansion and extraction of the purse, in combination with the bar, D, and spring, a, or their equivalent, for locking or fastening the catch, and holding the two parts of the clasp together, the several parts operating substantially as and for the purposes set forth.

62,690.—CHEESE VAT.—O. Sage, Wellington, Ohio.

I claim the arrangement of the valve, U, and rod, 5, in combination with the box, B, in the manner and for the purposes herein specified.

62,691.—RAILROAD RAIL.—Elnathan Sampson (assignor to himself and E. Chamberlain), Lansingburg, N. Y.

I claim, First, The chair rail, A, constructed with its sides, P C, top, a, groove, g, and rib, r, together with the usual base and flanges, substantially as set forth and described.

Second, The bearing rail, B, constructed with its track face, e, beveled inner edge, l, sides, h h', bearing edge, k, substantially as set forth and described.

62,692.—ANTI-RHEUMATIC COMPOUND.—Jacob Schmoll, New York City.

I claim an anti-rheumatic compound made as described.

62,693.—MACHINE FOR CUTTING THREADS ON BOLTS.—Franzis Schweizer, New York City.

I claim, First, The sliding stocks, N and O, in combination with the lever, P, arranged relatively with the cutters, a and b, operating as described for the purpose specified.

Second, I claim the adjustable lever, P, which is provided with arms, d and e, substantially as and for the purpose herein shown and described.

Third, I claim the elastic sliding rest, g, made and operating substantially as and for the purpose herein shown and described.

62,694.—GRAIN SEPARATOR.—H. H. Seely, Hudson, Mich., assignor to F. Swift, Lenawee County, Mich.

I claim, First, The adjustable shoe bottom, C, rod, b, and perforated plate, a, upon the shoe, arranged and used as and for the purpose herein specified.

Second, The arrangement of the rod, G, lever, H, and rods, J and L, with the shoe for the purpose of giving said shoe three motions or one as may be desired, substantially as set forth.

62,695.—ASH AND SIFTING PAN FOR COOKING STOVES.—Jacob H. Shear, Albany, N. Y.

I claim, First, The sloping plate under the fire chamber, in combination with a closely fitted lifting receiver, having an independently vibrating or oscillating grated bottom for sifting the ashes, substantially in the manner and for the purposes above described.

Second, I claim the detachable lifting receiver with a vibrating or oscillating grated bottom fitted closely to the hearth and to the sloping plate under the fire chamber, for the purposes within described, in combination with the lifting ash pan underneath, to receive the ashes during the sifting of the same.

Third, I claim the detachable receiver with the vibrating or oscillating grated bottom, in combination with the lifting ash pan underneath, and the vacant space or chamber, F, between the receiver and the front of the oven, to give the grate room to vibrate outside of the receiver, substantially as shown and described.

Fourth, I claim the detachable lifting receiver having a vibrating or oscillating grated bottom, constructed in the manner substantially as and for the purpose above described.

62,696.—FILTER.—Frederick Shickle and Evermont Randals, St. Louis, Mo.

We claim the water filter consisting of the annular receiving chamber, E, filtering chamber, D, supply chamber, C, surrounded at its upper part by the partition wall, d d, tube, f f, air tube, g, and mud chamber, B, when constructed and arranged as herein set forth for the purpose specified.

62,697.—STRAINER FOR COFFEE AND TEA POTS.—Michael Simons, Middletown, Conn.

I claim the arrangement and combination of movable strainer, C, with its handle, D, and guides, B, when made of Brittania ware, and attached to and operating on the inside at the base of the spout of a tea or coffee pot, as herein described and for the purposes set forth.

62,698.—CUTTER FOR TRIMMING WALL PAPER.—Henry C. Snow, (assignor to himself and C. C. Laltimer), Princeton, Ill.

I claim an implement or cutter for the trimming of wall or other paper or sheet material, constructed, arranged and operated substantially as herein described

62,699.—STOVE-PIPE DRUMS.—John G. Sorgen, Kenton, Ohio. Antedated Jan. 10th, 1857.

I claim the deflecting cones F and L, and the frustum of a cone J, arranged in relation to each other and the cylinder A, as set forth.

I also claim making the points of the deflecting cones movable so that they can be swung from the opening in the cone to let the blaze and smoke pass up in the centre of the cylinder.

62,700.—CAR COUPLING.—Ezra Staples and William W. Gould, Skowhegan, Maine.

I claim the drop slide D, carrying the pin C, forked piece F, hook G, counter balance G', draw head A, having its bottom plate slotted lug n, bent lever J, horizontal rod k, and handles m m, when all are constructed and arranged as herein set forth for the purpose specified.

62,701.—METHOD OF ATTACHING CORDS TO WINDOW SASHES.—Carlos Swift, Mount Carroll, Ill.

I claim the bed plate a, in combination with the catch plate b, for attaching the cord d, to the sash A, arranged and operating as and for the purposes herein described.

62,702.—KNIFE AND SCISSORS COMBINED.—Chester W. Sykes, Suffield, Conn., assignor to James Moore, H. H. W. Wright, Albert Pickernell, Marshall W. Parker, Richard S. Genness, Daniel Dorr, James A. Kelley, George Ochs, and Clarence E. Wilkins, South Boston, Mass., and Erastus Wilkins, Warner, N. H.

I claim the knife blade B, shield A, in combination with the scissors, when constructed and operating substantially as herein described.

62,703.—MACHINE FOR POLISHING SHEET METALS.—Henry Todd, (assignor to Bridgeport Brass Co.), Bridgeport, Conn.

I claim the combination of the trough and presser B, and C, with the rotating shaft E, arranged to draw the sheet through the scouring surfaces of the trough and presser substantially as specified, also in combination with the same, the removable sleeve G, and reversely rotating shafts E and F, essentially as and for the purposes herein set forth.

62,704.—KINDLING FIRE.—William H. Towers, Boston, Mass.

I claim the use of gas for kindling fires, substantially as herein set forth and described.

62,705.—RESTS FOR SHARPENING SAWS.—Jas. F. Tuder, Philadelphia, Pa.

I claim, First, Combining the rest plate, A, with the standard, B, by means of the joint, a, at or near the plate, substantially as above described, and for the purpose specified.

Second, The combination of the rack, f, on the standard, B, with the rest plate, A, substantially as and for the purpose set forth.

62,706.—MANUFACTURE OF IRON AND STEEL.—Charles Usher, Iowa Falls, Iowa.

I claim the within described process for plating iron and steel, substantially as herein described.

62,707.—ATTACHMENT FOR HEATING KETTLES AND BOILERS BY GAS.—Mary Van Vranken, Washington, D. C.

I claim a perforated stand attached to the bottom of a kettle or boiler, and adapted to be used upon an ordinary gas burner, substantially as and for the purpose specified.

62,708.—WASHING MACHINE.—C. F. Walker, Benfords Store, Pa.

I claim the combination of the dashers, B B, valves, 6, lever, C, weight, D, and tub, A, as and for the purpose specified.

62,709.—ENVELOPE FOR SPITTOONS.—S. W. H. Ward, New York City.

I claim the spittoon envelope with the perforation, E, in the bottom for the purpose of raising the spittoon out of the cavity which contains it, when it is desired to remove it, substantially as set forth.

62,710.—STEAM ENGINE.—George I. Washburn, Worcester, Mass.

I claim, First, The arrangement of the cylinders, A C, with their double acting pistons, B D, and valve with three disks reciprocating in the chamber between the cylinder and controlling the ports, substantially as described.

Second, I claim the steam valve when arranged to be operated by pressure from below and an eccentric above, substantially as described.

62,711.—STEAM ENGINE.—G. I. Washburn, Worcester, Mass.

I claim an arrangement of cylinders and steam parts by which the steam, after being used on one piston is permitted to flow to the other side of the same piston and to the other cylinder to be used expansively, substantially as described.

I claim the arrangement of the double-disk hollow valve, H, operating substantially as described.

62,712.—STEAM ENGINE.—G. I. Washburn, Worcester, Mass.

I claim the arrangement of the two cylinders with single acting pistons and the larger cylinder with a double acting piston upon whose sides the steam from the other cylinders is used expansively, substantially as described.

62,613.—STEAM ENGINE.—G. I. Washburn, Worcester, Mass.

First, I claim the arrangement upon one piston rod of the double-acting operating piston in its own cylinder and a valve or valves attached to said piston rod and operating within a valve chamber in line with said cylinder, substantially as described.

Second, I claim the combination with each other of two such arrangements as expressed in the above claim, the valves attached to a given piston rod in each case governing the induction and eduction parts of the opposite steam cylinder, in which reciprocates the other piston rod, substantially as described.

Third, I claim a valve operating in connection with an exhaust port or pipe, to permit the egress of steam and prevent reflux thereof, for the purpose described.

62,714.—FILTER.—George Waite, New Orleans, La., administrator of the estate of John Watts, deceased.

I claim a water filter and cooler having the chamber, B, the cylinder, H, perforated at a, filtering material, C, cylinder, H', perforated at a', chamber, D, and clear water chamber, E, all arranged as herein set forth, for the purpose specified.

62,715.—APPARATUS FOR MAKING VINEGAR.—Wendelin Weis, St. Paul, Minn.

I claim an apparatus for making vinegar which consists of the boxes, C C, troughs, D D, or blocks, F or G, all made and operating substantially as and for the purpose herein shown and described.

62,716.—PLATE LIFTER.—Dan Welch, Lowell, Mass., assignor to H. A. Hildreth, Lowell, and W. J. Johnson, Newton, Mass.

I claim the combination of the fixed and swinging jaws, B and C, arranged substantially as described and for the purpose fully set forth.

62,717.—OINTMENT FOR TREATING DISEASES IN HORSES AND OTHER ANIMALS.—John S. Williams, Warsaw, Ohio.

I claim the improved Spanish ointment for treating the diseases of horses, prepared substantially as herein set forth and described.

62,718.—PORTABLE FENCE.—Eli York, Windsor, Ill.

I claim the combination of the post, A, mud sills, B, braces, C, planks, D, connecting bars, E, and cross bars, G, substantially as described for the purpose specified.

62,719.—SHIFTING RAIL FOR CARRIAGE SEATS.—Joseph Zahm, Fredonia, N. Y.

I claim the joint and lever above described and the use and application of the same for the uses and purposes above described.

62,720.—HINGE.—John Hartzell Zinn, Idaville, Pa., assignor to himself and Peter D. Johns.

First, I claim attaching the socket or knuckle, c, to the leaf centrally so as to project equally on each side of the leaf at the point of attachment, substantially as herein shown and described.

Second, I claim the leaves, A and B, constructed with the parts, a and b, of different thickness and arranged to shut together, as shown and described.

Third, I claim a loose joint butt hinge, constructed and arranged to operate as herein set forth.

62,721.—STEAM VALVE.—John Zundorff, New York City.

I claim the expansive movable ring, b, with longitudinal slot, n, and ports, m m', when constructed substantially as described and for the purposes set forth.

62,722.—SAFETY VALVE.—John Zundorff, New York City.

I claim the spherical-formed pipe, p, in combination with the ports, G G' G'' G''', when constructed and operated substantially as described.

Second, The combination of the valve, F, and ports, G G' G'' G''', for the purpose specified.

Third, The spring, b, in combination with the piston, d, shippers, g and f, when operated as above described.

62,723.—PROPELLER.—R. D. Chatterton, Bath, England.

First, I claim the arrangemedt of the valved diaphragms, G G', in the tube, A, constructed as described and operated simultaneously by means of a connecting device of rack and wheel, or equivalent, for the purpose specified.

Second, The arrangement of the valves, G G' H H' the racks and pinions and the reversing apparatus, I J K, or equivalent device, as set forth.

Third, I claim the combination with the longitudinal tube, A, of the direct action engine and pump acting between valved diaphragms connected for simultaneous adjustment and reversal, substantially as described.

REISSUES.

2,500.—WAGON.—Edgar Huson, Ithaca, N. Y.—Patented Feb. 17, 1857.

First, I claim as my invention the use of two or more side splinter bars, when they extend from any convenient point at or near the forward ends of the side springs to the head block; and the use of the said splinter bars whether attached directly to the forward ends of the said side springs, or by any convenient means intervening between them, as described.

Second, I claim fastening the pole or thills to the side splinter bars, or other convenient part of the platform or frame at or near or in rear of the ends of the side springs, as described.

Third, I claim so making the frame or platform as to leave the extremities of it open so as to receive the pole or thills between and back of the forward ends of the side springs, thus bringing the team or horse nearer the wagon thereby lessening the draft and requiring less room in which to turn.

2,501.—FORMING EMERY WHEELS AND GRINDING AND POLISHING SURFACES.—The New York Quartz Company, New York City, assignees by mesne assignments of George E. Van Derburgh. Patented Jan. 7, 1862.

I claim, First, The combination of the particles of emery or other gritty or cutting materials into an artificial stone or substance for grinding, polishing or other purposes by the vitrifaction or partial vitrifaction of any suitable vitriscent flux previously intermingled with said particles, all substantially in the manner herein set forth.

Second, The combination of sand or particles of emery, ground glass, or any other suitable gritty or cutting particles with an alkaline silicate or other vitrescent flux for the purpose of producing an artificial grinding and polishing stone, by the vitrifaction of said flux under the influence of heat, substantially in the manner herein set forth.

Third, I claim also curing and hardening a plastic combination of gritty particles with a vitrescible flux by first subjecting the same to a moderate heat until dry and afterwards to the action of a higher temperature until a partial or entire vitrifaction of the flux is produced, substantially in the manner herein set forth.

NOTE.—FIFTY-FIVE patents in the above list were obtained through the agency of the Scientific American.

EXTENSION NOTICES.

Lucy A. Pope, administratrix of the estate of Augustus R. Pope, deceased of Somerville, Mass., having petitioned for the extension of a patent granted to the said Augustus R. Pope on the 21st day of June, 1853, for an improvement in electro-magnetic alarms, for seven years from the expiration of said patent, which takes place on the 21st day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 3d day of June next.

Alexander J. Walker, of New York City, having petitioned for the extension of a patent granted to him on the 24th day of May, 1853, for an improvement in spirit lamps, for seven years from the expiration of said patent, which takes place on the 24th day of May, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of May next.

Zur Beachtung für deutsche Erfinder.

Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten. —

Erkundigungen über die, zur Erlangung von Patenten nöthigen Schritte, können in deutscher Sprache schriftlich an uns gerichtet werden und Erfinder welche persönlich nach unserer Office kommen, werden von Deutschen prompt bedient werden. Man adressire

MUNN & CO.,
37 Park Row, New York.

Extensions.—The applicant for an extension must file is petition and pay in the requisite fee at least ninety days prior to the expiration of his patent. There is no power in the Patent Office to renew a patent after it has nce expired. The preliminary business to extend a patent should be commenced at least six months prior to the expiration.

Many valuable patents are annually expiring which might readily be extended, and, if extended, might prove the source of wealth to their fortunate possessors.

All the documents connected with extensions require to be carefully drawn up and attended to, as any failure discrepancy, or untruth in the proceedings or papers is liable to defeat the application.

In case of the decease of the inventor, his administrator may apply for and receive the extension; but no extension can be applied for or granted to an assignee of an inventor. Parties desiring extensions will address MUNN & CO., 37 Park Row, N. Y.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

The general rule is, that whatever is really embraced in the original invention, and so described or shown that it might have been embraced in the original patent, may be the subject of a reissue.

Reissued patents expire at the same time that the original patent would have done. For this reason, applications for reissue will be acted upon immediately after they are completed.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts.

One or more divisions of a reissue may be granted, though other divisions shall have been postponed or rejected.

In all cases of applications for reissues, the original claim is subject to re-examination, and may be revised and restricted in the same manner as in original applications.

But in all such cases, after the action of the Patent Office has been made known to the applicant, if he prefers the patent originally granted to that which will be allowed by the decision of the Office, he has the privilege of abandoning the latter and retaining the old patent.

The documents required for a Reissue are a Statement, Petition, Oath, Specification, Drawings. The official fee is $30. Our charge, in simple cases, is $30 for preparing and attending to the case. Total ordinary expense, $60. Reissues may be applied for by the owners of the patent.

By means of Reissue, a patent may sometimes be divided into several separate patents. Many of the most valuable patents have been several times reissued and subdivided. Where a patent is infringed and the claims are doubtful or defective, it is common to apply for a Reissue with new claims which shall specially meet the infringers.

On making application for Reissue, the old or original patent must be surrendered to the Patent Office, in order that a new patent may be issued in its place. If the original patent has been lost, a certified copy of the patent must be furnished, with affidavit as to the loss. To enable us to prepare a Reissue, the applicant should send to us the original patent, remit as stated, and give a clear statement of the points which he wishes to have corrected. We can then immediately proceed with the case. Address MUNN & CO., 37 Park Row, New York. We have had great experience in obtaining Reissues.

Disclaimers.—Where, by inadvertence, accident, or mistake, the original patent is too broad, a Disclaimer may be filed either by the original patentee, or by any of his assignees.

Foreign Patents.

American inventors should bear in mind that, as a general rule, an invention which is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. In England the law does not protect the right of a foreign inventor as against the first introducer of an invention from abroad. For twenty years past the great majority of patents taken out by Americans in foreign countries have been obtained through Munn & Co's agency. Patents are secured with the utmost dispatch in Great Britain, France, Prussia, Belgium, Russia, Austria, Italy, The Netherlands, Spain, Sweden, Australia, and other foreign countries. Models are not required, but the utmost care and experience are necessary in the preparation of applications. Patentees who intend to take out Foreign Patents should send to us for a Pamphlet of full advice. Address

MUNN & Co., No. 37 Park Row, N. Y.

Advertisements.

The value of the Scientific American *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

RATES OF ADVERTISING.

Back Page.....75 *cents a line.*
Back Page, for engravings.....$1.00 *a line.*
Inside Page.....40 *cents a line.*
Inside Page, for engravings.....60 *cents a line.*

HUTCHINSON & LAURENCE, 8 Dey st., Have on hand, and furnish to order, Steam Engines and Boilers, Circular-saw Mills, Cotton Gins, Iron & Wood-working Machinery, Shafting, Belting, etc. 12 4*

PLATINUM—In ALL FORMS, for ALL purposes. Platinum scrap and ore purchased. 12 3*] H. M. RAYNOR, Office 748 Broadway, N. Y.

IMPORTANT to EVERY HOUSEKEEPER—Read advertisement, No More Poor Bread, in No. 11 Scientific American. 12 4

GRIST MILL AND FACTORY SITE near New York, for sale cheap. Address 12 3] H. D. BEACH, Tom's River, N. J.

GREAT POPULAR NOVELTY.—Work-holder, Needle-threader, Spool-holder, Thread-cutter, Buttonhole-cutter, Scissors and Knife Sharpener, all combined in one ornamental instrument. Is indispensable to both old and young ladies. Price only $1. Very liberal terms to agents. For sample and full particulars address JOHN H. MARTIN, 1*] Hartford, N. Y.

EXCELSIOR!



LONGSHORE'S PATENT

COMBINED STOVE HANDLE and HOUSEHOLD TOOL,

will fit and lift with convenience and safety any stove lid, skillet, frying pan, bread pan, pot, kettle, pie plate, pudding pan, stew pan, roasting pan, pie pan, or any other hot vessel or dish used about a stove, open the stove, and turn the dampers. It is also a complete carpet tool. Stretches carpets, drives tacks, draws tacks, cracks nuts, etc., etc., and is a perfect hammer and pincers for a hundred other uses. The whole is complete, convenient, and durable, made of good material, and neatly finished. It is an article needed in the kitchen, it is wanted in the parlor, it is convenient in the store room, it is useful in the shop, it is handy in the office. It is appreciated by everybody, *and in reach of all*. Sample sent on receipt of 50 cents. For terms, address

LONGSHORE & BRO.,
Sole Manufacturers and Proprietors,
Mansfield, Ohio

BAIRD'S PRACTICAL AND SCIENTIFIC BOOKS.

LIST NO. 6.

KENTISH.—A Treatise on a Box of Instruments, and the Slide Rule; with the Theory of Trigonometry and Logarithms, including Practical Geometry, Surveying, Measuring of Timber, Cask and Malt Gauging, Heights and Distances. By Thomas Kentish. In one volume, 12mo.....$1 25.

LARKIN.—The Practical Brass and Iron Founder's Guide: A Concise Treatise on Brass Founding, Molding, the Metals and their Alloys, etc.: to which are added Recent Improvements in the Manufacture of Iron, Steel, by the Bessemer Process, etc., etc. By James Larkin, late Conductor of the Brass Foundry Department in Reaney, Neafie & Co.'s Penn Works, Philadelphia. Fifth edition, revised, with Extensive Additions. In one volume, 12mo.....$2 25.

LIEBER.—Assayer's Guide: or, Practical Directions to Assayers, Miners, and Smelters. By Oscar M. Lieber. 12mo, cloth.....$1 25.

LOVE.—The Art of Dyeing, Cleaning, Scouring, and Finishing, on the most Approved English and French Methods: being Practical Instructions in Dyeing Silks, Woolens, and Cottons, Feathers, Chips, Straw etc.; Scouring and Cleaning Bed and Window Curtains, Carpets, Rugs, etc.; French and English Cleaning, any Color or Fabric of Silk, Satin, or Damask. By Thomas Love, a Working Dyer and Scourer. In 1 vol., 12mo.... $3 00.

LOWIG.—Principles of Organic and Physiological Chemistry. By Dr. Carl Lowig. Translated by Daniel Breed, M.D. 8vo, sheep.....$3 50.

MAIN AND BROWN.—The Marine Steam Engine. By Thomas J. Main, Professor of Mathematics, Royal Naval College, and Thomas Brown, Chief Engineer, R. N. Illustrated by engravings and woodcuts. 8vo, cloth.....$5 00.

☞ THE TEXT BOOK OF THE U. S. NAVAL ACADEMY. ☜

Contents: Introductory chapter—the boiler; the engine; getting up the steam; duties to machinery when under steam; duties to machinery during an action or after an accident; duties to engine, etc., on arriving in harbor; miscellaneous; appendix.

MAIN AND BROWN.—Questions on Subjects connected with the Marine Steam Engine, and Examination Papers; with hints for their Solution. By Thomas J. Main, Professor of Mathematics, Royal Naval College, and Thomas Brown, Chief Engineer R. N. 12mo, cloth.....$1 50.

MAIN AND BROWN.—The Indicator and Dynamometer, with their Practical Applications to the Steam Engine. By Thomas J. Main and Thomas Brown. With Illustrations.....$1 50.

MAKINS.—A Manual of Metallurgy, more particularly of the Precious Metals, including the methods of Assaying them. Illustrated by upward of 50 engravings. By George Hogarth Makins, M.R.C.S., F.C.S., one of the Assayers to the Bank of England; Assayer to the Anglo-Mexican mints; and Lecturer upon Metallurgy at the Dental Hospital, London. In 1 vol., 12mo.....$3 50.

Contents: General properties of the metals; general view of the combining properties of the metals; combination of metals with the non-metallic elements; of metallic salts; of heating apparatus, furnaces, etc.; of fuels applicable to metallurgic operations; metals of the first class; metals of the second class; the principles of electro-metallurgy.

Marble Worker's Manual: Containing Practical Information respecting Marbles in general, their Cutting, Working, and Polishing; Veneering, etc., etc. 12mo, cloth.....$1 50.

☞ The above, or any of my Books sent by mail, free of postage, at the publication price.

☞ My new Catalogue of Practical and Scientific Books, will be sent free of postage to any one who will favor me with his address.

HENRY CAREY BAIRD,
Industrial Publisher,
12 1] 406 Walnut street, Philadelphia.

TO STOVE FOUNDERIES—Valuable Patent for sale. Wilson's combined funnel elbow and damper. See Scientific American of March 9, 1867. Address WILSON & WOOD, 12 4*] Wilmington, Del.

NATIONAL INVENTORS' EXCHANGE, 208 Broadway, New York. BRANCHES THROUGHOUT THE UNITED STATES. Send stamp for Circular. 12 2*

TAYLOR'S PATENT GROOVERS.—These groovers will cut a perfect groove, across and with the grain, ¼ to 1¼ inch wide and ¾ deep—price $35. Sold only by S. C. HILLS, 12 Platt street, N. Y., who has for sale all kinds of machinery 12 4

SPOR'S CHANGE WHEEL TABLES for SCREW CUTTING. Price 25 cents. Sent by mail. An agent wanted in every shop. JOHN W. FRANCIS, 1*] Care of Industrial Works, Philadelphia, Pa.

SHIPBUILDING—
THEORETICAL AND PRACTICAL.
Illustrated by a series of engravings from drawings furnished by the most eminent British shipbuilders. By J. Macquoon Rankine, C.E. 1 vol. folio, half Russia, $40. For sale by D. VAN NOSTRAND, 1 192 Broadway.

WANTED—TO EXCHANGE A VALuable Patent Right for the Western States for as valuable a one for the Middle and Eastern States. Address Post-office Box 467, Northampton, Mass.

"STAR SPANGLED BANNER"—A large 8 page illustrated paper, cheapest and funniest paper out. Full of fun, fact and fancy. Only 50 cts. for a whole year, and a gift free to EVERY subscriber, worth from 50 cents to $25. Send 50 cents for a year, or a specimen sent for 10 cents. Address STAR SPANGLED BANNER, Hinsdale, N. H. 12 1—R.

BLYMYER, DAY & CO., Mansfield, Ohio, Manufacture **Blacksmith's Drills and Screw Cutters,** for hand use.
Drag and Circular Sawing Machines, 1, 2, and 4 horse.
Cutting Boxes. The Eureka.
Corn Shellers, Star Pattern.
Cider Mills. The Eureka.
Sulkey Revolving Rake. New thing and best extant.
Garden Cultivator, Crawford's Patent.
Cane Mills. Victor Pattern.
Evaporators. Cook's—for Sorgo or Maple.
Amalgam Bells. For Church, School, and Farm.
Refrigerators. New Principle.
Pure **Sorgo** and **Imphee Seed,** Selected varieties. Send for Circular. 12 eow3*]

RENNIE'S LATHE
For Turning Nulled Work, Mouldings, and other Ornamental Turning; chair stuff, broom handles, fork handles, and all such work usually done by a Gage Lathe.

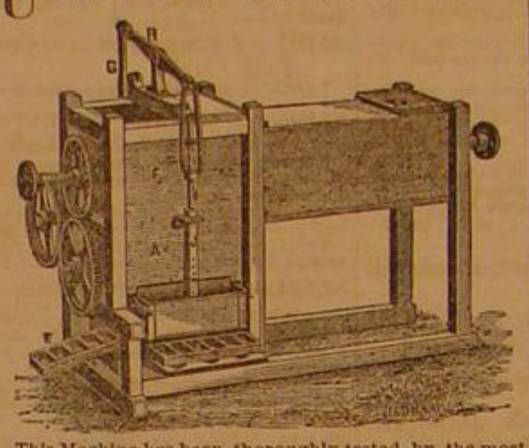
This Lathe is the "Ne Plus Ultra" of simplicity, and for neatness and accuracy of working, and also for the rapidity with which it accomplishes its work, it has no rival. The device can be easily attached to any common Lathe for turning wood, and can be operated by any person not acquainted with the art of Turning, by a very little practice.

The price has been reduced fifty per cent since they were first introduced, and is cheaper than any similar Machine in the market. Rights to manufacture for sale.

Agents wanted. For further particulars address F. Y. PAYNE,
1*] Binghamton, Broome County, N. Y.

FOR SALE.—Foundery, Machine Shop and Planing Mill, at Waukegan, Ill., thirty-five miles north of Chicago, on the Lake Shore, with a good supply of patterns suited to the times, including patterns for four sizes Stationary Engines, Sheep-right Patterns and Flasks for Leonard's Seamless Thimble Skeins, suitable Machinery for Finishing and for Sash, Blinds, and Doors, Planing and Resawing Lumber, with sufficient Power. Will be sold low to a cash customer. Apply to the subscribers, TIFFANY & LUCAS,
12 6*] Waukegan, Ill.

UNIVERSAL BRICK MACHINE.—



This Machine has been thoroughly tested by the most extensive Brickmakers in the country, who consider it the best. Its principal advantage is that it is a horizontal machine, which makes it superior over any other for making the best Front or Common Brick. Its construction is very simple, and is not liable to get out of order. All machines are warranted. For circular, with full description, address FREEMAN JACOBIE, No. 254 Broadway, New York, or JOHN BRIDGFORD, Albany, N. Y.

HEADS AND CHARACTERS.—Hons. B. F. Wade, John B. Alley, B. F. Boyer, J. W. Patterson, J. H. Farquhar, R. B. Hayes, R. P. Buckland, Wm. Lawrence, Martin Welker, S. E. Ancona. Also, Mr. Thomas C. Durant, N. P. Willis, with Portraits, Biographies, and Characters. Indian Legends; Mental Telegraph; Woman's Rights and Woman's Wrongs; Plain Words to Big Boys: The Teacher; Hints to Travelers; Visiting the Sick; Health at Home; A Trip to Omaha; Flogging; Parental Influence; Going to Paris; Pope's Essay on Man, etc., in March number Phrenological Journal. Only 20 cents, or $2 a year. News men have it. Address 12 2] FOWLER & WELLS, 389 Broadway, N. Y.

THE "McGOWAN" AND "BUCKEYE" Double-acting Hand and Power Pumps, for railroads, factories, mills, etc. Manufactured by McGOWAN BROTHERS, 94 and 96 Elm street, Cincinnati, Ohio. ☞ Send for circular. 12 4

LOOK HERE!—Something for everybody. For sale, the right for an article of daily use. Agents wanted in every town and county. Send stamps for circular. Address Joseph L. Routzahn, Frederick City, Md.

$25 WILL PURCHASE THE COUNTY Rights of three Patents, including 150 books and a silver watch. Send stamp for circular. M. L. BYRN, 82 Cedar street, New York; Box 4,669, Post-office. 1*



CHASE'S IMPROVED Dollar Microscope, illustrated full size in Scientific American, Jan. 26. Most valuable, amusing, interesting, instructive, and useful thing in the world for old and young, adapted to counterfeit money, cloth, flowers, pictures, living insects, etc., etc. Sent by mail on receipt of $1, with directions, etc. Trade supplied. Address O. N. CHASE, 9 La Grange street, Boston, or, FOWLER & WELLS, New York.

FIRE AND POWER PUMPS.—For simplicity, efficiency, and durability there is not to be found the equal of B. Holley's Patent Rotary Power Pump, manufactured by the Holly Manufacturing Company, Lockport, N. Y. The Pumps have all of Mr. Holly's recent improvements and are made under his immediate superintendence. For full particulars, send immediately for new and enlarged illustrated catalogue and price list. T. T. FLAGLER, President. J. K. McDONALD, Treasurer.

FOREMAN WANTED—For a medium size Foundery in Massachusetts. A man of character and stability, thoroughly acquainted with his business, will find a desirable situation. Kind of castings—Machinery. Quality required—*the best*. No person connected with the "Molder's Union" need apply. Box 6029 New York Post-office. 12 2*

WOOD BENDER, with ADJUSTABLE Self-yielding and Compression, for Fellies, Shafts, Bows, Poles, Bob and Cutter Runners, etc. Also, for the heaviest Ship and Boat Timbers. Warranted superior to any machine now in use. Photographs sent. H. E. STAGER, Patentee and Builder, 1*] 128 Fowler street, Milwaukee, Wis.

ONE-HALF OF ONE OF THE MOST VALUABLE PATENT RIGHTS OF THE UNITED STATES will be sold for $5000. Articles required in every family. One-half of the amount must be in cash, the balance may be paid out of 25 per cent of the profits. All the particulars will be satisfactorily given. Address S., 1*] Room 20, 155 and 157 Broadway.

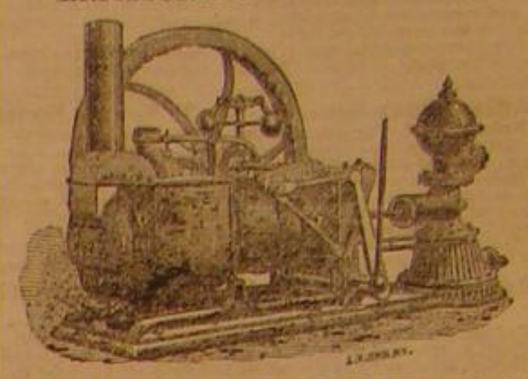
GUN MACHINERY.—For Sale, part or or the whole of a select lot of special machines, in perfect working order, comprising among others, Rifling Machines, Barrel Drills, Barrel Lathes, Barrel Polishing, Edging Machines, Revolving Head Lathes, etc., etc., and many valuable fixtures. Address W. NICHOLS, JR., 12 2—N.] Box 1013, Boston, Mass.

AGENTS WANTED IN EVERY TOWN and City in the U. S., to sell my improved flat-iron Holder, Patented Feb. 19, 1867. Can be sold in every family. Sample Boxes, containing 1 doz. Holders, sent to any address on receipt of $3. LEWIS HOVER, 12 3*] Box 23, Chicago, Ill.

TAKE YOUR CHOICE.—
We will send a $55 SEWING MACHINE, either Wheeler & Wilson or Grover & Baker, to any person sending us the names of EIGHTEEN new subscribers to the NEW YORK OBSERVER, with the money ($65) for one year in advance. We have sent away, as premiums, more than FIVE HUNDRED of these machines, and they give universal satisfaction.
Sample copies and Circulars sent free.
TERMS, $3 50 A YEAR IN ADVANCE.
SIDNEY E. MORSE, JR., & CO.,
12 1—B.] 37 Park Row, New York.

PUMPING ENGINES.

ERICSSON'S CALORIC PUMPS,



FOR ECONOMY, DURABILITY, and EFFICIENCY UNEQUALED. Have been in use on the Erie, Central, Hudson River, and Harlem, and other roads for eight years.

HUDSON RIVER RAILROAD,
SUPERINTENDENT'S OFFICE,
New York, January 30, 1867.

JAMES A. ROBINSON, Esq.,

Dear Sir:—In reply to your request of the 28th inst., I am pleased to state the result of our experience in the employment of the Ericsson Caloric Engines for "pumping." We have five of them in use of 18 and 24 inch sizes, raising water different hights from 22 to 80 feet, and in one case drawing and forcing it more than 1,500 feet horizontally, in addition to the elevation. Our first engines have been in service about seven years. All have performed their work satisfactorily, more particularly those built at your Works, being more thoroughly constructed than our earlier ones (built by other parties), their cost of repairs is reduced to a trifling amount. We now use Caloric Engines exclusively at all stations where an independent power is required for supplying water. At different points we have substituted them for Steam Engines, with decided advantage in all respects.

My own judgment is that the "Hot Air Engine," as now constructed (its capacity being properly suited to its work) affords the *most* economical, and, in every respect the *best power obtainable*. It consumes much less fuel than the best Steam Engine. It is absolutely safe against explosion and self-injury from "low water." Is much safer on account of fire. Has no feed pump nor pipes to freeze up, and become useless when not running. It requires no *mechanical* skill and very little labor or attention to keep it regularly at work, and consumes far less time than steam to get in operation after starting fires. Another important advantage is, that all the escape heat is easily utilized for warming Tank Houses and Water without danger from fire. In short, I may say, I consider the Caloric Engines better adapted for universal use than any prime mover known for work within their limit. Respectfully yours,

A. F. SMITH, General Superintendent.

☞ Orders promptly filled.
JAMES A. ROBINSON,
164 Duane street, corner Hudson, New York.

REGNAULT'S MAGNIFICENT TREATISE ON CHEMISTRY,
Already introduced as a Text Book in many of the Schools, Academies, and Colleges in the United States, including the University of Pennsylvania, Jefferson Medical College, Harvard University, etc.

ELEMENTS OF CHEMISTRY, by M. V. Renault. Translated from the French by T. Forrest Betton, M. D., and edited, with notes, by James C. Booth, Melter and Refiner, United States Mint; and William L. Faber, Metallurgist and Mining Engineer. Illustrated with nearly Seven Hundred Wood Engravings. In two volumes, 8vo., Cloth, comprising nearly 1,500 pages. Price, $10.

CONTENTS:

VOLUME I.—French and English Weights, etc., Introduction, Crystallography, Chemical Nomenclature, Metalloids, Oxygen, Hydrogen; Compounds of Hydrogen and Oxygen, Atmospheric Air, Compounds of Nitrogen and Oxygen, Compound of Nitrogen and Hydrogen, Compounds of Sulphur and Oxygen, Compounds of Sulphur and Hydrogen, Compound of Sulphur and Nitrogen, Selenium, Tellurium, Chlorine: Compounds of Chlorine and Oxygen, Compound of Chlorine and Hydrogen, Compounds of Chlorine and Sulphur, Compounds of Chlorine and Nitrogen. Bromine, Iodine, Fluorine, Phosphorus: Compounds of Phosphorus and Oxygen, Compounds of Phosphorus and Hydrogen. Arsenic: Compounds of Arsenic and Oxygen. Researches on Poisoning by Arsenic. Boron, Silicum, Carbon: Compound of Carbon and Oxygen, Compounds of Carbon and Hydrogen; Compound of Carbon and Sulphur, Compounds of Carbon and Nitrogen. On the Equivalents of Metalloids. Metals—Geology, Physical Properties of the Metals, Chemical Properties of the Metals: Alloys, Properties of Metallic Oxides, Properties of Metallic Chlorides; Properties of Metallic Bromides, Iodides, and Sulphurides; Properties of Metallic Phosphurets and Arsenurets. On Salts: Solubility of Salts, Decomposition of Salts by Acids, Decomposition of Salts by Bases, Reciprocal Action of Salts on Salts, Mutual Action of Salts in the Dry Way, Mutual Action of Salts in the Wet Way, Determination of the Electro negative Body of a Salt or Binary Compound.

I. Alkaline Metals.—Potassium: Compounds of Potassium and Oxygen, Compounds of Potassium and Sulphur, Distinctive characters of the Salts of Potassa. Sodium: Compounds of Sodium and Oxygen, Compound of Sodium and Chlorine. Distinctive Characters of the Salts of Soda. Lithium, Ammonia: Distinctive Characters of Ammoniacal Salts.

II. Alkalino-Earthy Metals.—Barium: Salts of Protoxide of Barium or Baryta, Compounds of Barium and Sulphur and Chlorine. Strontium: Salts of Protoxide of Strontium or Strontia, Salts of Strontium with Sulphur and Chlorine. Calcium: Salts of Protoxide of Calcium or Lime; Sulphide, Chloride, and Fluoride of Calcium; Distinctive Characters of the Salts of Calcium. Magnesium: Salts of Magnesia, Distinctive Characters of the Salts of Magnesia.

III. Earthy Metals.—Aluminum: Salts of Alumina, Distinctive Character of the Salts of Alumina. Glucinum, Zirconium, Thorinum, Yttrium, Erbium, Terolum, Cerium, Lanthanum, Didymium. Chemical Arts dependent on the preceding bodies—Gunpowder, Lime and Mortar, Glass: Kinds of Glass, Imperfections and Alterations of Glass. Pottery: Pottery, the Paste of which becomes compact by burning; Pottery, the paste of which remains porous after burning. Ornaments and Painting: Chemical Analysis of earthenware.

VOLUME II.—Preparation of Ores, Manganese, Iron: Reduction in the Blast Furnace. Chromium, Cobalt, Nickel, Zinc, Cadmium, Tin, Titanium, Columbium, Niobium, Pelopium, Ilmenium; Lead, Metallurgy of; Bismuth, Metallurgy of; Antimony, Metallurgy of; Uranium, Tungsten, Molybdenum, Vanadium: Copper, Metallurgy of; Mercury, Metallurgy of; Silver, Metallurgy of; Gold, Metallurgy of; Platinum, Osmium, Iridium, Palladium, Rhodium, Buthenium.

IV. Organic Chemistry.—Introduction: Ultimate Analysis of Organic Substances, Construction of a Formula, Analysis of Gases. Essential Proximate Principles of Plants: Cellulose, Albuminous Vegetable Substances, Amylaceous Substances, Sugar, Gelatinous Principles; Action of Acids on Lignin, Starch, and Sugar; Spontaneous Decomposition of Plants, Alcoholic Fermentation. Acids existing in Plants, Organic Alkaloids, Neutral Substances in Plants, Nitrils, Essential Oils: Benzole Series, Salicin, Oil of Cinnamon, Coumarin, Oil of Aniseed, Oil of Cumin, Oil of Cloves, Amylic Alcohol, Enanthic Acid, Caoutchouc, Oil of Garlic. Products of Dry Distillation, Fats, Organic Coloring Matters, Action of Plants on the Atmosphere: Animal Chemistry, Secretions, Excretions; Technical Organic Chemistry, Manufacture of Bread, Brewing, Cider and Perry, Wine making, Beet Sugar, Cane Sugar, Sugar refining, Manufacture of Bone Black, Soap boiling, Principles of Dyeing, Mordants, Calico printing, Tanning, Charring Wood and Coal, Manufacture of Illuminating Gas.

☞ The above, or any other of my Practical and Scientific Books sent by mail free of postage, at the publication price. Post-office order the best form of remittance.

☞ My new Catalogue sent free of postage to any address. HENRY CAREY BAIRD,
Industrial Publisher,
1 t.] 406 Walnut st., Philadelphia.

TWO OF THE MOST SOLIDLY useful family monthlies of their kind in the world. AMERICAN AGRICULTURALIST, $1.50 a year. HALL'S JOURNAL OF HEALTH, same—are sent during 1867 for $2.15 if sent to Hall's Journal of Health, No. 2 West 45d street during this month. 1*

PATENTEES TAKE NOTICE.
Having made large additions to our works, we can add one or two machines to our list of manufactures. The machines must be strictly first class, and well protected. BLYMYER, DAY & CO., Manufacturers of Agricultural Machines and Tools Mansfield, Ohio. 9 tf

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports, etc., on the useful arts. 1 tf

THE CELEBRATED "SCHENCK" WOODWORTH PLANERS, WITH NEW AND IMPORTANT IMPROVEMENTS, Manufactured by the SCHENCK MACHINE CO., MATTEAWAN, N. Y. JOHN B. SCHENCK, President. T. J. B. SCHENCK, Treas. 11 tf

MACHINE AGENCY IN RUSSIA.—A young man, with first-class references, who leaves in a short time for St. Petersburg, and who has connections throughout the whole Russian empire, will accept agencies for agricultural and other machines, tools, etc. Address letters to S. S., Post-office Box 3750, N. Y. 11 2*

$25 A DAY! Fifteen new articles for Agents. [11 13 N.] O. T. GAREY, Biddeford, Me.

500 AGENTS Wanted in a new business. 11 13 N.] H. B. SHAW, Alfred, Me.

$125 Per Month and expenses. Shaw & Clark S. M. Co., Biddeford, Me. 11 4 N.

WANTED—3 Steel Letter and Stencil die cutters. E. H. PAYN, Manufacturer Stencil Tools and Stock, Payn's Block, Burlington, Vt. 11 2*

STEAM ENGINES—OF ANY POWER desired for manufactories, of superior construction, with patent frictionless slide valve and variable expansion. Address M. & T. SAULT, New Haven, Conn. 11 tf

ROLLING MILL ENGINES—WITH Sault's patent Frictionless Slide Valve, link motion reverse gear, shafting, hangers, mitre gear, etc. Address 11 tf] M. & T. SAULT, New Haven, Conn.

MATCHES.—FOR SALE—
A set of machines for the Manufacture of the Square Match, with frames, slats, and tools complete, for sale at a low price. THOMAS ALLEN,
11 4*] 321 Olive street, St. Louis, Mo.

AMES' Celebrated Portable and Stationary STEAM ENGINES,
All Sizes, and Superior to all others. Also, PAYES' PATENT TRIP HAMMER.
Write for Circular. [11 4*] H. M. AMES, Oswego, N. Y.

COAL TAR COLORS.
TO DYERS AND CALICO PRINTERS.
Prof. H. Dussauce, Chemist, is ready to furnish processes for dissolving coal tar colors in water, without the use of alcohol, wood naphtha, or other costly materials.
For further information Address
Prof. H. DUSSAUCE,
1*] New Lebanon, N. Y.

FABRICATION OF VINEGAR.—
Prof. H. DUSSAUCE, Chemist, is ready to furnish methods of manufacturing vinegar by the slow and quick processes, with and without alcohol, directly from corn. Also, process to manufacture vinegar and acetic acid by the distillation of wood. Methods of assaying commercial vinegars. Address
1*] New Lebanon, N. Y.

BARNES' Patent SHINGLE MACHINE.—State and county Rights of this unsurpassed machine for sale. It will cut shingles, box stuff, veneering, staves, laths, etc., more rapidly than any other machine, with less power, and can be changed from one to the other instantly. Address H. D. BARNES,
11 4*] Fair Haven, Conn., for machines or information

AN AMERICAN MAN OF 15 years' experience in the construction and management of Marine, Stationary, and Locomotive Engines, wishes to get a situation as Master Mechanic on some Railroad in the United States. Address
11 2*] Box 481, Providence, R. I.

NASBY'S "ANDROO JOHNSON'S Comic Life and Western Trip." It's rich, contains 40 "Kurus Kuts." 100,000 sold. Mailed free 10 for $1; 100 for $8; single copy 20 cents. Address
11 2—R.] HUNTER & CO., Hinsdale, N. H.

SPICE CAN and BLACKING-BOX Makers will find it to their interest to use Painter's Patent Method of Fastening without Solder, a neat and secure joint being expeditiously made from the tin at a fraction of the cost of soldering. Thirty machines in use by leading manufacturers. Full particulars, references, and samples furnished by the proprietors.
WM. PAINTER & CO.,
19 4] 45 Holliday street, Baltimore, Md.

— MACHINERY. —
FOR SALE—Six Double Engines, Boilers etc., 36-H. P., made in England, first-class work, complete and new. Will be sold at much less than cost.
19 4*]2 OBER NANSON & CO., 43 Broad street.

PATENTED JAN. 1, 1867.—GRAY'S Wear Plates for the Soles and Heels of Boots and Shoes. State and County Rights for sale. A model heel, with wear plate inserted, sent to any address on receipt of 75c. Address John Gray, Box 58, East Aurora, N.Y. 19 4*

CARPENTERS, BUILDERS, AND ARchitects send for circular of Cummings', and Millers', and other new Architectural Works.
9 4*] A. J. BICKNELL, Troy, N. Y.

S. HEALD & SONS, Barre, Mass., build the most accurate Lever-setting Portable Circular Saw Mills. Prices low. Send for Circular. 6 3*

LE COUNT'S IMPROVED HOLLOW Lathe Dog, the lightest, strongest, neatest, and cheapest made. A set of 8 dogs, from ⅜ to 2 inches, $8. 12 dogs to 4 inches, $17 50. Send for circular. The trade supplied. C. W. LE COUNT,
19 13*] South Norwalk, Conn.

H. VAN DE WATER'S CELEBRATED TURBINE WATER WHEEL.—This celebrated wheel has been thoroughly tested by the side of the best wheels—claimed to be—in the country, and with the same amount of water used, my wheel proved to be far superior; for the facts of which I respectfully refer you to my printed price list circular, which will be forwarded on application with stamp. Address
tf H. VAN DE WATER, Buffalo, N. Y.

A MESSIEURS LES INVENTEURS—Avis important. Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Français peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toute communications recived in confidence.
MUNN & CO.,
Offic American Office, No. 37 Park Row, New York

EASTHAMPTON PUMP AND ENGINE COMPANY.
Manufacturers of RODIER'S PATENT STEAM PUMP.
DIRECTORS:
Hon. Samuel Williston.....Easthampton
James Sutherland (Williston Mills).....Easthampton
R. G. Knight (Williston, Knight & Co.).....New York
E. H. Sawyer (Nashawannuck Mfg. Co.).....Easthampton
J. W. Winslow, M. D.....Easthampton
LOUIS C. RODIER, Superintendent.
J. B. GARDINER, General Agent,
Springfield, Mass.
A contract with the Ames Manufacturing Company, of Chicopee, Mass., has been made which will enable us to fill all orders with promptness after the first of April next. They will be from 20 to 50 per cent stronger built than pumps now in use, and the reputation of the builders warrants us in stating that no superior workmanship can be found in their line. They are extremely simple in construction, having no eccentric, tappet arm, or other complicated valve motion, and present numerous other advantages which will readily be seen on examination.
The Ames Company have facilities for building the largest sizes, and orders are especially solicited for pumping engines for towns, cities, and mines, as well as for fire and boiler purposes. Address communications to
J. B. GARDINER, General Agent,
10 tf] Springfield, Mass.

TO SPECULATORS AND MANUFACturers of Agricultural Implements.—For Sale—The right of an improved Potato Digger. Territory to suit purchasers. N. B.—There are two very great improvements in this machine. For particulars address M. T. DRAKE, care McCullough & Kennedy, Cincinnati, O. 10 4*

ANTI-Incrustation Powder.—Prevents scale, saves cleaning, fuel, and repairs, never foams, stops leaks. H. N. WINANS, 11 Wall st., N. Y. 10 4*

1866.—TOPLIFF'S PATENT PERpetual LAMP WICK, received First Premium at N. Y. State Fair, and special premium, Book of Transactions. Needs no trimming. Rare inducements to Agents. Sample sent for 20 cents; two for 30 cents. MURPHY & COLE, 81 Newark ave., Jersey City. 3 tf 6

HARRISON STEAM BOILER.
NO MORE DESTRUCTION OF LIFE AND PROPERTY BY STEAM BOILER EXPLOSIONS.
GREAT REDUCTION IN PRICE.
From the rapid manner in which the HARRISON STEAM BOILER is coming into use, but little need be said of its conceded merits.
They may be summed up briefly as follows:—
Absolute safety from explosion, as it cannot be burst under any practicable steam pressure.
Less first cost.
Economy in fuel equal to the best in use.
Facility of transportation.
It occupies but about one third the ground area of ordinary boilers, with no increase in hight.
In consequence of recent improvements in its manufacture, this Boiler can be furnished to the public AT LESS COST than heretofore, and is now much the cheapest article in the market.
For Price and Circular apply to
JOSEPH HARRISON, Jr.,
Harrison Boiler Works,
5 17*] Gray's Ferry Road, Philadelphia.
Branch Office, 119 Broadway, New York, Rooms 9 and 10
C. B. HYDE Agent

R. BALL & CO.,
SCHOOL STREET, WORCESTER, MASS.,
Manufacturers of Woodworth's, Daniell's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood.
Send for our Illustrated Catalogue. 1 25*

WOOD, LIGHT & CO.—MANUFACturers of Machinists' Tools and Naysmyth Hammers. Lathes from 4 to 30 feet long, and from 15 to 100 inches swing. Planers from 24 to 60 inches wide and from 4 to 46 feet long. Upright Drills. Milling and Index Milling Machines. Profile or Edging Machines. Gun Barrel Machines Shatting, Mill Gearing, Pulleys and Hangers, with Patent Self-oiling Boxes.
Works, Junction Shop, Worcester, Mass.
Warehouse at 107 Liberty street, New York. 10 tf

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address
J. C. HOADLEY & Co., Lawrence, Mass. 1 tf

SPOKE AND HANDLE MACHINE.—For turning Spokes, Yankee Ax, Plow, Pick, Adze, and Hammer Handles, Whiffletrees, and irregular forms generally. Capacity 180 Spokes and 200 Hammer Handles per hour. For cut and description, address the Subscriber, Manufacturer and Patentee, at Warren, Trumbull county, Ohio. [7 10*] E. R. WICKELL.

RICHARDSON, MERIAM & CO.,
Manufacturer and Dealers in
DANIELS'S AND WOODWORTH PLANERS,
Boring, Matching, Molding, Mortising and Tenoning Machines, Scroll, Cut-off, and Slitting Saws, Saw Mills, Saw Arbors, Spoke and Wood-turning Lathes, and other wood-working Machinery. Warehouse, 107 Liberty street, New York. Manufactory, Worcester, Mass. 10 tf

THE EUROPEAN INVENTOR'S AGENCY CO., 96, Newgate street, London, E. C.
MR. T. BROWN, C. E., Manager.
This Company undertake the purchase, sale, or licensing of Patents in any part of the World, on Commission only.
No business as Agents for procuring Letters Patent undertaken.
Information for Inventors or Owners of Patents, or for those desirous of purchasing Patents, will be freely given.
The Offices of the Company are at the disposal of Inventors and those interested in Inventions; also, for the convenience of those having no London address their letters can be addressed to the offices.
Further particulars on application. 1 15*

MILL-STONE DRESSING DIAMONDS Set in Patent Protector and Guide. Sold by JOHN DICKINSON, Patentee and Sole Manufacturer, and Importer of Diamonds for all mechanical purposes; also, Manufacturer of GLAZIERS' DIAMONDS, No. 64 Nassau street, New York City. Old diamonds reset. N. B.—Send postage stamp for descriptive circular of the Dresser. 9 12*

PATENT SHINGLE, STAVE, AND Barrel Machinery, Comprising Shingle Mills, Heading Mills, Stave Cutters, Stave Jointers, Shingle and Heading Jointers, Heading Rounders and Planers, Equalizing and Cut-off Saws. Send for Illustrated List.
FULLER & FORD,
9 8* tf—C.] 282 and 284 Madison street, Chicago, Ill

PAPER-MILL MACHINERY.
Megaw's Improved Rotary Pump for paper mills, steam engines and boilers, manufactured by
19 cow 4*] MEGAW & BILLANY, Wilmington, Del.

TO MANUFACTURERS OF TEXTILE FABRICS.—Butcher's Patent Temples, adapted to weaving all kinds of goods; also, Thompson's Patent Oil Cans for oiling Machinery—neat and economical; also, Patent Shuttle Guides which will protect the weaver and save the owner the cost of the guides every year. Furnished by E. D. & G. DRAPER,
6 11* cow] Hopedale, Mass.

LATHE CHUCKS OF ALL KINDS and sizes, with new improvements, made by
A. F. CUSHMAN, Hartford, Conn.
Send for cuts and price lists. 8 3* cow

WOOD-WORKING MACHINERY. The SUBSCRIBER is Agent in New York for J. A. Fay & Co., C. B. Rogers & Co., Ball & Williams, Richardson, Merriam & Co., H. B. Smith, Gray & Woods, Lane & Bodley, D. Doncaster, and all other manufacturers of Wood-working Machines. S. C. HILLS, No. 12 Platt st. d

CASTINGS.—THE UNDERSIGNED are now prepared to do every variety of Brass and Composition Castings. HAYDEN, GERE & CO.,
3 12* 84 Beekman street.

HAYDEN, GERE & CO., 84 BEEKMAN street, New York, manufacture every variety of Brass Work for steam, water and gas.
Globe Valves, Steam, Gage and Air Cocks, Whistles, Oil Cups, Water Gages, Plain Bibbs, Stops, Hose Pipes, Couplings, etc.
Address as above for price lists. Illustrated catalogue furnished to customers. 3 12*

PORTABLE AND STATIONARY Steam Engines and Boilers, Circular Saw Mills, Mill Work, Cotton Gins and Cotton Gin Materials, manufactured by the ALBERTSON & DOUGLASS MACHINE CO., New London, Conn. 6 8* tf

GOULD MACHINE COMPANY,
Of Newark, N. J., and 102 Liberty street, New York.
IRON AND WOOD-WORKING MACHINERY, STEAM ENGINES, BOILERS, SAW MILLS, ETC. 1 tf

FOR ENGINE BUILDERS' AND STEAM Fitters' Brass Work, address
F. LUNKENHEIMER,
10 26*] Cincinnati Brass Works.

SPOKE-LATHES, TENONING AND Spoke-Polishing Machinery of approved Patterns manufactured by J. GLEASON,
10 10*] 1030 Germantown Avenue, Philadelphia, Pa.

TO THE CONSUMERS OF LUBRICATING OILS.
THE LESTER OIL MANUFACTURING COMPANY
Is now offering for sale an oil for lubricating purposes which is superior to any other oil in use for either light or heavy machinery.
This oil is fluid at a temperature far below that at which sperm or lard oils chill.
It does not gum, but dissolves what has been before deposited from other oils.
It is manufactured for this company at Peter Cooper's factory, Williamsburgh, L. I., and is for sale by
BENJ. COLLINS,
Agent for the Company,
43 Broad street, New York.
Samples furnished upon application as above. 10 4*

NITRO-GLYCERIN.—
UNITED STATES BLASTING OIL CO.—We are now prepared to fill all orders for Nitro-Glycerin, and respectfully invite the attention of Contractors, Miners and Quarrymen to the immense economy in the use of the same. Address orders to
JAMES DEVEAU, Sec.,
2 52*] 32 Pine street, New York

AIR SPRING FORGE HAMMERS ARE made by CHAS. MERRILL & SONS, 556 Grand street, New York. They will do more and better work, with less power and repairs, than any other Hammer. Send for a circular. 4 tf

ANDREWS'S PATENT PUMPS, ENGINES, etc.—
CENTRIFUGAL PUMPS, from 90 Gals. to 40,000 Gals. per minute, capacity.
OSCILLATING ENGINES (Double and Single), from 2 to 250 horse-power.
TUBULAR BOILERS, from 2 to 50 horse-power, consume all smoke.
STEAM HOISTERS to raise from ½ to 6 tuns.
PORTABLE ENGINES, 2 to 20 horse-power.
These machines are all first-class, and are unsurpassed for compactness, simplicity, durability, and economy of working. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO.,
1 tf No. 414 Water street N. Y

WHEELER & WILSON, 625 BROADway, N. Y.—Lock-stitch Sewing Machine and Button-hole do. 1t

FIRST-CLASS MACHINISTS' TOOLS.
PRATT, WHITNEY & CO.,
Flower street, Hartford, Conn.,
Manufacturers of Engine Lathes, (15) fifteen inches to (8) eight ft. swing; Power Planers, (16) sixteen inches to (5) five feet wide, and of any length desired, and special machinery. Also only makers of Engine Lathes with Slate's Patent Taper Attachment, conceded by all who have used it to be most perfect and simple in its construction and almost indispensable for good workmanship.
For a circular and price list address as above. 8 26

FOR HYDRAULIC PRESSES, HYdraulic Pumps, Steam Heaters, and all kinds of Linseed Oil Machinery, address
8 6*] McGREGOR & CALLAHAN, Dayton, Ohio.

T. F. RANDOLPH & BRO.,
—MODEL MAKERS.—
7 8*] 67 West 6th st., Cincinnati, Ohio.

SHAW & JUSTICE'S POWER HAMMER is Moderate in Price, is driven with one-tenth the power used by other Hammers, and will not cost the one-hundredth part of what is usually spent in repairs. Its power is far in excess of any Hammer known. Manufactured by PHILIP S. JUSTICE,
14 North 5th street, Phila., and 42 Cliff-st., New York.
Shops 17th and Coates-sts., Philadelphia. 8 8* tf

JUST PUBLISHED—THE INVENTOR'S and MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO. 37 Park Row, N. Y.

PATENT POWER AND FOOT-PUNCHING PRESSES, the best in market, manufactured by N. C. STILES & CO., West Meriden, Conn. Cutting and Stamping Dies made to order. Send for Circulars. [1 13* tf

JUST PUBLISHED—UNITED STATES Census in Pocket Form, by States Counties, and Towns. Just what every patent man wants. 174 pages. Post paid, paper 60c., tuck $1. Address
8 5*] A. WOODWORTH, Cambridge, N. Y.

MODELS, PATTERNS, EXPERIMENTAL and other Machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos. 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN Office. 1 tf

MASON'S PATENT FRICTION CLUTCHES, for starting Machinery, especially Heavy Machinery, without sudden shock or jar, are manufactured by VOLNEY W. MASON,
1 13* tf] Providence, R. I.

SETS, VOLUMES AND NUMBERS.
Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

WROUGHT-IRON WELDED TUBE of all sizes, for Steam, Gas, or Water purposes. Brass work and Iron Fittings of every kind to suit the same; also, PEACE'S Improved Gas-Pipe Screwing and Cutting off Machines, for both Hand and Steam power, to screw and cut off from ⅛ to 4-in. pipe, and all other tools used by Steam and Gas-Fitters. Manufactured and for sale by CAMDEN TUBE WORKS, Second and Stevens streets, Camden, N. J. 6 13*

VAN DE WATER CELEBRATED WATER WHEEL.—For Sale at the Eagle Iron Works, Buffalo, N. Y. [5 11*] DUNBAR & HOWELL.

LATHE CHUCKS—HORTON'S PATENT—from 4 to 24 inches. Manufacturer's address, E. HORTON & SON, Windsor Locks, Conn. 5 25*.

ERICSSON CALORIC ENGINES OF GREATLY IMPROVED CONSTRUCTION.—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton Gins' Air Pumps, Shafting, Pulleys, Gearing Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON,
1 tf—D] 164 Duane street, cor. Hudson, New York.

$200 A MONTH IS BEING MADE with our IMPROVED STENCIL DIES, by Ladies and Gentlemen. Send for our free Catalogue containing Samples and Prices. Address
1 15*tf—R.] S. M. SPENCER & CO., Brattleboro, Vt.

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, N. Y. 1 tf

WOOD & MANN STEAM ENGINE CO.'S CELEBRATED PORTABLE AND STATIONARY STEAM ENGINES AND BOILERS, from 4 to 25 horse-power. Also, PORTABLE SAW MILLS.
We have the oldest, largest, and most complete works in the United States, devoted exclusively to the manufacture of Portable Engines and Saw Mills, which, for simplicity, compactness, power, and economy of fuel, are conceded by experts to be superior to any ever offered to the public.
The great amount of boiler room, fire surface, and cylinder area, which we give to the rated horse-power, make our Engines the most powerful and cheapest in use; and they are adapted to every purpose where power is required.
All sizes constantly on hand, or furnished on short notice. Descriptive circulars, with price list, sent on application. WOOD & MANN STEAM ENGINE CO.
Utica, N. Y. Branch office 96 Maiden Lane N. Y. City.
1 32*

STATIONARY ENGINES
Built under the BABCOCK & WILCOX PATENTS.
An entirely novel arrangement of valve gear, guaranteed to give a more regular speed, and to consume less fuel per horse-power than any engine in use. Call or send for a circular.
HOWARD ROGERS,
1 20*] 59 Vesey street, New York.

MICROSCOPES, MICROSCOPIC OBjects, Spy-Glasses, Opera-Glasses, Marine and Field-Glasses, Stereoscopes, and Views; and Lenses of all sizes and foci. Made and for sale by
JAMES W. QUEEN & CO.,
924 Chestnut street, Philadelphia, Penn.
Priced and Illustrated Catalogue sent free. 1 12*

SHEET AND ROLL BRASS.
German Silver, Brass, and Copper Wire, etc. Especial attention to particular sizes and widths for Machinists and Type Founders.
Manufactured by the THOMAS MANUFACTURING COMPANY, Thomaston, Conn. 1 24*

WOODWORTH PLANERS, BARLETT'S Patent Power Mortise Machine, the best in market. Wood-working Machinery, all of the most approved styles and workmanship. No. 24 and 26 Central, corner Union street, Worcester, Mass.
4 9*] WITHERBY, RUGG & RICHARDSON.

TAYLOR, BROTHERS & CO.'S BEST YORKSHIRE IRON.—This Iron is of a Superior Quality or locomotive and gun parts, cotton and other machinery, and is capable of receiving the highest finish. A good assortment of bars in stock and for sale by JOHN B. TAFT, sole agent for the United States and Canadas, No. 18 Batterymarch-st., Boston. 1 40*—R.

THE BEST POWER HAMMER MADE is the Dead Stroke Hammer of Shaw & Justice. Sizes suited for manufacturing awl blades or engine shafts; consume but little space, and require but little power. Manufactured by PHILIP S. JUSTICE,
14 North 5th street, Phila., and 42 Cliff-st., New York.
Shops 17th and Coates-sts., Philadelphia. 8 8* tf

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven, Ct. 1 tf

CAN I OBTAIN A PATENT?—For Advice and instructions address MUNN & CO., 37 Park Row, New York for TWENTY YEARS Attorneys for American and Foreign Patents. Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN ($3 a year) 50,000 Patent cases have been prepared by M. & Co.

TO MACHINISTS.—There is no Bolt Cutter in the market so well adapted to your wants as "SCHLENKER'S IMPROVED BOLT CUTTER." No running back off the thread. Bolt is cut on Lathe principle. Die simple and durable. Send for circular. Orders filled promptly. Address W. S. SHAW, Gen. Agt.,
Or, R. L. HOWARD,
9 4*] Buffalo, N. Y.

TO STEAMBOAT OWNERS.—"LOCK Up Safety Valves."—The undersigned would call attention to "Paige's" Patent "Lock-up" Safety Valve, now extensively applied to the boilers of steamers, as a compliance with law. The trade supplied.
CHARLES W. COPELAND, Sole Agent,
9 4*] 171 Broadway, New York.

FOR SALE—A Set of Boiler-plate Bending Rolls, six feet long, suitable for bending iron No. 4 in thickness, and under. POOLE & HUNT,
9 4*] Baltimore, Md.

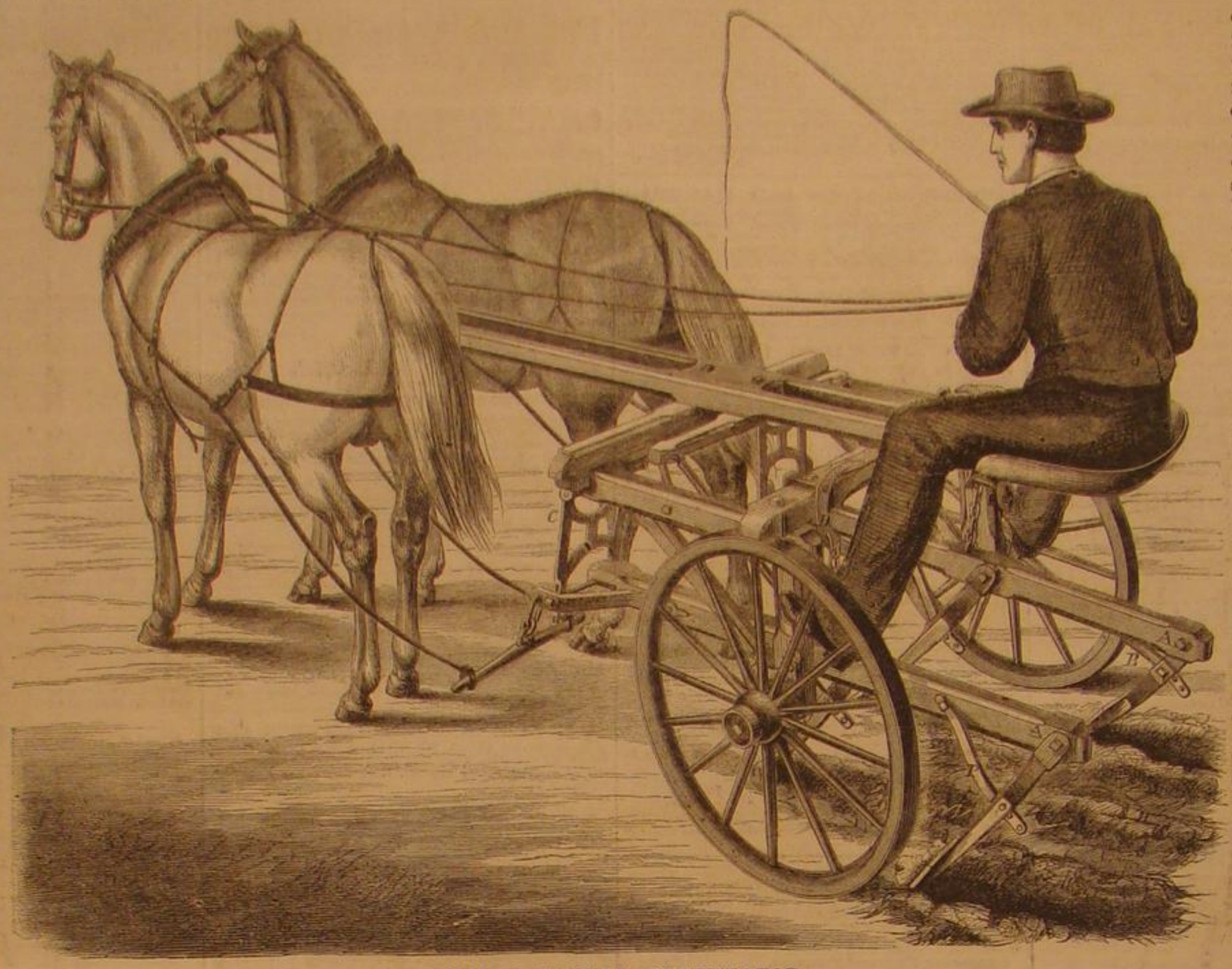
MANUFACTURERS of Agricultural Implements, and machinery generally, please send address, descriptive, and price lists to M. L. Parry, Agricultural Implement Warehouse and Machine Depot Agency, Galveston, Texas, for circulars. Refers to any of the old merchants of Galveston and Houston M. L. PARRY, 19 4*

IMPORTANT.
MOST VALUABLE MACHINE for all kinds of irregular and straight work in wood, called the Variety Molding and Planing Machine, indispensable to competition in all branches of wood-working. Our improved guards make it safe to operate. Combination collars for cutters, saving 100 per cent, and feed table and connection, for waved moldings and planing, place it above all others. Evidence of the superiority of these machines is the large numbers we sell, in the different states, and parties laying aside others and purchasing ours, for cutting and shaping irregular forms, sash work, etc.
We hear there are manufacturers infringing on some one or more of our nine patents in this machine. We caution the public from purchasing such.
All communications must be addressed "Combination Molding and Planing Machine Company, cor. 1st ave. and 28th-st., New York, where all our machines are manufactured, tested before delivery, and warranted.
Send for descriptive pamphlet. Agents solicited. [1 13* tf

OIL! OIL!! OIL!!!
For Railroads, Steamers, and for machinery and burning, PEASE'S Improved Engine Signal, and Car Oils, indorsed and recommended by the highest authority in the United States and Europe. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American", after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No 61 and 63 Main street, Buffalo N. Y.
N. B.—Reliable orders filled for and part of the world 1 tf

Improved Cultivator.

This implement is so constructed that while the draft of the horses shall be direct upon the plows, the control of the driver over the direction and elevation of them shall be perfect. The plowshares are attached to the main frame by a pivot bolt through the heads as at A, and their inclination can be regulated and adjusted by the bars or braces, B, which have a series of holes in them to receive a pin or bolt. The horses are attached directly to the plow beams by the whiffletrees, while the pole which passes between them is secured to the upper frame by bolts, and the two frames are connected by swivel frames, C, in front, and hinged diagonal bars. The end of the pole, which is double or divided to allow the driver to guide his team over the drills, sustains the driver's seat. In front of him are two bent levers, D, connected at one end with the plow beams and used to raise the shares out of and clear from the ground. There are also on the uprights to which the wheels are attached foot pieces by which he can easily swing the upper frame and thus aid in determining the direction of the furrows. The forward swivels, to which the whiffletrees are attached by means of a rod passing through a vertical slot in their sides, are connected to the upper frame by pivots, and the rod attached to the whiffletree bar also passes through a horizontal slot in the forward end of the plow beam, thereby permitting lateral motion to the shares.



FORD & HOWE'S CULTIVATOR.

The simple construction of this cultivator, with its ease of handling, seems to be sufficient to recommend it as an effective farm implement. The horses as well as the implement papear to be so attached and arranged as to be under entire control. Patent ordered to issue through the Scientific American Patent Agency to Ford & Howe, assignees of Henry Howe. Address the former at Oneonta, N. Y., for further information.

THE HYDRAULIC PRESS.

It is doubtful if Mr. Bramah, the inventor of the hydraulic press in 1796, ever imagined the many and important uses to which his apparatus would be applied. It has become one of the most important machines for the manipulation of the metals—especially the working of steel—as well as being of the greatest value in many other departments of manufacturing industry. For pressing fabrics and material like cotton into convenient bales it has long been used. For testing the strength of material in various forms it is extensively employed, and in forging and compressing steel in its fused state it is becoming more and more important. A pressure of over 2,000 tuns is not uncommon, and as this immense pressure must come upon the main cylinder, it is evident that the cylinder must be correspondingly strong.

This cylinder is usually made of cast iron, of great thickness of wall compared to the bore, yet the water has been forced through the pores of the iron in fine spray in some cases. When this occurs the limit of resistance of the cylinder is reached. To prevent this leakage the cylinders of cast iron are lined with copper or brass, which seems to be very effectual if the inner cylinder is accurately fitted to the wall of the outer. These cylinders have been made to withstand a pressure of over three tuns to the square inch. The attempt to strengthen the outer cylinder by hoops of wrought iron shrunk on, has not proved so advantageous as might have been expected, owing to the difficulty of making a perfect bearing at all points between the cylinder proper and its reinforce. A cylinder of perfect homogeneous metal appears to be the grand desideratum, and attempts are now being made in England to construct a cylinder of a single forging of Bessemer steel. It is highly probable this will prove effective and vastly increase the power of the hydraulic press, an increase which is very desirable in the present and prospective condition of the art of metal working.

Austria is said to be adapting and manufacturing breech-loaders on two methods: the old arms, to the number of 580,000, are being converted to the Linder rifle, and 420,000 new Remington rifles are to be made.

Patent Claims.—Persons desiring the claim of any invention, patented within thirty years, can obtain a copy by addressing a note to this office, giving name of patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Advertisements.

A limited number of advertisements will be admitted in this page on the following terms:—Seventy-five cents a line, each insertion, for solid matter; one dollar a line for space occupied by engravings.

HOW TO OBTAIN PATENTS.

The first inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them: they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

We (MUNN & CO.) have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century*. Many thousands of inventors have had benefit from our counsels. More than one-third of all patents granted are obtained by us.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person, at our office, or to advise them by letter. In all cases they may expect from us an *honest opinion*. For such consultations, opinion, and advice, we *make no charge*. A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly—do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential*. Address MUNN & CO., 37 Park Row, New York.

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the subject admits. A Caveat consists of the Petition, Oath, Specification, and Drawings. The Government fee for filing a Caveat is $10, and our ordinary charge to prepare the documents and attend to the whole business from $10 to $15. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words, and fees, $25 in full. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

Quick Applications.—When, from any reason, parties are desirous of applying for Patents or Caveats, in GREAT HASTE, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions for them. We can prepare and mail the necessary papers at less than an hour's notice, if required.

Interferences.—When each of two or more persons claims to be the first inventor of the same thing, an "Interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public.

Our Book of Instructions, containing the Patent Laws, Official Rules, 150 engravings, valuable tables for calculations, and full instructions concerning the cost of patents, method of proceedure, forms for assignments, etc., is *sent gratis* on application.

Address all letters (post-paid),

MUNN & CO.,
No. 37 Park Row, New York City.
Office in Washington, Cor. F and 7th streets.

WONDERFUL DISCOVERY!—In making Cider Without Apples. Immense profits realized. A fortune can be made from it at this time when apples are so scarce. An enterprising man can make $5,000 this season without leaving home. To a Western man this knowledge is a fortune in itself. Full directions, with individual rights, sent for 25 cents. Address
6 1—R.] JULIUS RISING, Southwick, Mass.

BAUMEISTER'S PATENT
WATER HEATER!
The Water Heater supplies you with warm water all day, by heat which would otherwise escape without any benefit being derived from it.
The drum surrounding the water vessel heats your room as much as the stove itself, and you save FIFTY PER CENT IN FUEL.
Being made out of one piece, it don't get damaged by heat if empty.
It occupies no room on the stove plate, but is put in place of the stove pipe. It can easily be applied to any stove and is an ornament to the same.
They sell at from $8 to $12 each, and answer as well as a copper boiler, attached to a stove, which costs five times the sum. One hundred families use them in Detroit, Mich., and vicinity, to any of whom we refer.
State and County Rights sold in any part of the United States by S. W. JOHNSON & CO., Detroit, Mich.,
12 2os General Agents for the Patentee.

NEW BRICK AND PEAT MACHINE.—Common labor only required, for clay or peat: is worked by one man, by horse or steam; makes from 400 to 3,000 an hour; cost from $110 to $700; the mold measures 9x4½; the dry peat 8x4, showing how little water had to be displaced.
DRYING TUNNEL, for drying bricks, peat, pottery, fruit, vegetables, peanuts, broom corn, lumber, etc. Bricks and peat molded one day are dry the next, all the year. For further particulars, in a pamphlet (seventh edition enlarged), giving full instructions on brick setting and burning with wood or coal, address, sending twenty cents, FRANCIS H. SMITH,
1 Box 556, Baltimore, Md.

PATTERN LETTERS To put on Patterns, for castings. KNIGHT BROS., Seneca Falls, N. Y. 12 6*

TURBINE WATER WHEELS.



The REYNOLDS PATENT embodies the progressive spirit of the age. Simplicity, Economy, Durability, Accessibility all combined. The only Turbine that excels Overshots. Awarded the Gold Medal by American Institute.
Shafting, Gearing and Pulleys furnished for all kinds of Mills, made on Mechanical Principles, under my personal supervision, having had long experience. Circulars sent free.
GEORGE TALLCOT,
4 os 13* tt—H] No. 36 LIBERTY STREET, NEW YORK.

[Certificate.]
John McDuffie, Esq., Long Eddy, Sullivan County, N. Y., having one of the largest Circular Saw Mills in the country, driven by one of our Turbines, in letter Feb. 21, 1867, says: "Your wheel comes fully up to our most sanguine expectations. It now works most *beautifully, smoothly, and steadily*. I feel proud of our wheel, and candidly believe that it is superior for a greater amount of work, less liable to get out of repair, and takes less water to run it, according to its size and power, than any other Water Wheel in the world.
(Signed) [12 os2—H.] JOHN McDUFFIE.

ASAHEL DAVIS, Manufacturer of
PLAIN AND FANCY BOXES.
Also, Exclusive Maker of A. & A. Davis' Patent Dovetailing Machines. Post-office Box 509, Lowell, Mass. 11 os3*

Winans' Boiler Powder, N. Y., Removes & prevents scale. References 11 years' use 7000 tests.

CIRCULAR SAWS—
With EMERSON'S Patent MOVABLE TEETH. These saws cut more and better lumber in the same time, and with less power, than any other saw in the world, with less expenditure of labor and files to keep in order, and never wear smaller. Also, Emerson's Patent Gauging and Sharpening Swage, for spreading the points of saw teeth. Send for descriptive pamphlet, with new price list.
AMERICAN SAW COMPANY,
11 os tf] 3 Jacob street, near Ferry street, New York.

MACHINERY.—
We are prepared to furnish
FIRST-CLASS MACHINISTS' TOOLS OF EVERY DESCRIPTION, ON SHORT NOTICE AND REASONABLE PRICES.
SAMPLES of the TOOLS manufactured by us may be seen at our Wareroom, and we invite an inspection of their Workmanship and Design by those in want of superior Machinery.
NEW YORK STEAM-ENGINE CO.,
Office and Wareroom
7 os 13 222 Pearl street, New York.

DRAWING INSTRUMENTS
OF EVERY DESCRIPTION—
Swiss, German Silver, and French
TRANSITS, LEVELS, SURVEYOR'S COMPASSES, etc.,
DRAWING PAPER, WATER COLORS, etc.,
And all supplies for Engineers, Architects, and Machinists.
Sets of Instruments furnished for schools, and cases made to order. A Priced and Illustrated Catalogue sent free by mail on application.
WILLIAM Y. McALLISTER,
8* os] 728 Chestnut street, Philadelphia, Pa.

TINNERS' MACHINES AND DRILL Stocks. Far the best in the world. Address
6 8*] A. W. WHITNEY, Woodstock, Vermont.

LUMBER can be Seasoned in from Two to Four Days, by Bulkley's Patent, at an average cost of $1 per M. For circulars, with information, address, C. H. BULKLEY, No. 2 Case Building, Cleveland, O. 11 3os*]

EUROPEAN AGENCY for the Exhibition and Sale of American Patents and Manufactures.
BLANCHARD & McKEAN.
No. 82 Boulevard de Sebastopol, Paris, France.
GEO. A. BLANCHARD.] 40 os13* [J. A. McKEAN.

Scientific American.
ENLARGED FOR 1867.

This is the oldest, the largest and most widely circulated journal of its class now published. It is the constant aim of the Editors to discuss all subjects relating to the industrial arts and sciences, in a plain, practical, and attractive manner.

All the latest and best Inventions of the day are described and illustrated by Splendid Engravings prepared expressly for its columns by the first Mechanical Engravers in the country.

It would be impossible within the limits of this Prospectus, to enumerate the great variety of subjects discussed and illustrated. A few only can be indicated, such as Steam and Mechanical Engineering, Fire-arms, Mechanics' Tools, Manufacturing Machines, Farm Implements, Hydraulic Engines, Wood-working Machines, Chemical Apparatus, Household Utensils, Curious Inventions, beside all the varied articles designed to lighten the labors of man in the Shop, Factory, Warehouse, and Household

The Scientific American has always been the Advocate of the Rights of American Inventors. Each number contains a weekly list of Claims of Patents, furnished expressly for it by the Patent Office, together with notes descriptive of American and European Patented Inventions.

Patent Law Decisions, and questions arising under these laws, are fully and freely discussed by an able writer on Patent Law.

Correspondents frequently write that a single recipe will repay them the whole cost of a year's subscription.

With such advantages and facilities, the columns of the Scientific American are of special value to all who desire to be well informed about the progress of Art, Science Invention, and Discovery.

Published Weekly, two volumes each year, commencing January and July,

Per annum	$3 00
Six months	1 50
Ten copies for One Year	25 00

Canada subscriptions, 25 cents extra. Specimen copies sent free Address

MUNN & CO., Publishers,
No. 37 Park Row, New York City

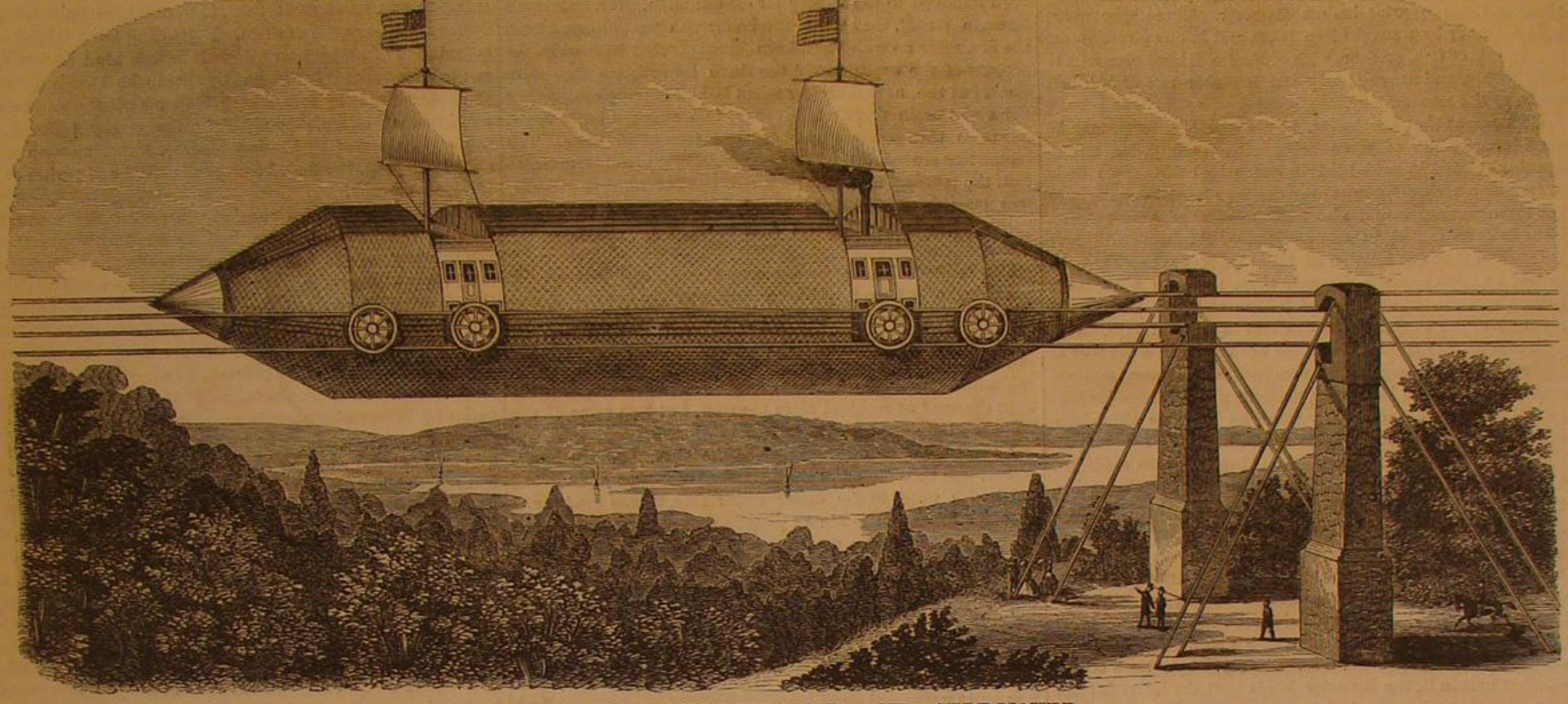
SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVI.---No. 13. [NEW SERIES.] NEW YORK, MARCH 30, 1867. $3 per Annum. [IN ADVANCE.]

New System of Aero-Locomotion.

The two large engravings herewith presented represent two forms of locomotion designed to diminish the resistance of gravity to the motion of heavy weights, and in a measure that of the impact of the atmosphere against moving bodies.



FONTAINE'S AERO-STEAMER AND SELF-MOVER.

It is a combination of a gas of great levity with steam, hand, or other power for sustaining and driving carriages for the transmission of passengers and freight, the carriages traversing elevated roadways composed either of wire or oth erropes, or rigid rails, supported upon strong columns of masonry and iron combined, the rails, when of rope, to act as guys, being secured to some solid point in the earth in the manner of the ropes which support suspension bridges. These tracks or rails are double, one engaging with the lower surface of the wheels of the car and the other with the upper surface, the rims of the wheels being deeply grooved to insure their retention on the track whether the weight is positive or negative.

The objects of this improvement are two: One to combine the lifting power of a gas with propelling power, to diminish the weight of a carriage in traversing levels, or surfaces nearly level; and the other to provide, by means of the gas, a quick and feasible method of ascending elevations, in which case the rails or ropes are not used as tracks by which the vehicle can be impelled, but only as guides to control and direct its upward or downward movement. The first is called by the inventor an aero-steamer and the other an aero-self-mover. The aero-steamer has a portion of its spaces devoted to the reception of a gas specifically lighter than air, and is so formed, as may be seen by the engraving, Fig. 1, to present comparatively little resistance to the atmosphere. It is a cigar shaped balloon traversing the fixed guides of the stretched ropes, or the rigid rails, and moved, when on a level, by steam, wind-sails, or some other adequate means of propulsion. The frame of the structure is to be as light as comports with safety, while it is strongly braced with outside network, the lines of which pass under the compartments containing the motive power and thoseholding the passengers and freight. The columns which support the ways are so formed as to present no impediment to the free passage of the car, their forms being specially adapted to this object. If at any time the ascending or lifting power of the gas overbalances the positive weight of the carriage, the wheels engage with the upper line of rails, and when the weight of the carriage is greater they rest on the lower line.



FONTAINE'S SELF-MOVER.

The self-mover is designed for ascending elevations and the vessel is filled with gas, the passengers or freight being placed in the suspended car. The ascending force of the gas is intended to raise the carriage with its load, the whole being guided by the lines. In descending, the action of its gravity, assisted either by a partial exhaustion of the gas or a weight suspended to the bottom of the car, is intended to bring it to the ground gradually down to the level earth. The inventor proposes to again use the gas thus exhausted, down at the foot of the declivity, by forcing it through tubes by a pump.

It is the intention of the inventor to make a practical application of his improvement soon on a scale sufficiently large to test its practibility. It was patented through the Scientific American Patent Agency, by J. A. A. Fontaine, M. D., whom address, Box 3, Station A, Spring street, New York City Feb. 5th, 1867, and who will be pleased to correspond with those interested in similar subjects, and will entertain propositions for the formation of a joint stock company or other arrangement which may lead to a thorough experiment of the plan.

Two Story Cars are in growing favor on the European railways. Some of those now in use on the French Eastern railway and branches are very elegant, and withal rather odd. They are a compromise between our democratic freedom and the European exclusiveness and constraint; the lower story being divided into compartments, and the upper, to which access is had by stairs at each end, being on the American plan, except the reversing seat backs. The latter appears to be too great a concession to individual comfort, as yet; so the seats are placed in pairs, staring one another in the face, coachwise. Some of these cars contain first, second and third class compartments, graded in style, furnishing and price; an arrangement inconceivable in America, where there are no 'umble people, and where pride must consequently minister to itself and expect no tolerance off its private premises. These cars are set very low on their axles like our street cars, and have also very low ceilings, the whole standing less than 14 feet high. The St. Petersburg and Moscow railroad has two-story cars 18 feet high, with a central saloon on the first floor, from which stairs conduct to a large apartment above, furnished with chairs, tables, sofas, etc. The American style of cars is having a trial on a short line between Lyons and Bourg-en-Bresse. An English correspondent in France illuminates the United Kingdom in regard to the American arrangement, explaining among the advantages, that "passengers may obtain refreshment at the bar which forms part of most passenger trains;" and among the disadvantages, that "some people visit the bar too often, and are constantly passing backward and forward to the annoyance of others, while the shortness of the seats never allows a stretch at full length." Our imaginative English friend might witness that incredible "stretch at full length" several times before he got tired of inquiring for the "bar," on an American train.

Sodium.---A Scientific Canard.

The exaggerated report of the explosion of a box of sodium, which originated in an American newspaper, and was long ago corrected in the Scientific American, is echoed back to us from a foreign scientific journal in the conclusion that the explosive force of that metal in contact with water is 30 times that of nitro-glycerin and 300 times that of gunpowder. Remarks follow upon the importance of the agent and the probability that the large demand will soon develop means for producing it cheaply enough for general use. Sodium, rapidly decomposing water, causes an explosive mixture of hydrogen and air, the moderate force of which is known to everybody, and this slight foundation is all there is for the statement.

It is a pity that newspaper reporters are not infallible, since their stories are so often circulated with unquestioning faith. We also observe in renewed circulation, a re-translation of another American story, which has gone through several languages and has now come back not much improved by its European tour, to the effect that caustic soda is even better

than sodium amalgam for separating gold: the latter in fact forming caustic soda in the process, before effecting its purpose. It is needless to say that there is no truth in this statement also.

HARRISON STEAM-BOILER.

Report of the Committee on Science and the Arts, Constituted by the Franklin Institute, on the Harrison Steam-Boiler, Invented by Joseph Harrison, Jr., Philadelphia, Pa.

The Committee to whom was referred the examination of the "Harrison Boiler," report that, on Tuesday, October 30th, 1866, they visited the foundry of Mr. Joseph Harrison, Jr., Philadelphia, and had an opportunity of inspecting the boilers in various stages of manufacture, and of seeing several in operation.

Experiments were tried to prove the strength and durability of the boiler, under extraordinarily severe use.

These boilers are of cast iron, formed of a combination of hollow spheres each eight inches diameter externally, and three-eighths of an inch thick, connected by curved necks three and one quarter inches diameter. These spheres are held together by wrought iron bolts, and in one direction are cast in sets of two, or four, with opposite lateral openings to each sphere, and are called by the inventor two or four-ball units, as the case may be.

He assumes that the boiler, in its smallest form, may be considered as one of these balls, with its opposite lateral openings closed by caps held in place by bolts. Two balls united by a neck, with caps over the four lateral openings, in the same manner would also make a boiler of a larger size. Four balls so united in one casting, would be a still larger boiler, and that any number of these balls or spheres may be united by bolts passing through them so as to form large boilers, and the strength of the boilers so made, will be the strength of the weakest sphere or ball in the structure.

In manufacturing the boiler for ordinary use, a number of these units are generally so arranged, as to form sections twelve and thirteen balls long, six balls wide. These sections are all tested by hydrostatic pressure, as high as three hundred pounds per square inch, before being delivered to purchasers. The Committee saw one of these sections subjected to a bursting pressure of water, one sphere bursting when the pressure had reached six hundred pounds per square inch. A second one, tested in the same manner, burst at six hundred and twenty-five pounds. They were shown a section in which one unit had burst at nine hundred pounds per square inch, the damage having been repaired by the insertion of a new unit. The section then stood eleven hundred pounds per square inch before bursting in a new place. The available strength of the section in all cases being the strength of the weakest unit in it, the inventor holds that the boiler is safer than any other in use; in fact, he considers it entirely free from danger of disastrous explosion. To prove which, he had a section equal to six horse-power, similar to the one tested by hydrostatic pressure, and such as he is regularly selling, placed in an extemporary furnace built in a clay bank, and set in the usual manner for a boiler of this kind.

The boiler was filled with water to the regular hight, say about two-thirds full, with no outlet or safety valve of any kind, and sealed up tight, a small tube leading from the upper ball to a high pressure-gage, placed at a safe distance, say about two hundred feet from the boiler. A fire was made under and around the boiler, with the fuel of dry pine wood. The wind was very high at the time of the experiment, blowing from the west directly into the furnace, thus fanning the flames to an intense heat.

The gage soon gave indication of the formation of steam, the pressure steadily increasing up to four hundred and fifty pounds to the square inch.

At this pressure there seemed to be a sudden discharge of steam, as from a small opening. The discharge did not continue for many seconds, and the committee are not certain that it proceeded from the boiler; there may have been some water discharged from the bank of wet earth into the fire. The pressure then increased at a uniform rate until it had reached the enormous strain of eight hundred and seventy-five pounds per square inch, when a sudden discharge of steam took place, seemingly no greater in volume than might issue from a safety valve of two and a half inches diameter, or even less; after which the pressure fell to four hundred and fifty pounds, at which it stood when the fire was drawn for examination. While this boiler was being uncovered for examination, a boiler of about twelve horse power, consisting of two sections, similar to the ones previously experimented upon, was fired and steam raised to one hundred and twenty-five pounds pressure. This boiler had no safety-valve, but was provided with a globe valve of one inch capacity or area, as an escape valve to regulate the pressure in the boiler. When the committee examined this boiler at time of firing, it had two full gauges of water, the escape-valve was opened so as to reduce the pressure to one hundred pounds per square inch, and regulated from time to time to keep the pressure uniform at this point. The fire was pushed, and no more water injected into the boiler. In due time the lowest gage cock gave no indication of water. Soon afterward a slight leak was observed in one joint of the left-hand section. This closed in a few minutes and one opened in a similar manner in the right-hand section; this also closed in a short time. No other leaks showed themselves during the experiment As the water boiled away, the soot began to burn off the upper balls of the sections, that is, off those of the upper balls of the lowest row, visible through a peep-door above the fire-door provided for inspection. The boiler then became gradually red hot, and even when all the water seemed to be exhausted, and the pressure slowly fell, the gage stood for some minutes at thirty pounds, as if from the vaporization of some water in the lower courses of the sections, showing that in this red-hot condition, the boiler was tight enough to hold pressure. After the fire had been drawn, and the boiler cooled, the bolts holding the units together, were found to be loose, as if stretched by the unusual heating of the cast iron surrounding them. During the time of the experiment with low water, the escape cock was many times closed to increase the pressure, then opened quickly to reduce it to the one hundred pound standard, but with no deleterious result. When the gage stood at thirty pounds, all of the boiler visible from the peep-door and fire-doors, down to the bridge-wall of the furnace, was at a bright red heat. This was unmistakable, as when the fire was drawn, the boiler was hot enough to ignite a piece of wood held against it.

November 13, 1866.—At four o'clock, P. M., the committee met at the factory. J. Agnew, and J. C. Cresson, present. They examined the boilers tested at the former meeting. The boiler which had been subjected to its own steam-pressure of eight hundred and seventy-five pounds per square inch, had been removed to the factory for examination. Mr. Harrison's foreman stated, that when the boiler was first dragged from the fire, after its water had been forced out, (as detailed in the account of the experiment,) the three lower bolts were quite slack, but the next morning when it had become cold, one of them was again tight. The other two were not quite tight, but were then screwed up about one turn of the nuts. The committee are confirmed in their belief that in this extreme test, the pressure at eight hundred and seventy-five pounds, was enough to stretch some of the bolts, that the joints opened as safety valves, and thus relieved the strain on the boiler.

The boiler which, in former experiments, had had all its water boiled out and had been heated to bright redness, was found to be quite sound and fit for use making steam freely, and showing no leak, blowing off at sixty-five pounds by the safety-valve. It was somewhat disfigured on its outside, by oxidation. Your committee was informed that it had not been changed or repaired since the trial, but that some of the bolts had been screwed up.

A third boiler of the same size as the above, twelve horse-power, was then tested in the following manner: after being filled with water to the upper water line, it was fired until pressure was raised to ninety pounds, at which it was blowing off freely. The water was then all blown out by the blow-off cock, the pressure falling to sixty pounds while blowing off, at which it stood until steam reached the blow-off pipe, when the pressure fell to zero. It was kept empty for three minwfth the fire still burning, and was then rapidly filled with cold water: and steam raised to one hundred pounds pressure in thirty minutes, blowing off at one hundred pounds, and was quite sound and tight.

The Committee was informed by one of its members, who was witness of, and cognizant of, all the facts, that at the establishment of Mr. Wm. Sellers & Co., of this city, a boiler of this kind has been in use for about two years. During some experiments in testing the Giffard Injectors made by that firm, a workman inadvertently loosened a connection to the water supply pipe, resulting in the pipe blowing full open, discharging the water from the boiler as fast as a two-inch diameter opening would allow, the men in the boiler room barely escaping with their lives. As soon as all the water had blown off, and access could be had to the boilers, the fires were drawn and cold water run in as fast as possible, and in about thirty minutes, the steam was high enough to run the engine, with no seeming injury to the boilers.

The Committee mention this as an accidental experiment, similar to the one above reported. The same boiler is still in use, and seemingly as good as when first erected. It is, however, the first one erected in this contry from units made in England, and is not so good as those made since then. On Saturday, November 17th, Mr. Harrison repeated an experiment in the presence of a part of the Committee, Messrs. Agnew, Morton and Sellers, which experiment he stated had been tried twice the day before, and once two days previous, all the experiments being with the same boiler. The experiment, as witnessed, was as follows:—

The boiler which had been under experiment November 13th was fired up, and steam raised to one hundred and ten pounds. The fire was active—what might be called a very clear fire—and in good condition to make steam freely. It had been kept up sufficiently long to thoroughly heat all the furnace walls. Steam was blowing off freely from the safety valve. At a given signal the blow-off cock was opened suddenly, blowing off all the water until the pressure had fallen to zero, and neither steam nor water was escaping from the blow-off cock. In fact, it is believed the boiler was entirely dry. The blow-off cock was then closed, and cold water from a well pumped rapidly into the hot boiler, for it was at all times exposed to the active fire. As the water entered the boiler, the pressure as per gage, rose slowly during an interval of about three minutes, when it is supposed the water level had reached the more heated portion of the boiler above the bridge wall of the furnace, for the pressure seemed instantly to increase to the hundred and ten pounds, and steam blew freely from the safety valve.

This pressure and escape of steam, continued for some minutes with no variation, when suddenly an escape of steam was evident from the boiler into the furnace, and upon opening the peep-hole door a jet of water was seen issuing from one of the joints. This leak, in less than a minute, suddenly stopped; then, as the water rose in the boiler, a similar sudden leak and sudden stoppage, occurred at the next higher joint; again, at a third one, when, by that time, the water was showing itself at the lower gage cock soon afterwards at the second when the pump was stopped, at which time the pressure stood at one hundred and ten pounds, steam blowing off freely from the safety valve. The fire was as active as when the experiment began, and the boiler perfectly tight. This experiment, as before remarked, had been repeated three times previous to the one witnessed by the Committee, and Mr. Harrison's account of the previous experiments, given to your Committee, agreed in every respect with the facts as seen by them. This is as severe a test as any boiler is ever accidentally caused to sustain, and is, in fact, the one most likely to occur from carelessness. It is also testing practically, the favorite theory to account for explosions. During the experiments, the employés of Mr. Harrison seemed quite fearless in their manipulation of the boilers, showing a confidence in their safety, truly remarkable. With the exception of the single boiler sealed up and submitted to the extreme pressure of eight hundred and seventy five pounds to the square inch, all the experiments were tried within the building in which the boilers are made, and any explosion would have resulted in serious loss of property, if not of life. Had any ordinary wrought-iron boiler, made in the simplest form, and of the best material, been submitted to these same tests, it would have probably been destroyed by any one of them. Regarding the liability to accumulation of sedimentary deposit in this kind of boiler, we can only say that it is asserted by those who have used them the longest, that by occasionally blowing out the water under a full head of steam, then allowing the empty boiler to be moderately heated by the hot furnace, filling up with water and rinsing out, the scale becomes detached and rushes out at the blow-off cock.

The Committee have carefully inspected the manner of making these boilers as practiced by Mr. Harrison, and find the greatest care is taken to insure perfection of workmanship; but at the same time it is eminently noteworthy that the peculiarities of the boiler, and its mode of manufacture, are such as to enable a high degree of mechanical excellence to be obtained by mechanical devices, apart from the workman's skill. Thus, in the process of casting, taking as an example a four-ball unit, the four eight-inch spheres united by necks 3¼ inches diameter, internally, have on each ball two opposite lateral openings, 3¼ inches diameter, thus making in all eight openings to four balls. The patterns are all of cast iron, parted lengthwise through the center of the unit by a plane at right angles to the lateral openings, these serving as supports to the green-sand core which is molded within the pattern itself, and not in a separate core box, thus insuring absolute uniformity to the thickness of the metal, and offering a more yielding core to the contracting metal than in the case of dry-sand molding. The lateral necks which are to serve as joints in combining the units into the boiler structure are faced off by machinery of the most ingenious kind, so arranged as to insure neat accuracy in the surface, the joints on one side having depressions to match projecting tongues on the other, these tongues serving with the longitudinal bolts to hold the units in position. One of the most thorough descriptions of this kind of boiler is the report of a paper read by Mr. Zera Colburn before the Institute of Mechanical Engineers in 1864, an abstract of which can be found in *Engineering Facts and Figures*, by A. Betts Brown, for 1864. He shows that although the tensile strength of cast iron is not so great as wrought iron, yet the spherical form of each unit of the boiler gives it an equivalent strength. He says: "The strength of a hollow sphere to resist internal pressure is exactly twice that of a hollow cylinder of the same diameter, material and thickness, and it can be shown that even a cast iron sphere, seven feet in diameter and seven sixteenths of an inch thick, is as strong as the shell of a Cornish boiler of the same dimensions." "The plane in which rupture, if it happen at all, will take place in a hollow sphere, is the largest plane that can be drawn through it, and the metal resisting the strain tending to cause rupture is the whole section of metal bounding the plane." "In a hollow cylinder the area upon which the greatest pressure tending to cause rupture will be exerted is that represented by the product of the length into the 'diameter of the cylinder.'" The ends of such a cylinder add nothing to the strength of the cylindrical part, in case of a rupture beginning at the cylindrical part.* The spherical form of each part of this boiler is one of its marked advantages, not only so far as strength is concerned, but as enabling a much larger amount of surface to be exposed to the fire than in any form of combined cylinder. To the spherical form with the curved necks has been ascribed by the inventor the property, which this boiler is asserted as having, to cast its scale when emptied of water, as there is no seeming abutment for the arch of the crystallized scale to spring from.

The value of cast iron, so far as durability is concerned, has long been conceded. The purer the iron the more readily does it corrode, while the mixture of even a small amount of carbon increases its ability to resist corrosion. Wrought iron water pipe under ground soon rusts out. Cast iron, even of the same thickness, remains good after many year's use; in fact, is considered practically to suffer no deterioration. Wrought iron in boilers decays internally—the most rapidly where moisture and air both operate, as in the upper side of mud drums, while they are often eaten through from the outside by trifling leaks, and the constant trickle of water over the surface. Wrought iron boilers are, according to the experiments of Fairbairn and others, so much weakened by the process of riveting etc., as to suffer a deterioration of about forty per cent. The Harrison boiler is made of pieces of as uniform strength as possible, united in a systematic manner. The uniting the units or pieces into mass, does not diminish their strength. In case of accident to any part of the boiler, the damaged part may be removed, and instead of being repaired,

*The metal effectively resisting the rupture in the cylinder being only the length of the cylinder. Thus, by comparison, Mr. Colburn arrives at his conclusion as to the relative strength of the two forms.—See *Engineering Facts and Figures*, 1864, pages 12 and 13.

as is done with wrought iron boilers, new parts may be substituted, just as bricks may be taken out, and new ones replaced in a building. The patching of a damaged wrought iron boiler makes it weaker. The renewal of any part of the Harrison boiler gives it its original strength.

The experiments heretofore described, have been conducted to determine the safety and durability of the boiler under unusual and severe usage, or rather to determine whether any danger can result from submitting this kind of boiler to those circumstances which, in ordinary wrought iron boilers, are thought to result in explosions or great injury to the boiler.

The Committee are impressed with the great utility of the boiler, as one perfectly safe and free from all danger of explosion even when carelessly used. This recommendation alone, in a humanitarian point of view, must strongly commend it to public favor. During the experiments, its steam-making qualities were favorably noticed, and such boilers in actual use as your Committee have had an opportunity to examine, seem to give satisfaction in point of economy; but in the absence of all experiments in this direction, conducted under their immediate supervision, they do not feel qualified to report in figures as to its steam-making efficiency.

Comparing cast iron plates with wrought iron ones of the same thickness, the transmission of heat is known to be in favor of the former; hence the material, if in a safe form, is better adapted to economical steam-making than wrought iron. Ordinary boiler plate is seldom less than one fourth of an inch thick, and more commonly three eighths, particularly for high pressure. The castings used in the experiments for safety, were not over three eighths of an inch thick, and in one boiler set up in a form adapting it to marine purposes, some of the units were only three sixteenths of an inch thick, and were worked successfully at one hundred pounds pressure, driving all the machinery in Mr. Harrison's factory in an efficient manner. The principle of enlargement of the boiler by addition of units, and the fact that it can be constructed in any shape or style, just as various kinds of buildings are constructed of ordinary bricks, places it in the power of the engineer to adapt it in its form to the requirements of each particular case; so that with the known advantage of the use of cast iron, and the unlimited scope in the arrangement of heat absorbing surface, coupled with the demonstrated fact of safety, your Committee unhesitatingly approved and heartily recommend it to public favor.

Sub-committee appointed to make the examination: Coleman Sellers, Chairman; John Agnew, John F. Frazer, Henry Morton, J. C. Cresson.

Iron Works in Alabama.

From an old subscriber, F. Watson, of the Brierfield Iron Works, fifty miles from Selma, Ala., in Bibb county, we have a very gratifying account of the progress of the iron manufacture in his vicinity. He says:—

"These works are situated on the Alabama and Tennessee River Railroad. They were destroyed by Wilson in his raid, April, 1865, but have been partially rebuilt by a company of southern planters. They have now a hot-blast charcoal furnace in operation, making fifteen tuns of iron per day, a mill for rolling merchantable bar iron, a pattern shop, machine shop, and foundery, and will soon have in operation several additional puddling furnaces, billet rolls, nail-plate mill and at least ten nail machines. A second charcoal furnace will soon be started."

We are glad to hear of these evidences of enterprise at the South. Time, energy and perseverance, with capital, will eventually develope the riches of the Southern States so long dormant.

Editorial Summary.

THE DURABILITY OF SUBMARINE CABLES is a problem just now very prominent in importance, and in the thoughts of inventors. We noticed a few weeks since, the faulty construction and rapid destruction of cables hitherto laid, not excepting the Atlantic, but omitted to mention that the last Atlantic cable is protected with galvanized wire, and has therefore a fair "expectation of life." The latest proposal we have seen for increasing the protection against oxidation, is that of Mr. Latimer Clark, (Eng.) who patents a cable, served over the iron with two broad, strong and porous webs of hemp saturated with bitumen: the two webs being served spirally in opposite directions.—Another form of cable, somewhat novel in principle, has been patented lately by A. J. De Morat, Philadelphia. The core conductor is wound with two consecutive ribbons of thin copper, breaking joints, a coating of gutta-percha is then applied, another pair of copper ribbons is served on, and so alternately the conductor and insulator are repeated until sufficient thickness is obtained. The advantage sought by this arrangement lies in the concentric position of all the conductors, giving them "a common electrical atmosphere," and in working the conductors separately, as positive and negative, obtaining a greater velocity in signals.

SOLUBLE BLUE.—Dr. Brucke obtains soluble Prussian blue by preparing a solution of 217 parts of yellow prussiate of potash and one of sesquichloride or tersulphate of iron made of 72 parts of protosulphate, or its equivalent of metallic iron, mixing each solution before they are brought together, with twice its volume of cold saturated solution of glaubersalts. The iron liquor is then added to the prussiate, keeping them well stirred, the precipitate is washed by decantation, until the washings come off blue. It is then transferred to a strainer, and afterwards dried and pressed between paper.

LIGHT AND HYDROGEN.—It is a suggestive statement, if correct, that an atmosphere of hydrogen supplies to plants the want of light, enabling them to grow green in the dark.

THE THAMES EMBANKMENT.—This great improvement in the British metropolis is interesting enough to warrant a short notice. The channel of the river is deepened by dredging, and narrowed and defined by a massive wall of granite on each side, surmounted by a handsome parapet, making in effect a great stone basin or dock, open at the ends, and flanked with piers of a peculiar construction to rise and fall with the tide. Each pier is a sort of granite dock, through which the tide freely passes, and its surface or floor is supported on a floating pontoon, rising and falling in its granite chamber. Bridges, with one end hinged on the wall and the other resting on the pontoon, connect the piers with the shore. The north embankment is so far forward that the completion of the main portion may be expected within the present year, leaving only the part between the Temple and Blackfriar's Bridge, which is not yet under contract. The south embankment is in progress, as yet, only between Westminster and Lambeth bridges. On the land reclaimed from the river, there will be room for a superior class of warehouses etc., besides a magnificent road and promenade extending the whole length on each side.

AMMONIA FROM THE ATMOSPHERE.—The nitrogen of the air is obtained and converted into ammonia (a compound with hydrogen, valuable for fertilizing and other purposes) by a process recently promulgated by MM. Marguerites and De Sourdeval. The air being passed through a calcined mixture of carbonate of baryta, iron filings, refuse of coal tar, and sawdust, the oxygen is converted into carbonic oxide, and the liberated nitrogen is introduced into a retort where barium is heated with charcoal, and there unites with the carbon, forming cyanogen, and with the metal, forming cyanide of barium. The cyanide is then decomposed by passing steam through it at a temperature less than 300°, and the nitrogen is disengaged in ammonia. Nitric acid may next be obtained, perhaps, by oxidizing the ammonia. But the application of the process to practical purposes on the large scale, is quite a subsequent question

IMPORTANT TO INVENTORS.—At the suggestion of Capt. W. M. Mew of the Treasury Department, who has been for some time past, engaged in the consideration of the most efficient means for preserving life at sea, and the advancement and security of the merchant service; public notice is given to all inventors having any apparatus or improvements that in any way conduce to the object above specified, to present the inventions for examination before a committee acting under the authority of the Secretary of the Treasury, at a meeting to be held in this city on the second Monday of April next. Such inventions are to embrace steam-engine boilers and safety valves, anti-incrustators, steam and water gages, steering apparatus and life boats with detaching tackle. Inventors may appear in person and explain their inventions, but no expenses will be allowed under any circumstances.

A NEW COMET.—M. Stephan, director of the observatory at Marseilles, discovered on the 22d of January a new comet, of considerable brilliancy, generally round, and with a well defined nucleus. The train is supposed to be in line with the nucleus and the earth, and therefore concealed. (Some comets, like Betty Bo-peep's sheep, "bring their tails behind 'em.") The nucleus appears denser on one side than the other, leading to the supposition that the train is fan-shaped. On Jan. 25th, at 8h. 53m. 35s. P. M., the right ascension was 2h. 33m. 53·5s.: north polar distance. 74° 26′: hourly movement in right ascension +5.17s. and in polar distance, —1·29′. The appearance of this comet is regarded as highly opportune for following up recent developments in spectrum analysis.

SAWING IRON.—The endless band-saw is now used with great success in England for cutting out locomotive frame plates and other work of like character. A saw half an inch wide, one thirty-second of an inch thick, lubricated with soap and running at the rate of 200 feet a minute, cuts out ½-inch plates at the rate of one inch feed per minute, and works four or five hours at this rate without sharpening. The finest angles, inward and outward, are cut with precision never attained by old methods. An inscription of words, surmounted by the royal arms, the whole cut by the saw out of a heavy iron plate, is to be shown at the Paris Exposition.

PETROLEUM ENGINES.—Mr. Richardson's experiments under the patronage of the British Admiralty have resulted very encouragingly with an ill-adapted boiler, the construction of which impeded a full gaseous blast sufficient to consume the smoke as intended. During a trial of seven hours, 18.91 lbs. of water were evaporated per pound of fuel; the latter being the crudest refuse of coal tar etc. This is more than double the best practice with coal. Mr. Richardson has applied to the Admiralty for a large common marine boiler for further experiments in which it is expected that still better results must be obtained with an abatement of the smoke nuisance.

PRESERVATION OF EXHIBITION PACKING CASES.—The Paris Chamber of Commerce has made the following proposal for taking care of empty cases in which goods have been forwarded to the Exposition: "For closing, numbering, removing, and conveying the empty cases to the warehouses for storage, classing storing and insuring the same against fire during the Exhibition, and returning the same to the owners, two francs per case of one cubic meter and under, and for every additional metre or part of a metre, fifty centimes, about ten cents of our money.

THE CALIFORNIA BORAX COMPANY ships 2,500 lbs. of borax and upwards every day, at a cost for all expenses of $90 a tun. The article is said to be worth $320 a tun in the European market, and $600 in the American.

HYDRO-PROPULSION.—We observe a recent change of tone among English engineers in regard to the possibilities of this form of motor. The official result of the trial of the *Waterwitch* with the *Vixen* seems to show that with a very crude and wasteful arrangement of her water jets—wasting power both in lifting and short turns of the water ejected—she did quite as well as the steamer, making 9 knots with 750 indicated horse-power. At a subsequent trial with deeper draft she did better, and "the results, bad as they are," says *Engineering*, "have led to sanguine predictions as to the final success of the jet system."

THE CHASSEPOT GUN.—It appears that the French Government is actually going into the manufacture of its pet arm. (See illustration in SCIENTIFIC AMERICAN, page 16.) A large contract has been made in England, and an order is being filled for two hundred lathes for a company in Paris, to be employed in converting the present French rifles into "Chassepots." In view of the example of other Governments and the results of trials, this looks very much like sacrificing national safety to national vanity or private influence. It is true, however, that experiments and trials are still making with the Remington and other leading patterns.

TELEGRAPH LIGHTNING PROTECTORS have been introduced in France with much promise of success, composed of two smooth brass plates about two inches square, placed one above the other, and separated by a sheet of paper, or probably still bitter, by a thin film of mica. One of the plates is in connection with the line, the other with the earth; and as soon as a strong tension occurs on the line, the electricity passes in sparks from the former plate to the latter, perforating the insulator between, and escaping into the earth.

ERRATA.—The following corrections in Dr. Adolph Schmidt's article on making Bessemer steel, were received from the author after the article was printed. In the description of metal No. IV. strike out the words "and often partially fibrous." In the description of No. V., for the words, "its fracture is partly fibrous, partly grainy, with big dark colored grains"—substitute "its fracture is grainy, with bigger and darker colored grains, and shows frequently a disposition toward fibrous structure."

THE ATLANTIC TELEGRAPH.—The latest report to the company states that its profits from the time of the opening of the line, July 28, 1866, have been at the rate of 25 per cent per annum on its capital ($3,000,000) although the business is said to be only about one-twelfth of the capacity of the two cables, in consequence of the exorbitant rate charged. With a view to still greater profits, the rate was reduced to $1 25 per word on the 1st of March. One hundred words per minute can be sent through each cable.

TRIAL OF HORSE HAY-FORKS.—The examining committee of the Farmers' Club, in the trial of horse hay-forks alluded to in our last issue, have made their report, wherein they award the first prize, in class No. 1, to Palmer's Excelsior sickle-tined fork, and the second prize to J. H. Chapman of Utica, N. Y. In class No. 2, comprising harpoon forks, the first prize is given to C. C. Blodgett of Watertown, N. Y., the second prize to Messrs. S. E. & L. B. Sprout, Muncy, Pa.

COAL-CUTTING MACHINERY is wanted in the mines of England—as everything calculated to diminish the cost of iron making and to counteract the effect of strikes is now eagerly looked for by the alarmed English manufacturers—and prizes of £100, £200 and £500 respectively have been offered by the South Lancashire and Cheshire Association of Colliery Proprietors for the best three coal-cuttins machines submitted before November next.

RUSSIA AND THE CAUCASUS.—Russian correspondence states that a great joint-stock company has been formed for the improvement and development of the Caucasus: proposing, in short, to supply to a rude country at once, by adequate organized capital, the public works and industrial machinery which would otherwise be accumulated only by the slow progress of ages, if at all.

SNOW IN LOUISIANA.—A correspondent adds to the catalogue of snow storms in eighty years, one which he witnessed in Madisonville, La., on the 18th of February, 1864, on which day also, as a letter informed him, it was snowing furiously in New Orleans. Since that time [until the present year, as our paragraph meant but failed to say,] no snow has fallen in Louisiana—so far as we are informed.

GLASS-ENGRAVING INK.—M. Kessler's successful experiments in engraving flint glass by means of alkaline fluorides and acids have led to the preparation of an ink from hydrofluate of ammonia and hydrochloric acid, with which characters and designs may be written ineffaceably upon glass.

A GREAT RAILROAD FERRY PROPOSED.—The North Eastern Railway Company of Switzerland, with those of Wurtemberg and Baden, are discussing a plan and estimates for carrying the trains across the lake of Constance on steam rafts of 200 horse power.

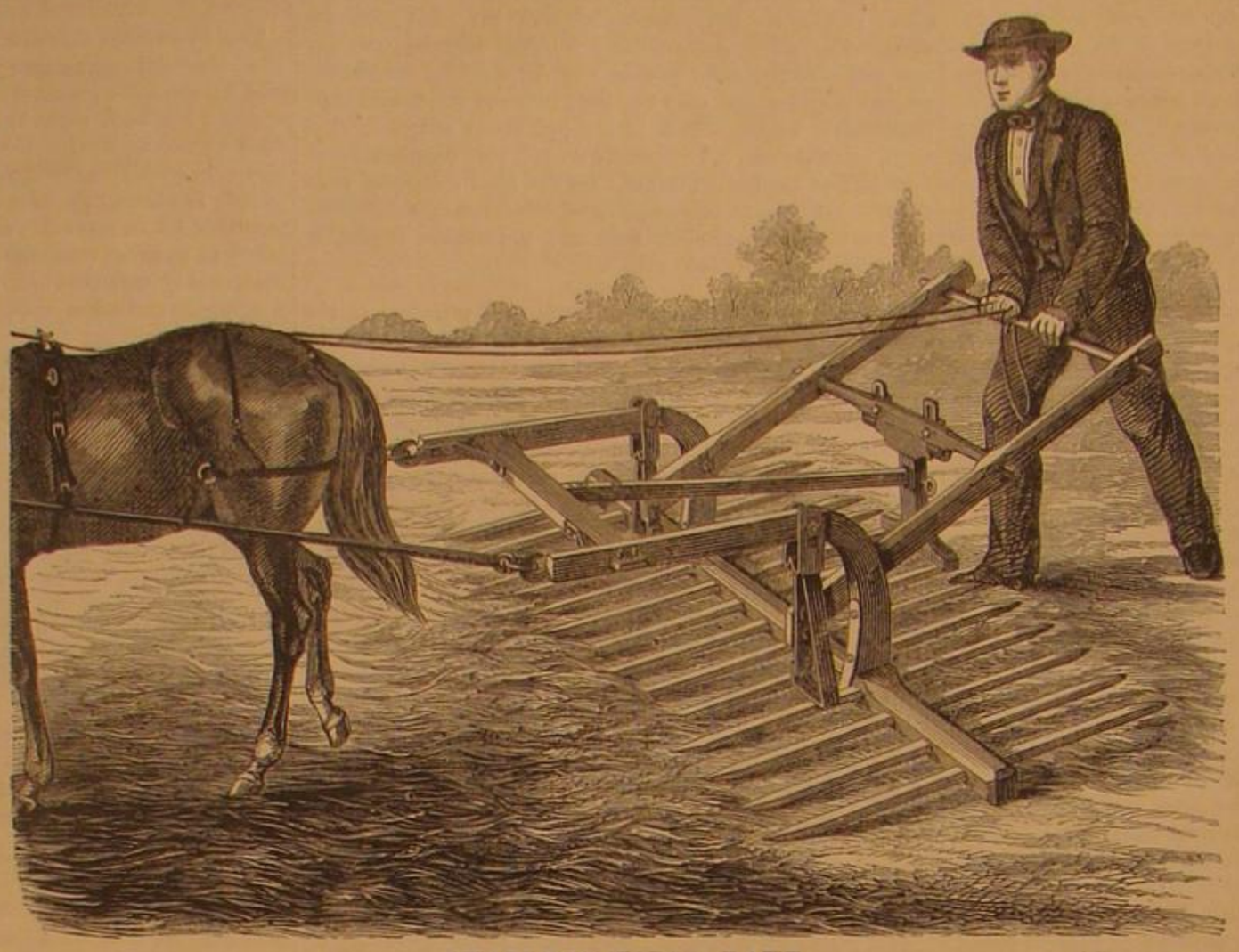
HORSES are beginning to receive the benefit of anæsthesia in surgical operations. It has been applied with success locally, both by means of ether, and of the rhigolene spray. Many horses may thus be saved by operations which otherwise would be impossible or fruitless.

VENTILATION METER.—General Morin has submitted to the French Government an electric anemometer, by which the state of ventilation in hospitals and public buildings is accurately indicated.

Improved Horse Rake.

This rake appears to be one of the best we have yet seen, judging from the model before us. That at least works excellently well. It is a revolving rake; as soon as the acting line of teeth are loaded, a slight motion of the driver's hand reverses the rake and lays the hay in windrows ready to be ricked. The rake proper rotates in straps on the lower ends of curved bars which serve also as a means of attaching the horse. From these bars project, at the rear, two guiding bars properly united by connecting rods, the upper one serving as a handle for the driver. These rear bars are pivoted to the curved supports, and at their forward ends are bolted to reversed V-shaped springs, one leaf of which is free to work in the angle of the spring. Holders to keep these springs in place while working are attached to the curved bars directly over the springs, which act to keep the forward part of the rake to the ground. The inside cross-bar below the driver's hands has a stop or pendulum connected by a pivoted rod with the cross bar on the draft or curved shafts. This pendulum acts with the springs on the forward side of the rake to keep it in position.

When the rake is full and it is desired to empty the load, the driver slightly pulls on his handle, which draws back the curved shafts and disengages the pendulum, allowing the rake to rotate. The back of the rake, in coming to place in front, acts on the inclined side of the V springs, pressing it in until the teeth have passed it, when the bottom shuts over the teeth, holding all snug. The holders over the springs and the supports of the pendulum at the rear are adjustible to regulate the draft. The rake is made quite light, is easily managed, and appears to be a very desirable implement. It was patented by Atlas H. Chaplin, Tecumseh, Mich., who will furnish any other particulars desired.



CHAPLIN'S HORSE RAKE.

[For the Scientific American.]

GOLD HUNTING AND GEOLOGY.

Within the last fifteen years a series of excitements, in relation to discoveries of gold, have occurred in Ohio, Indiana, and Iowa. In nearly every instance some gold was found, but the localities never afforded it in paying quantities, and disappointment followed. None were ever paid for their labor.

The question naturally arises, if some gold has been found in the states named, why may it not exist there in quantities as well as in the Carolinas, Georga, and the Pacific States and Territories? It may be well to answer this question in the light of Geology.

All gold and silver is derived from fissures in the rocks, which have been filled with these metals from the interior of the earth. These veins never exist, except in regions where there has been much disturbance of the earth's crust, by what geologists call plutonic action, to distinguish it from volcanic action. The stratified rocks of the globe, when undisturbed, lie in horizontal layers or beds, and, where no internal heat has reached them to change their condition by metamorphism, are usually more or less filled with fossil remains of vegetables and animals. In such rocks mineral veins are not to be found, such as gold, silver, and copper. But where the strata have been thrown up into a vertical or inclined position, there metallic veins may be expected. Silver and copper are usually found in these veins, in the form of ores which are soluble in water; but gold being insoluble in the acids existing in nature, is always found in its pure state as a metal, though often in such minute particles that it cannot be detected by the eye. As time wears away the rocky strata, including the gold veins, this metal, remaining undecomposed, is strewed over the surface in the vicinity of its veins, or is carried away by rains glaciers, or currents of water, along with the sands, gravel and rocky fragments with which it becomes intermingled. Being of greater specific gravity than the debris of the rocks, the gold in its transportation finds its way to the bottom of the loose deposits, and is mostly found resting there upon the undecomposed rocks.

Gold is found then in two conditions: included in veins, and strewed over the surface at the base of drifted deposits. But silver and copper, occuring generally in the form of ores soluble in water, mostly disappear from the surface as the veins are worn down, and are not found in paying quantities, except at depths at which they remain unaffected by atmospheric agencies.

Now, whenever surface-gold is found in a region where the rocks are disturbed, the geologist infers that gold veins exist near at hand; but if the rocks are undisturbed, the finding of surface-gold is no indication that veins exist in its vicinity. It must have been transported from a distance, along with the drifted deposits at the base of which it is found.

Throughout Ohio, Indiana, Illinois and Iowa, the rocks are all of the stratified order, and remain nearly horizontal, having never been broken up by plutonic action and the intrusion of metallic veins. The only exceptions are in the lead regions of Illinois and Iowa, where disturbances have occurred. According to geological science, gold veins are not to be found in any of these states where the rocks remain horizontal, but gold has been found in them all. How is this fact to be explained? In the states named, there is strewed over the surface of the country, in irregular beds of various depths, what is called the diluvial formation. It is composed of boulders of granite and metamorphic rocks, gravels, sands, clays and portions of the local rocks. No granite, syenite, gleciss, or other primary rocks exist, in place, in any of these states. The masses of them, strewed over the surface, and forming part of the diluvium, have therefore been transported to their present resting places from a distance. What little gold has been found is included in this diluvium, and has been transported along with the boulders. All the varieties of rocks represented in the diluvium, are to be found to the north-west, in the Lake Superior and Rocky Mountain regions. Their transportation eastward is supposed to have been effected by the agency of icebergs, at a period when the continent was immersed in the waters of the ocean, or by the inflowing of the sea over the continent from the north-west. The particles of gold in the diluvium, must have been derived from that source. It is no more strange to see gold in this formation, in Ohio, than to see blocks of granite in it there. As granite must exist in place, so also must gold veins exist there; but to what extent, and in what quantities, none can yet determine.

The foregoing deduction was made in 1858, when no discoveries of gold had been made as far north as Nevada, Idaho, etc., and supplies an additional proof of the value of geological facts and sound deductions therefrom.

From all the examinations made in the states under consideration, no encouragement is afforded to the gold hunter to dig any longer in their diluvial deposits. It must be labor lost. This will be apparent when it is considered, that the veins from which the gold already found has been derived, must be located at a distance north-west, beyond the range of the undisturbed and fossil-bearing rocks; and that he who would find it in paying quantities, must shift his labors to that distant field of action.

It has been said that the rocks of Ohio and Indiana are nearly horizontal; and that they have not been subjected to volcanic action and the intrusion of metallic veins. This is true also of the greater part of some of the other western states. A line drawn from Sandusky City, to Knoxville Tenn. presents the strata of the rocks nearly horizontal as far as Cumberland Mountain. South of this point the disturbances commence, and extend for nearly three hundred miles, or to where the newer formation begins. Within this space all the veins of copper and gold-bearing quartz are found. Nearly everywhere along this line, after entering the mineral range, the strata are highly inclined and metamorphic—in some places being nearly vertical. The same condition of the rocks exists in California, where both surface gold and vein gold are found.

Could the gold hunters of Ohio and similar states see the vast difference between the geology of a true mineral region and that of the one they have been vainly exploring, the contrast would be so striking as to make them desist at once from their fruitless toils; and did editors possess a little more knowledge of geology, it would prevent them from misleading their readers to an injurious extent, by reporting the discovery of valuable mines where that science says none can exist.

D. C.

Cholera Animalcules.—Dr. Kolb, of Vienna, has found by microscopic examination that the rice-water discharges contain countless mushroom-like insects, or "entomistic excrescences." To destroy these organisms and arrest their propagation, is the problem now before the profession.

WHY A BELT RUNS ON THE LARGEST DIAMETER OF A PULLEY.

In our issue of Feb. 16th, we stated, in reply to a question of a correspondent, that if the two shafts connected by a belt were kept in line with each other, *i. e.*, parallel, and the belt itself kept straight, there would be no necessity of having the faces of the pulleys crowning; but that if the shafts were slightly out of line, the tendency of the belt, as of liquids on a revolving shaft, was, by centrifugal motion, to traverse the part furthest from the center, and therefore the belt would seek the crowning portion of the pulley.

J. S., of Connecticut, thinks this reason will not apply to all cases, no matter what the speed of the shafts, *i. e.*, that of the pulley faces. He further says: "Unless any belt having width runs on a straight pulley at right angles to the axis of rotation it will work toward that edge of the pulley nea rest the end of the shaft with which it forms the acute angle. Now if a belt having width is laid on a taper pulley at right angles to the axis, that edge of the belt embracing the largest circumference will move faster than the other edge and the belt will be bent edgewise, and a short portion will approach the pulley at an acute angle on the side toward the largest diameter, and consequently the belt must work gradually to the largest part of the pulley."

We cannot see in what respect the statement of our correspondent affects the reply we made. He acknowledges that if the shafts are not in line the belt will tend to that portion of the pulley furthest from the axis, and that the belt will necessarily become crooked. Our position was precisely the same; but J. S. seems to ignore the force of centrifugal motion unless the motion is rapid, which is, we think, an untenable position.

J. W. S. also attacks the centrifugal theory by the same statement in regard to a curved belt, made so by the stretching of one edge. He illustrates his idea by a diagram of a wide-face, crowning pulley, with a belt running with one edge on the largest diameter and the other on a smaller diameter at the end of the pulley, and says that though the shafts may be in line the curve of the belt will in reality direct the belt on the pulley at an acute angle, or out of line, and as every turn of the pulley tends to roll the belt to the center, it will so move until the strain is equal on both edges.

If this is so, and only the stretching of the belt's edge compels it to traverse the highest point, it would seem that one edge being once curved, the time could not arrive when the strain would become equal on both edges, unless the belt passed its width entirely over the highest part or crown of the pulley, when the belt would have attained its normal condition of straightness and again repeat the process of traversing transversely indefinitely.

[For the Scientific American.]

OUR NAVY—ONE STEP IN THE RIGHT DIRECTION.

The Hon. Mr. Grimes has introduced a bill in the Senate of the United States, the principles of which if carried out, will do more toward improving our navy than any Act of Congress passed since the Rebellion broke out. The bill proposes to create a Board of Commissioned Officers consisting of three Line Officers, a Chief Engineer, and a Naval Constructor, "who shall examine all plans and specifications for the construction, equipment, armament, and repair of all vessels," before any money shall be expended or contract made for the construction of any vessel of war." This certainly looks as though the object of constructing ships was to be well considered and the plans carefully matured before the work was commenced, either in the navy yards or contracted for by outside parties. It is time that we adopted the principle of knowing beforehand whether we are going to build fighting ships or pleasure yachts; or whether the vessels we propose to build will, when prepared for sea, float, and if so, whether the guns can be worked in a seaway.

One would believe after reading the well-written Report of the Hon. Secretary of the Navy, if not conversant with a detailed history, that we had a very respectable and formidable navy, both in numbers and strength, and quite sufficient for the protection of our commercial interests and our rights in any foreign country. Undoubtedly our aim should be to have a navy that can fight not only gun for gun but tun for tun of any naval power whatever; for by such a standard, our relative strength must be compared. If we do not keep on hand, built and ready for equipment, so large a number of vessels of war as some other nations do, we must be prepared with the requisite facilities, such as materials and tools, navy yards, dry docks, workshops, and storehouses, with which a large number of ships could be built on the shortest possible notice, and that will constitute our naval strength.

Can any one of common capacity review what has been done

in the navy during the last six years, and consider the actual condition in detail, without feeling chagrined and mortified at the result? The Secretary's report and the Navy Register say that we have sixty-one iron-clads; do the people know that sixteen of them were built from models of 614 tuns burden, and that not one of them will, if the proposed armament, stores men and effects are put on board, float, and that they are entirely useless? Would this have been the case if the plans and specifications had been submitted to a competent board for their examination? Some one in authority made contracts for these vessels to be built, and furnished plans without knowing whether the ships would sink or swim, and should be held responsible for this waste of money.

Some seven or eight more out of the sixty-one iron-clads were captured from the enemy and are not worth keeping in repair. Three of the iron-clads, the *Dictator*, *Puritan*, and *Roanoke*, draw too much water to be used for harbor defence and are not safe for cruising at sea. The *Puritan* was intended to carry two turrets, but being of the same model as the *Dictator*, which was found to have too little capacity for even one turret with all of her deck plating, coal, stores, and men and their effects on board, it is supposed if she is ever finished she will have only one turret. Eight of the iron-clads were built after the model of the *Manhattan* of 844 tuns burthen carrying two guns each, and did some service during the war in frightening the rebels, but could not take Fort Sumter, or blockade Charleston, and are not to be considered of much account in future warfare. We have nine iron-clads of the *Canonicus* model, 1,034 tuns, carrying two guns each, and they are a small improvement upon the *Manhattan* class. Two are to be returned to the contractors. Deducting the above number from the list of iron-clads, we have fifteen left, four of the *Monadnock* and *Miantonomah* class, four of the *Kalamazoo* class, now building, and seven of no value in a naval point of view. The *Kalamazoo* class were intended to be an improvement on the *Miantonomah* class, and as structures showing mechanical skill, they are equal if not superior to any vessel built, but as engines of war it is doubtful if they are equal to others, inasmuch as they will draw more water, have no more speed, be longer time in turning round, owing to their great length, carry more men, burn more coal, consequently be more expensive to keep in commission and only carry the same number of guns. Y. Z.

Science Familiarly Illustrated.

What Is Clay?

[We cannot do anything better for our young readers on this subject, than to borrow the following from the *Country Gentleman*.]

On the table before us, lies a bright piece of sheet metal. It is not as bright as silver, and it has not the intense blue tinge that distinguishes zinc. Its surface soon gets soiled and dull, otherwise it would probably assume a place as one of the precious metals. But nitric acid, in which silver dissolves almost as easily as sugar does in water, has no action upon this metal, and beyond the first mere dulling of the surface it remains for years without rusting or tarnishing. But by far the most singular feature of the metal before us is its lightness, or as a chemist would say, its low specific gravity; for while osmium, the heaviest body in existence, is nearly 21½ times as heavy as water, silver ten times, lead eleven times, steel eight times, and zinc nine times, aluminum is only two and one half times as heavy as water.

Hence a teapot made of aluminum would weigh but one-forth the amount that one of the same size made of silver would do, and this property of the metal has caused it to be used in France in the construction of helmets and of the eagles which surmount the standards of the imperial forces, it being of great consequence is these cases that the weight to be carried should be diminished as much as possible.

As yet, however, this beautiful metal, of which the soil beneath our feet may be regarded as one vast mine, has not been brought into anything like general use, and we presume that many of the readers of this article have never seen it. It has, it is true, been made into spoons, which have been sold as curiosities, but the only really useful purpose to which it has been applied in ordinary life is the manufacture of pens. For this purpose we understand aluminum, is but little inferior to gold.

One gentleman in England took a brick from an old Roman wall and extracted from it a sufficient amount of aluminum to manufacture a pen, with which he wrote a very interesting book.

But although in these days a metallic base is an attractive subject, we must pass on. When this bright metal is burned it forms a beautiful white powder—alumina. It seems strange to talk of a metal burning. When men wish to make a fire-proof building, they employ iron for shutters, stair rails, etc. And yet in some conditions iron is more easily ignited than gunpowder. We have seen a popular scientific lecturer pour iron in fine powder out into the air, and it took fire itself, which gunpowder will not do. He then held up a large bunch of iron filings, set them on fire with a match, and they burned like tinder, falling down in splended burning flakes. All this was in the open air and without the aid of chemicals. Then again, we saw him take a brilliant silvery metal—magnesium; it was in the form of a slender ribbon, which he ignited with a spirit lamp, when it continued to burn, giving out a light of dazzling brilliancy—the famous magnesium light which can be seen at a distance of sixty miles.

Alumina, as we have said, is a beautiful white powder. It is but very rarely found in nature uncombined with other substances. We do not say unmixed, but we use the stronger term, uncombined. The sapphire, the amethyst, the topaz, the ruby, and the emerald, are nearly pure alumina, and it is curious that the soft clammy earth alumina, should produce gems which, in hardness exceed quartz, and rank next to the diamond.

It also occurs combined with water in a few minerals as Diaspore, Gibbsite, etc., but it does not occur uncombined in any quantity in nature, and we might just as well say that water is the breath of life because it contains oxygen, as to say that clay is alumina.

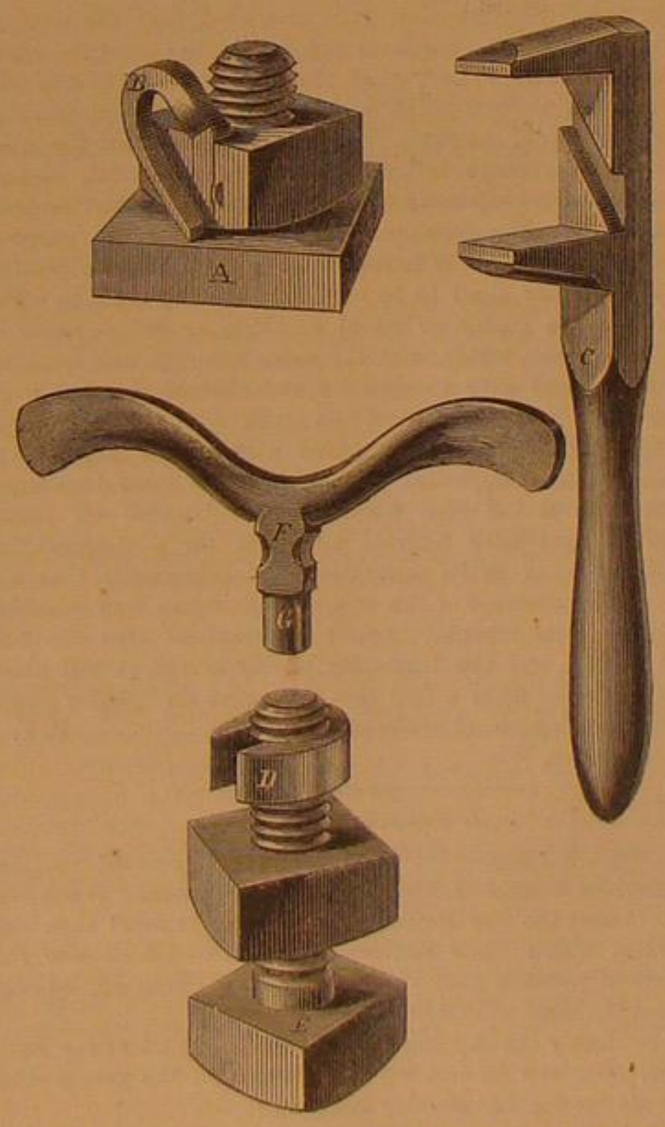
Alumina, in its general character, has a strong resemblance to the earths, but on the other hand it seems on some accounts to have a greater affinity to the group of which iron and manganese are members.

Like these metals, it combines with acids to form salts, but never fully neutralizes the acids so that sulphate of alumina, like sulphate of iron, has always a slightly acid reaction. And like iron and manganese, aluminum, can form the base of an acid as well as the base of an earth, and thus form salts, of which it can play the part of an acid or a base. Thus with sulphuric acid, it forms a beautiful crystalline salt—sulphate of alumina. With potassa, it forms the equally definite compound aluminate of potassa, while in the well known substence, alum, it assists in forming a double salt—sulphate of alumina and potassa. This peculiar property of alumina, or perhaps of aluminum, probably confers upon its charactures whose value has not yet been fully appreciated. It probably gives it a mobility which enables it to perform importent, though hitherto but little understood functions in the nutrition of plants, even though alumina itself is not plant food.

Pure alumina is rare, except in combination with silica or quertz, it forms the great bulk of many soils. In this combination the silica plays the part of an acid, and the resulting compound is not in any sense a mixture. Even the beautiful white clay which is sometimes called pure clay, contains a large portion of silica, and this silica connot be separated by any mechanical means. It forms a true chemical compound—silica of alumina.

HARRIS AND BROWNING'S SPRING-FRICTION NUTS.

Railroad men are greatly annoyed by the working loose of nuts on the rolling stock, consequent upon the jar and continual vibration of the parts. The evidences of this are to be seen on the line of all railroads in the large number of nuts scattered along the track. The ordinary check nuts are not sufficient to overcome this annoyance, as, whatever the force applied to set them up, they will start after being for awhile exposed to the never-ceasing shaking and trembling of the train



A, in the engraving presents one form in which the nut carries its own check. This is a curved spring, B, seated in a dovetail slot on the side of the nut and set up by a cold chisel.

This slot can be formed when the nut is punched, if machine-made. The point of B stands a trifle below the face of the nut, and in screwing the nut against the face of the plate A, the spring gives and slides over the plate. But when the nut is turned the other way for unscrewing, the point of the spring seats itself into the plate or against the surface, and refuses to yield. It is evident that a common wrench will not suffice to start this nut, and the inventors have contrived a wrench, seen at C, for the purpose of unscrewing it. On the inner face of the wrench is a diagonal slot cut at an angle corresponding with the overhang of the opening, B. When placed on the nut this inclined slot engages with the spring, and, as the wrench is turned in the act of unscrewing, its side lifts the spring just before the jaws of the wrench gripe the side of the nut. Once started from the plate, A, the spring does not intefere with the turning of the nut.

D is a spring check-nut to take the place of the ordinary check-nut. The thread tapped through it is made by a tap slightly smaller than the shank of the bolt, E, and the jaws of the nut are sprung apart slightly to enable it to register with the thread of the bolt. Of course this check-nut cannot be started in either direction by a common wrench, and therefore a pocket wrench, or key, F, is used to open the jaws. The stem, G, of this key is of oval form in its cross section so that by turning it after it is inserted between the jaws of D, the jaws are spread and the nut will turn easily on the shank of the bolt, E. From the specimens before us we have no doubt of the efficiency of this device for the purpose intended. The improvements are the subject of two patents dated Jan. 27, 1867. For additional particulars address Wm. Harris or Clinton Browning, Rush Run, Jefferson Co., Ohio.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Exploding Force of Cylindrical Boilers.

MESSRS. EDITORS:—The received error to rupture a cylindrical boiler by internal pressure, has been previously noticed by me in the SCIENTIFIC AMERICAN, but the present article presents a clearer view of the opposing theories.

This error consists in estimating the force exerted to rend the circle apart at any two opposite points, to be as the pressure on a space equal to the diameter, instead of the semi-circumference, or their equivalent the quarter circle, compared with a space equal to the radius.

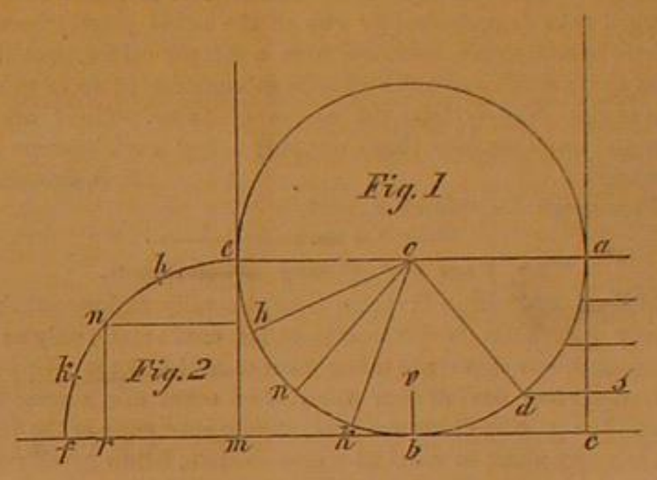


Fig. 1 is the ring of a boiler, and the parting point considered at top and bottom. Divide the space *a c* (equal to radius=1) into four equal parts. Let the pressure of steam in the boiler be 0·25 on a space equal to each one of the divisions, making the total of force on *a c* equal to 1, to separate the ring horizontally at *b*, by the received theory.

Select the lower division with its proportion of force =0·25, alleged to be derived from the steam pressure on the arc, *d b*=0·72. Now by the irrefutable law of statics, the force to rend asunder at *b* is inversely as the versed sine, *v b*, to the arc, *d b*, being an increase of 0·47 over the direct and horizontal force of 0·25+0·47=0·72. This law of the parting force being as the versed sine to the subtending arc, is uniform and true at any point from *b* to *o*, and is applicable to all cylinders subjected to internal gaseous pressure, from the most fragile tube to a piece of ordnance.

In Fig. 2 the arc, *e f*, represents the supposed motions and varied direction of the rays of pressure on the boiler arc, *e b*, and are in the directions of the corresponding parts of the arc, *e f*, as *h h*, *n n*, *k k*, etc,, the sum of which, =1·57, is to be met by the required resistance of force =*m f*=1, and being of increased intensity, as it is less than *e f*. Therefore the parting effect of the pressures on arc, *e f*, is as much greater than that on a space equal to the radius as by the diagram *e f* is greater than *m f*.

Comparative forces to rupture:—Received theory, *a s*=0·75; *s c*=0·25, 1. Correct theory, *a d*=0·85; *d b*=0·72, 1·57.

Statement of values: *d* and *n*, angle,=48·8°; *n d*, chord, =1·32; *v b*, versed sine,=0·25; *e n*, arc,=0·85; *n f*, arc,=0·72; *m r*, distance,=0·75; *r f*, distance,=0·25; *r n*, ordinate,=0·66.

THOS. W. BAKEWELL.

Cincinnati, Ohio.

Beet-root Sugar Machinery.

MESSRS. EDITORS.—We observe in your issue of the 16th inst. a continuation of Prof. Hirsh's interesting article on beet-sugar; in which, when describing the boiler apparatus, he says, "The vacuum pan, one of the neatest pieces of machinery employed in the manufacture, is used in Europe with a view to more economy than is used in this country. Here single pans are used, the vapors of which are condensed by water. In Europe the heat of these vapors is used to evaporate juice in one or two adjoining pans when the liquid is boiled under a still more reduced pressure" etc.

These remarks being founded on a misapprehension, we beg leave to inform your readers, that the plan referred to is known as the "Rillieux process," invented and patented in this country; that it has been extensively used in the manufacture of cane sugar in this country since 1843, in Cuba since 1850, and in South America for three years past; and that the "European machinery" referred to in the article above quoted, is made there from drawings originally obtained in the United States; it being found superior in economy to the French system of Dérosne, which it has supplanted to a great extent in Cuba, on that account as well as because the sugar made is better in color, not being exposed to the air as sirup on the "harp" refrigerators, as it is in the latter system.

We have been engaged (exclusively in this country) since 1843, in the manufacture of the Rillieux system of sugar boiling apparatus; and as it has worked a revolution in the process of sugar making from the cane, we are unwilling to see the credit pertaining to the American inventor (Norbert Rillieux) summarily transferred to European copyists. The beet-

root sugar process requires exactly similar machinery to the cane sugar process, excepting only the apparatus to extract the juices from the beet or cane respectively.

Merrick & Sons.

Philadelphia, March 13, 1867.

Safety of Kerosene Lamps.

Messrs. Editors:—There seems to be much misapprehension as to the principal source of danger in the use of kerosene lamps. If the prevailing impressions on the subject were correct, scarcely one of these lamps would fail to explode. It appears to have been observed that kerosene, benzine, and the vapors therefrom, even when mixed with air in explosive proportions, cannot be inflamed by contact with metal even at a red heat. To ignite them requires contact with flame. Even a red hot cinder, if not in a state of active combustion, will not ignite the most inflammable of the substances named. The danger of lamp explosions, therefore, is not more and in some sense not so much, from heated brass or from a highly inflammable quality of the oil used, as from such conditions in the burner as will, under any circumstances, admit flame into the reservoir of the lamp.

Under all ordinary circumstances the only avenue by which flame can be so admitted, is the "vent," an orifice at the bottom of the burner for the escape of the vapor, etc. Some have contended that no other vent than the wick tube is necessary, but properly conducted experiment will soon show that a distinct orifice for vent is advantageous. A small well-arranged tube is undoubtedly one of the safest possible vents. There is no danger, however, from a simple orifice, provided it is quite small and the burner is so constructed as to guard the orifice properly from the access of flame. There are a few and unfortunately there are only a few such burners in the market.

E. S. Blake.

Pittsburgh, Pa., March 4, 1867.

The Uses of Heavy Petroleum.

Messrs Editors:—It seems to be generally understood that heavy petroleum is serviceable in its crude state, only as a lubricator, but there are other uses to which it may be put, and at a great saving over the cost of other oils, commonly used. The Albany *Cultivator* says, "crude petroleum is the best oil to apply alone to wood as a preservative, being greatly superior to linseed oil. It has been little tried by way of mixing with ochres, or earth paints, but the little we have seen nduces us to think favorably of it for this purpose." The writer has tried it for oiling wood and concurs in the above statement: varnish dries on it perfectly, and if anything with a better gloss than on linseed. Furniture and agricultural implement manufacturers, who finish much of their work in oil and varnish, will find the lubricating petroleum better than linseed oil, and of course much cheaper, as it can be purchased by the barrel at a fifth of the cost of linseed.

It should also find its way into general use as a painter's oil. Whether or not a perfect dryer has been found for it, the writer is not sure, though he has seen specimens of painting when petroleum is used, apparently as fine as linseed paint, for house work, inside or outside. How well it will withstand the weather, time only will determine. If any one has a perfect dryer for it, the writer would be glad to know where to find it, and its owner.

P.

Randolph, Vt.

Expansion and Non-Expansion.

Messrs. Editors:—I do not wish to appear as an advocate of all that has been attributed to those who first suggested that there might be less economy in working steam expansively than is generally claimed. From the communication of S. H. W., page 122, current volume, and others I meet with, I find but few who understand upon what the argument of the "non-expansionist" is founded. We are yet in need of reliable testimony regarding this much discussed question, but until we are in possession of the necessary figures it may be of interest to S. H. W. and others to know what the theory of working steam non-expansively as well as that of expansion is, and then it may appear in a fairer light. I will illustrate it by the example given by S. H. W. Steam enters at 60 lbs. a given sized cylinder and is cut off at one-third of the stroke. I suppose this is 60 lbs. above atmospheric pressure. The average pressure during the stroke will be 35 lbs. Temperature at the beginning of the stroke is 311°, at the end 241°. Non-expansionists do not say that 20 lbs. worked full stroke in this cylinder will give the same result, either theoretically or practically; but they say, take a cylinder one-third the area of piston and the same stroke, and work 60 lbs. full stroke, and practically there will be a little in favor of expansion at high pressures, but growing in favor of non-expansion as steam is used at low pressures, and when arriving at the pressure generally carried by sea-going steamers non-expansionists assert that it will be found decidedly in their favor, taking all things into consideration. This is founded upon the fact that where the large cylinder is used there is about 75 per cent more condensation and radiation surface, more friction, more machinery, than where the smaller cylinder is used. Taken in this view, engineers, I think, will take a second thought before taking their experiments upon one cylinder as conclusive evidence of the fallacy of non-expansion.

In this connection, let me ask if you have any knowledge regarding the experiments instituted by the Navy Department to test this matter, and if those experiments have been completed and published.

A. F. Nagle.

Pittsburgh, Pa.

[Burgh agrees with our correspondent that unless steam of a pressure of 45 or 50 lbs. is used, the expansive power will not produce saving of fuel accompanied by power worthy of attention and productive of economy." The experiments referred to as instituted by the Navy department have not yet been concluded. We have some of the results, but shall reserve them for publication until the experiments are completed.—Eds.

The Crank Motion.

Messrs. Editors:—Notwithstanding, it has been said in your paper that the description of the question of the alleged "loss of power" in the employment of the crank has been exhausted, I would like if some one or more of your correspondents would answer me this simple question: What is the average leverage of a crank 4 feet long as used in the steam engine?

While some contend that as the crank pin describes a perfect circle, at two points of which, called "right angles" it exerts a leverage equal to its length, to wit, 4 feet, and at two other equi-distant points, called "dead centers," it exerts no leverage whatever, and that, therefore, the average leverage must be one half the maximum, to wit 2 feet: others allege that the average is about 2 feet, 8 inches, but furnish us no data, demonstration, or proof thereof, and impliedly admit that it is impossible to do so, by using the indefinite expression "about" 2 feet 8 inches.

Can no one demonstrate exactly what it is, and make it plain to those unacquainted with the higher branches of mathematics?

There is no law of the land, or of mechanics, which limits inventors to the employment of one mechanical agency or power to the exclusion of all the others to produce any given result. For one purpose, the lever, and a certain species thereof in particular, is obviously the best adapted. For another purpose, the pulley is entitled to the preference. For still another purpose, the wheel and axle, screw, wedge or inclined plane, is the best. In some machinery two of these mechanical powers are employed; and in the steam printing press all, I think, are used; each severally being best adopted to accomplish the particular end designed. It is not, therefore, the superiority of one over another in the abstract that should be contended for, but its best adaptation to the end sought to be accomplished by the particular one used. When the advocates of the theory of "no loss of power" in the use of the crank, shut their eyes and ears to the advocates of the contrary, they do not mean to say that for many purposes the pulley is not better adapted, but only that for the particular purpose used, the crank cannot be excelled, or even dispensed with. My question reaches farther than that. Suppose that it is conceded that the average leverage of a 4 feet crank is but 2 feet, but that the crank is indispensable to bring up the stroke of the piston at a precise and uniform point, and without any injurious shock or concussion of the parts, then it is imagined that the question of the average leverage thereof is immaterial, because of the conceded necessity of its employment for the purposes last named. *Non sequitur*. Suppose that for the purposes specified the crank is indispensable; yet it may be possible to add another shaft to be called the driving shaft, to which is attached a pulley, or wheel and axle, or wedge, screw, or inclined plane, which, with the same leverage and quantity of steam, will give increased speed thereof, then the question of the leverage of the 4 feet crank with the quantity of steam used therewith, compared with one or more of the other mechanical powers named, becomes most important.

Hitherto it has been assumed that because all rotary engines have been failures, and that for a reciprocating engine, a crank or its equivalent, is indispensable, that the end of improvement of the steam engine has been reached. This is a great mistake. Let it be conceded that the half of 4 is but 2, and the ingenuity of our inventors will show you an engine upon a boat that will give far greater speed with much less steam of the same pressure.

P. Y.

Milwaukee, Wis.

A Perpetual Sunday.

Messrs. Editors:—On page 141, No. 9, current volume, Scientific American, there is an article headed "When and Where does the Day Begin?" In it there is more than one problem which Time can and will solve. I shall cite the article in question that I may explain my meaning, having placed the same within brackets.

"Evidently the day has a first beginning, and at the eastward." But how far and where? What are the people who first see the light of Monday morning?

"It is the sun which brings the day; where does he first bring Monday? [Nowhere—for he is still with Sunday, having received it from the Almighty when He said "Let there be light:" and as it is not at all probable that the sun did ever cease sending forth light, it is more than probable that the original first day is still in existence, especially when we know the light was hurled upon a rotary sphere.] If we could travel with him we might find out. [Indeed we might.] Let us suppose the case. We will take an early start; at sunrise on Sunday morning, with the sun just at the point of peeping over the horizon behind us, we travel westward. As we go, the people give us a Sunday greeting; we bring Sunday [sunrise if we have traveled with the speed of the advancing day] with us to Pittsburgh, St. Louis, Salt Lake, San Francisco. At San Francisco, our faithful chronometer informs us that we have been on the tramp about three hours. But we started on Sunday morning and it is Sunday morning still. [Certainly the exact minute you started, provided you traveled with the above-mentioned speed.] We go on, still on Sunday morning. [I guess you do; I have no recollection of you getting off.] Will this Sunday morning ever end?" [Your humble correspondent answers never. The sun has never set further than setting still, consequently no second day has ever been ushered in. "Time shall solve all things."

Undoubtedly many when they read the idea advanced, will say, the best thing for this individual is to shave and blister his head, or else furnish him with a ticket to Auburn. Now to all such I would reply that common courtesy does demand a patient investigation before condemnation.

"Old Sol."

New York City, March 9, 1867.

[If our correspondent really be the Ancient Luminary, we dare not argue with him. We hasten to declare that looking at affairs from his standpoint there is but a single day, and that is Sunday; Sunday forever! The turning of our little earth on its axis once in twenty-four hours, and the revolutions of ten thousand other orbs, all in different and inharmonious times, are of little consequence to him. "There is a time for all things:" which means, it may be supposed, that each planet for itself must determine and keep account of its days and seasons.—Eds.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the most prominent home and foreign patents.

Plow.—D. Peters, J. W. Pauly, Keokuk, Iowa.—This invention has for its object to so improve the construction of the plow that the power necessary to draw it through the ground may be diminished, and the wear upon the landside and bottom of the plow greatly lessened.

Cotton and Corn Planter and Harrow.—Charles C. Garret, Dayton, Ala.—This invention consists in combining or constructing a machine by which cotton and corn may be planted in drills or hills at any desirable distance apart.

Carding Machine.—O. F. Fitch, Morristtown, Ind.—This invention consists in the construction and employment of a device which is to be attached to a wool carding machine in such a manner as to draw the electricity from the wool by means of conductors employed in close proximity to the roping.

Boots and Shoes.—Geo. W. Tolhurst, New York City.—This invention relates to an improved manner of strengthening the most exposed portions of boots and shoes and of simplifying the construction of the same. It consists in the arrangement of a combined heel, shank and counter which are molded in one piece of malleable iron or other suitable metal and in the manner of securing the upper of the boot or shoe and also the insole to the said metallic portion of the boot or shoe.

Auger.—Theodore Hofstatter, Jr. New York City.—The object of this invention is to provide an auger attachment, whereby it may be adjusted, to bore holes of any required depth, and whereby also when desired, the holes may be countersunk.

Governor for Water Wheels.—Oliver A. Kelly, Slatersville, R. I.—This invention relates to a governor in which the positions of the gate or valve is regulated by the action of two pawls and a ratchet gear.

Gage for Measuring the Strength of Main Springs.—N. A. Plympton, Northboro, Mass.—This invention relates to a gage by which a watch maker is enabled to compass the strength of different springs in such a manner that if spring the of a watch breaks, it is easy to find another of equal power to take its place.

Lantern.—Francis Leclere, Watertown, N. Y.—This invention has for its object to furnish a lantern in which the lamp can be attached to and detached from the lantern easily, quickly, and with one hand when necessary, and in which the wick can be raised or lowered as required without removing the lamp, or having a button projecting from the side of the lantern for this purpose.

Apparatus for Making Extracts.—Abraham Steers, New York City.—This invention relates to an apparatus which is intended particularly for the purpose of inspissating extracts of tan bark or other fluids or extracts.

Attachment to Locks.—F. J. May, Morrisania, N. Y.—The object of this invention is to prevent the key if left in the lock when locked from being turned upon the outside of the door.

Window-sash Lock.—J. K. Clark, Mount Pleasant, Iowa.—This invention relates to an improvement in window-sash locks or fastenings and consists in a device secured to one side of the sash wherein two friction rollers are hung upon the ends of two connected levers in such manner that the rollers will spread apart and bear against the window frame so as to stop the movement of the sash at any desired point by gravitation, while by touching a handle on the connected levers the rollers may be withdrawn from the frame and the sash be relieved to move up or down.

Field Roller.—H. R. Crowe, Carondelet, Mo.—This invention consists in pivoting the central section of the roller in front of the two end sections in such a way that it can be removed and used by itself when required; in hinging the frames of the two end sections to each other so that the roller may accommodate itself to the surface of uneven ground; and in suspending the seat from springs attached to the frames of the roller in such a way that the seat may be supported whatever position the rollers may take in passing over uneven ground.

Hoe.—William H. Startzman, Big Lick, Va.—This invention has for its object to furnish an improved manner of attaching the handle to the blade of the hoe.

Caloric Regulator.—John Geo. Cooper and Edwin W. H. Cooper, Hartford, Conn.—This invention relates to a regulator in which the air, inclosed in a suitable heater and exposed to the action of the fire in the furnace, is caused to open and close a damper in the furnace door.

Tool for Cutting Boiler Tubes.—Richard Lavery, South Boston, Mass.—This invention consists in the arrangement of an eccentric cutter in a cylindrical head which is made to fit the tube to be cut and to which a revolving motion is imparted by a ratchet handle or any other suitable means so that by turning the cutter on its axis its point or tooth can be thrown back within the surface of the cylindrical head and if the head is inserted in a tube and turned in the proper direction, the tooth of the cutter, when once brought in contact with the inner surface of the tube to be cut, will gradually turn up and the tube will be cut by one revolution of the cylindrical head.

Cultivator Plow.—A. S. Barnewell, Savannah, Ga.—This invention consists in constructing and arranging the shares of the implement in such a manner that weeds will be effectually cut from the sides of the rows of plants and the whole width of the spaces between the rows turned or worked over and the soil rendered light and pliable.

Cleaning Boiler and other Tubes.—John B. Christoffel, New York City.—This invention has for its object to furnish an improved instrument for cleaning or removing the scale from the interior surface of boiler and other tubes which shall be simple in construction, easily and conveniently operated, and effective in its operation.

Stereotype Plate-Holder.—Alexander T. DePuy, New York City.—This invention consists in having a block constructed of sections in such a manner that the sections may, with the greatest facility, be put together so as to form a block of any size corresponding to the plate which is to be secured to it, and the block, thus formed, be capable of bearing any desired or proper number of clamps or fastenings applied to it for the purpose of securing the plate to the block.

Shade Fixture.—John Cunningham Philadelphia, Pa.—This invention relates to a fixture for the cord of a window shade, the fixture containing a knob or pulley around which the lower part of the cord passes and by adjusting which the cord may be stretched where necessary and always kept in a proper taut state.

SPRING BED BOTTOM.—Thomas B. Moore, Bridesburgh, Pa.—This invention consists in the construction of the springs and in the manner in which they are connected to the slats and to the frame of the bedstead.

STEAM AND AIR TRAP.—John Hague, Providence, R. I.—This invehtion relates to an improved method of relieving steam pipes and other pipes of confined air and the water of condensation.

CHURN.—Samuel S. Ayers, Plainfield, N. J.—This invention has for its object to furnish an improved apparatus, simple in construction, and by means of which a small amount of power will be required to perform the churning.

CORN PLANTER.—Josiah S. Rickel, Geneseo, Ill.—This invention relate to a corn planter of that class which is operated by the driver as the machine is drawn along by one horse only, and it consists in a novel and improved construction of the working parts, whereby the driver has full control over them, so that the seed may be dropped evenly in check rows, and the driver allowed to see each dropping, so that no hills can be missed or fail to have seed dropped into them.

MACHINE FOR BORING AND TENONING.—Thomas Place, Alfred Center, N. Y.—The object of this invention is to provide a labor-saving machine for the use of wheelwrights, by which, with the ordinary tools of the shop, the tenons may be cut on spokes, and the holes bored in fellies with dispatch and accuracy, so that they will fit exactly and may be put together to form a perfect wheel.

BRIDGE FOR BILLIARD TABLES.—Thomas Dolan, Albany, N. Y.—This invention relates to a bridge for use on billiard tables as a rest for the cue, the object being to construct the head piece of the bridge, in such a manner as to form bearings for the cue, which will allow the cue to be moved with perfect ease and freedom.

PUNCHING PRESS.—Oliver Snow, West Meriden, Conn.—This invention consists in a novel construction of wrist box for the wrist or driving crank that drives the tool-carrying slide or socket, whereby the distance between the driving socket is varied at will.

TAILOR'S PRESSING MACHINE.—Joseph W. Thorp, Sanbornton Bridge, N. H.—This improvement consists in an arrangement of levers and slides in connection with the handle of a tailor's goose suspended upon a crane, whereby the operator can impart with the hand any desired amount of pressure upon the cloth, or relieve it of pressure entirely by simply raising or lowering the handle without the employment of a spring or catch of any kind.

CONSTRUCTING LEVEES OR DIKES.—Louis S. Robbins, New York City.—This invention relates to a new and improved method of constructing dikes and levees to prevent the overflow of water.

CIDER AND WINE MILL.—E. S. Purdy, Croton, N. Y.—This invention relates to an improvement in that class of cider and wine mills in which rotary toothed cylinders are employed, and one cylinder made to rotate with a greater speed than the other. The invention consists in arranging the rows of teeth on the two cylinders in such a manner that the teeth of the two cylinders will pass each other at the point where the peripheries of the two cylinders are nearest each other, which, of course, is in the plane of the axis of the two cylinders. By this means the mill is rendered very efficient, the fruit being ground or grated in a thorough manner, and very evenly or uniformly throughout.

FID.—H. H. Pember, New York City.—This invention consists in forming the fid in sections, and in so constructing it in other respects as to receive and hold a ring or thimble of any desired size within its limit, so that as the cringle rope or cord is driven and forced over the fid, from its smaller to its larger end, such cringle will, when stretched thereby to the proper degree, fall or come into position about and around the ring or thimble.

CAR STARTER AND BRAKE.—John Wiley, 2d, South Reading, Mass.—This invention relates to a new and improved brake mechanism for railroad cars, so constructed that the device, when applied as a brake to retard the movement or fully stop the cars, will retain or hold the power which accomplishes that result, and be capable of giving it out or applying it in such a manner as to start or aid in starting the cars.

CULTIVATOR.—C. F. Megquier, Eureka, Ill.—This invention relates to an improved arrangement of the plows or the mode of hanging or operating the same, whereby the driver will have entire control over the implement, and with the greatest facility raise and lower all the plows whenever necessary and move the innermost ones laterally toward and from the plants.

TRAP DOOR.—Samuel R. Bartlett, Detroit, Mich.—This invention consists in attaching to trap doors, hatches, etc., a swinging arm, which shall by its own gravity form a stop to the door, thus affording additional security against accident.

CAR BRAKE.—J. H. Williams, Somerville, N. J.—This invention consists principally in interposing a spring between the brake shaft and the parts by which the brake shoes are brought to bear upon the car wheels, in such a manner that they will act to hold the brake shoes against the car wheels, and if relieved therefrom, to bring them to bear upon the same; the said spring, when the brake shoes are released from the wheels, being compressed, and so held in any proper manner, when being released by their reaction the brake shoes are brought to bear upon the car wheels.

COMBINATION LOCK.—Anstin Leyden, Atlanta, Ga.—This invention consists in constructing a lock in such a manner that, in applying it to freight cars and to similar purposes, the car may be locked for through freight, and the destination of the car be indicated by a letter which is turned into position in the act of locking, and so that no way freight key for the same lock will unlock it.

CUTTING WOODEN HEADS.—Edmund Hersey, Hingham, Mass.—This invention relates to a machine for cutting the bottoms and heads of wooden boxes, measures, etc., and it consists of a cutter of peculiar construction attached to a rising and falling frame, and used in connection with a block over which the cutter works, and on which the stock or wood from which the bottom or head is cut, is placed.

HARROW.—Svan Svanson, Swede Point, Iowa.—This invention relates to a harrow for pulverizing the earth after being plowed. The invention consists in a series of toothed rollers, placed in a frame, and arranged so as to operate in an efficient manner.

FIRE-ARM.—Alfred S. Munger, Chicopee Falls, Mass.—The object of this invention is to dispense with the use of a breech piece for receiving the recoil of the cartridge case when the fire-arm is discharged, and consequently all the necessary connecting parts and operations of opening and closing, and locking and unlocking; the hammer, by this invention, being so constructed as to receive and sustain the recoil of the cartridge when the fire-arm is discharged.

CISTERN FILTER.—George W. Lampson, Waterloo, N. Y.—This invention is to construct a rain-water filter, and adapt it to the conductor pipe of the building, so that the rain water shall be purified or cleansed before it enters the cistern.

BROOM HEAD.—H. B. Miller and M. P. Webster, Grand Rapids, Mich.—Patent dated March 12, 1867.—The case attached to the end of the handle and adapted to receive the broom corn is clamped between two bars whose teeth project through the case into the corn to hold it in position; the bars are coupled together by screws which pass through the case of the corn.

PRODUCING ILLUMINATING GAS.—W. G. Walker and R. F. Smith, Kilmarnock. Dated 12th July, 1866. This invention is carried out as follows:—The apparatus is that ordinarily employed at gasworks for producing gas from coal in the usual way, but in lieu of using coal as the origin from which the gas is evolved, aquality of peat, or other similar porous material, capable of itself of generating gas on the application of heat, is saturated with shale oil, or petroleum, or other mineral hydro-carbon. The material so saturated is placed in the ordinary retort and heat is applied, when the oil and the naturally combined hydro-carbons of the porous material are driven off in the form of an incondensable illuminating gas.

PRESERVING TIMBER FROM DECAY.—A. Prince, Trafalgar Square, London Dated July 13, 1866.—The patentee claims the application of crude petroleum, either alone or with mineral paint or pigments, for the purpose of preserving wood or timber of any kind from decomposition or decay, and from the attacks of insects.

MANUFACTURE OF LEATHER.—T. F. Gillot, Stoke Newington. Dated June 30, 1866.—The object of this tion is to utilize the refuse inner skins or parings of hides. To do this, the inventor subjects these skins to the operation of tanning, after which they are stretched and dried, placed together in layers, and cemented with a composition of linseed oil, litharge, resin, balm, wax, sulphur, and gum lac. Perfect adhesion is effected by subjecting the layers to pressure in a hydraulic press, a solid sheet of leather resulting, capable of being manufactured into boots or shoes.

PROMOTING COMBUSTION OF FUEL IN STEAM-BOILER FURNACES.—W. E. Newton. Aug. 1st, 1866.—This invention consists in forcing upward, by means of a fan, blower, or pump, one or more jets of cold air into the chimney or smoke pipe of the furnace. By thus introducing the air under pressure into the chimney at a point which is above the heating surface, a partial vacuum will be created in the fire chamber, and the air from the fire room will be made to circulate through every part of the chamber.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

G. R., of C. E.—You are right in your opinion that the pressure upon a boiler undergoing a hydraulic test is unequal. It will be greatest on that part of the boiler sustaining the weight of water, a pressure of a little less than half a pound to every square inch of surface, where the water is one foot deep, being the difference. Consequently a proper pressure gage will register more at the bottom of the boiler than at the top.

L. W. F., of Ind.—Bevel gears for driving machinery absorb more power than straight gears, for they change the direction of the power. Take two bevel gears in your hands and turn them together, then two straight gears of the same size and you can feel the difference. . . White lead and oil—a thick paint—or white lead skins, make as cheap a cement for joints in wooden boxes as anything we know where resistance to water is required. The box should be of seasoned lumber and the joints well fitted.

W. E., of Ky.—Your questions are somewhat indefinitely expressed, but as we understand them we reply that the eccentric of an engine should stand ahead of the crank sufficient to compensate for the lap of the valve and whatever lead is desired. We cannot undertake to present a treatise on locomotive engines, such as you desire, in our columns, as it would occupy our entire paper to the exclusion of everything else. For information on this subject we refer you to "Burgh's Land and Marine Engines," "Bourne's Hand Book on the Steam Engine," his "Catechism," and "Russell's Steam and Steam Navigation."

R. S. F., of N. Y.—We know of no cement better either for emery wheels or emery belts than the best glue. In an experience as a machinist of fifteen years we never found anything superior.

W. W. C., of Ohio.—You ask whether there is not danger that the pressure of the column of water in the vertical shaft of the lake end of the Chicago tunnel will exert such a force as to break the walls of the horizontal portion, and thus ruin the work. We reply that the brick masonry is seated hard against the solid clay, forming the bed of the lake, in every direction. This clay must give way if the masonry does. Suppose a leak from the inside occurs on account of the pressure against the walls, the water thus escaping on the outside will, of course, exert the same amount of pressure as that on the inside and thus equalize the pressure on both sides, outside and inside. *Vide* "Silliman's Philosophy" for the pressure of liquids. The most eminent engineers in the country were employed on the construction of the Chicago Tunnel, and E. W. Smith, the consulting engineer, informs us that no accident such as you fear is possible.

R. W., of Ill.—We can see no insuperable objections to your plan for an elevated railway propelled by an endless rope, but it is not in any radical point different from others which have been repeatedly proposed.

J. H. P., of N. Y.—The diamond appears to be especially adapted to glass cutting. Other substances can cut, or rather abrade and wear it, but none which will produce a scratch which upon pressure will make a rupture in the line of the mark. Quartz crystals will scratch glass but not retain an edge, and the scratch made by them appears entirely different, under the microscope, from that made by the diamond. Fine steel can be hardened so as to cut glass but it will not retain its cutting edges or corners. The process is simply that of heating and plunging into a cold bath. . . . You can mend your iron kettle with a cement made of iron filings, fine, one hundred parts of weight to one part sal-ammoniac dissolved in urine to proper consistence; or four parts filings two of pipe or potter's clay, and one of ground crockery fragments, made into a paste with flour and water.

A. D. G.—Your solution of "cupsammonium" was probably not strong enough. You may concentrate it by evaporation. The second method of preparing the solution is not a good one. You will find old cotton cloth or paper more soluble than wood fiber. Another solvent of vegetable fiber is a strong solution of chloride of zinc in water.

J. M. S., of N. Y.—Your idea of hydro-populsion is not new. If we understand you the proposition is to produce, by mechanical means, the power to drive the screw. In other words you would lift water into the ship, change the direction of its flow, and use the column thus diverted against the buckets of a turbine. Will not the power of engine thus absorbed be so much taken from that which might be directly employed in driving the screw.?

M., of N. Y.—You ask whether the method of driving machinery by friction wheels instead of belts is superior. You misunderstood our statement. We were speaking of changing the direction of power as by bevel gears, for which the bevel friction wheels are a substitute, as they run easier and without noise. We do not know if this device is used in New York city, but it is extensively employed on gun machinery.

W. De. S., of Pa.—You are correct in supposing that a hydraulic cylinder whose bursting force, by the action of the pump, is a certain pressure to the square inch, would not stand the same pressure if instantaneously exerted as by the explosion of gunpowder. Reasoning from analogy would prove this. A sudden blow will rupture any substance which might withstand much greater force exerted gradually, as a pressure.

F. C. H., of Pa.—Our advice to you is to drop your attempts to produce perpetual motion. Any thesis on this subject involves the violation of the laws of nature, more immutable than those of the Medes and Persians. While we are ready to assist all who attempt mechanical improvements legitimately, we cannot waste our time or encourage a delusion by publishing plausible theories which have been over and over again proved to be without foundation.

J. T., of Pa.—It is an old idea to propel vessels by the intermittent ejection of water at the stern.

H. W., of Pa.—Your device for preserving butter, meats, etc. is we think patentable.

W. M. M., of Wis.—You can include several improvements upon one machine or instrument in one caveat, but not in one patent unless they are all connected in their operation. Perhaps a hot wire quickly put around would crack off the bottles as you desire.

C. C., of Pa.—The varnish you need for your brass and plated goods is shellac dissolved in alcohol. The articles should be slightly warmed when dipped. The tendency of a spirit varnish to chill or give a rough surface may be destroyed by adding to the varnish a little gum sandarac, oil of lavender, or concentrated ammonia.

W. C., of N. Y.—The hight to which a liquid will rise in a capillary tube varies both with the nature of the tube and the liquid. To secure the greatest movement the liquid must be mobile and there must be an adhesion or attraction between the liquid and the tube. Water in a glass tube two fifths of an inch in diameter will rise 12 inch. In tubes of different diameters, the hights of rising plus one sixth of the diameters will be inversely as the diameters. The capillary force never raises the water so as to overflow the top of the tube. But the top of the tube may terminate in a siphon and thus a liquid may be carrried over the sides of a vessel. Water rises in a vacuum by reason of the pressure of the air to about 34 feet, and by capillary attraction it may be lifted some distance higher. You need actual experiments to determine the precise efficiency of your gutta-percha tubes stuffed with fiber.

H. E. C., of N. Y.—One pound of sulphur, by burning in the air, produces two pounds of sulphurous acid. Therefore, the cost of sulphurous acid is not a serious objection to its usefulness. . . . The original and first inventor is often entitled to a patent notwithstanding a publication of the invention at home or abroad.

C. M. S., of Mass.—The color of glass is due to metalic oxides. If you take colorless flint glass you may give it any desired color by melting with it a small quantity of the appropriate oxide. Oxide of cobalt gives a blue color, uranium a yellow, gold a red, and in fact nearly all the oxides will give tints peculiar to themselves. The green of ordinary bottle and window glass is due to the oxide of iron.

H. L. S., of Minn.—The impression of a coin which has become faint or even invisible by long wear, will be revived by heating it to a low red heat. If the coin be heated and cooled several times it will be found that the impression will show itself in relief, the sunk or compressed part of the coin will become thicker.

C. S. W., of Tenn.—We understand from your description that under your boiler (25 feet long, return flue) there is a flue space 2½ feet deep the whole length. This flue space seems to us quite too large. We suggest that by filling it up to within 12 or 15 inches of the bottom of the boiler, the draft will be greatly improved, and your fuel will be burned more economically.

J. M. O., of Ill.—For an ink powder take 1 lb. nut galls, 7 oz. copperas, and 7 oz. gumarabic. Pulverize and mix. This amount of ink powder will make one gallon of good black ink. Two or three powdered cloves should be mixed with each pound of powder to prevent molding.

E. R., of Vt.—The following rule applies to your case. Extract the square root of the head or depth of water measured in feet and multiply it by 5.4; this gives the velocity in feet per second. Multiply this velocity by the area of the orifice in feet, and you have the number of cubic feet which flows out in one second.

J. J., of N. Y., condemns the practice of extinguishing a lamp by blowing down the chimney. If there is an explosive mixture in the lamp it is in this way easily ignited.

J. F. D., of Pa., wants a good receipt for brass to be used for fine castings and to work well in the lathe. 1. An excellent red brass. Copper 24 lbs.; zinc 5 lbs.; bismuth 1 oz. 2. A cheap yellow brass for turning: copper 20 lbs.; zinc 10 lbs. lead 1 oz. Melt, and stir in the lead just before pouring.

R. L., of Ky.—Picric acid is used in dyeing on silk and wool for yellows and greens when great stability and brilliancy are desired.

S. T. R., of N. J.—Beet sugar and maple sugar when thoroughly refined, cannot be distinguished from refined cane sugar.

J. G. F., of Minn.—One of the plans of testing a steam boiler is to nearly fill it with water, and increase the pressure by means of a pump. The ordinary gages indicate the pressure. It would be impracticable to determine the pressure by a column of water, as you require an addition of a little over two feet in the hight of the column, for each increase of one lb. of pressure. To give a pressure of 30 lbs. in the boiler would require a water column of about seventy feet in hight. The diameter of this column has no effect on the pressure. A pipe the size of a pipe stem would be as efficient as one a yard in diameter.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Wanted.—Best wool carding and spinning machines and power looms. Manufacturers send circular and price list to C. Picard & Co., Nebraska City, Nebraska Territory.

Manufacturers of House-furnishing Goods (Hardware) will please send their address and circulars to S. W. Johnson & Co., Detroit, Mich.

Coil Spring Manufacturers inquired for by James R. Laurent, Milford, Pike county, Pa.

Wanted.—Engine lathe, screw feed, 10 to 13 feet bead, 24 to 28 inch swing. Also one smaller. Address with price and description, Henderer Brothers, Binghamton, N. Y.

J. M. Lewis, Box 245, New Orleans, La., asks for a gas burner styled the American Gas Multiplier. Persons knowing of it, will please address him.

NEW PUBLICATIONS.

A NEW TREATISE ON GEOMETRY, Plane and Spherical Trigonometry, and Mensuration of Surfaces and Volumes; Accompanied by Logarithmic and other Useful Tables. By Charles Baillairge. Quebec: C. Darveau.

Founded on the works of Euclid, this treatise, by abridgment, substitution, and rearrangement, reduces the number of theorems and problems, by one-half. A new and universal theorem or expression is given for finding the solidity of all elementary bodies, whether prisms, cylinders, pyramids, cones, or frustrums of either, spheres or segments thereof, wedges, etc. Also, rules for determining the exact volume of irregular bodies, and the specific weight of any body. This volume is in the French language, but an English translation will soon appear.

FERMENTED LIQUORS; A Treatise on Brewing, Distilling, and Rectifying of various Spirits and Vinegar. By Dr. Lewis Feuchtwanger.

In addition to the subjects embraced in this comprehensive title, the work treats on Hygiene, and in the concluding portion, contains a large number of useful receipts and descriptions of new alloys employed in metallurgy, chemicals used in ambrotyping, artificial guano, artificial gems, cements, inks, and varnishes, and other preparations useful to the druggist, chemist, and mechanic.

NARAMORE'S UNITED STATES TREASURY AND BANK NOTE DETECTOR.

The above work is published with the official sanction of the Secretary of the Treasury, by the American Photograph Co., of Bridgport, Ct. It is designed to supply the people of the country with a *fac simile* of the genuine plates of the various denominations of Greenbacks and National Bank Notes, and thus to give them a sure protection against altered notes and counterfeits. The American, Continental, and National Bank Note Companies, in whose custody the proof sheets were kept, on the receipt of the official order, appointed agents to accompany the proof sheets to the artist's gallery, and to take account of every negative taken from them, not allowing the proof sheets to go out of their sight for a single moment. It was also required that the photographs should in all cases be not more than one fourth the size of the genuine notes. The proof sheets are the first impressions taken from the plate after it has been completed, upon pure white paper, of a spongy nature, prepared expresaly to take a perfectly clear and accurate transcript of the plate.

Improvement in Wind Wheels.

The general appearance of this wind motor can be understood by the engravings, although a brief explanation of its parts may be necessary. It is a self regulating machine capable of being run at high or slow speed as may be desirable, depending, of course, on the power of the wind. The platform, A, is centered on the shaft, B, but rests on an annular railway, C, on the frame, on which it traverses, bearing on rollers. By means of a suitable vane on the top and end of the structure—not shown—and this railway it can be kept with one end always facing the wind. Fig. 2 gives an idea of the plan of the platform, and the arrows show the direction of the wind. It will be seen that the two ends of the platform are beveled off to a point. The parallel sides are enclosed by lumber, supporting the roof, which is of similar shape with the platform. In Fig. 1 the side nearest the observer is removed to show the interior. There are two vertical wind wheels supported on shafts between the platform and roof, the wings or buckets of which are either radial or curved. These wings nearly approach and the wind acts on those nearest the respective sides of the structure. At D, Fig. 2, are hinged two doors, E, connected by levers working a sliding block traversing on proper vertical slides, as seen at F, Fig. 3. These doors deflect the wind against the wings of the wind wheels. As the doors are expanded the wind will impinge upon the outer edges of the wings, having diminisned force; while as the doors are brought together the wind will be directed to a point nearer their centers, thus increasing the motive force of the wind wheels, according to the inventor.

Motion to the horizontal driving shaft, G, is imparted through the upright shaft by bevel gears or any other suitable device. The regulation of the speed of the wind wheels is effected through the opening or closing of the deflecting doors, E, which is done by means of the horizontal lever, H, and the connecting bar, I, which engages with the sliding block and by its reciprocating upward and downward movement, through the medium of the connecting levers, J, opens or closes the doors. The horizontal lever, H, is connected with the governor, K, by an upright bar, J, and the governor with the wind wheels by proper gearing, seen plainly in Fig. 2.

The operation is simple The platform is kept by means of the vane with the point, D, facing the wind, which, passing by the deflecting doors, is thrown against the wings of the wheels giving motion to their respective shafts, connected by the gearing which also gives motion to the governor, and thus, by the levers hereinbefore described, opens or shuts the guiding doors as before shown. By these means the velocity of the main driving shaft approximates a uniformity of speed. This device was patented Nov. 20, 1866, through the Scientific American Patent Agency by J. C. Fay, who, if addressed care of Fay & Co., 47 Pearl street, New York City, will furnish any additional information desired.

Fig. 1

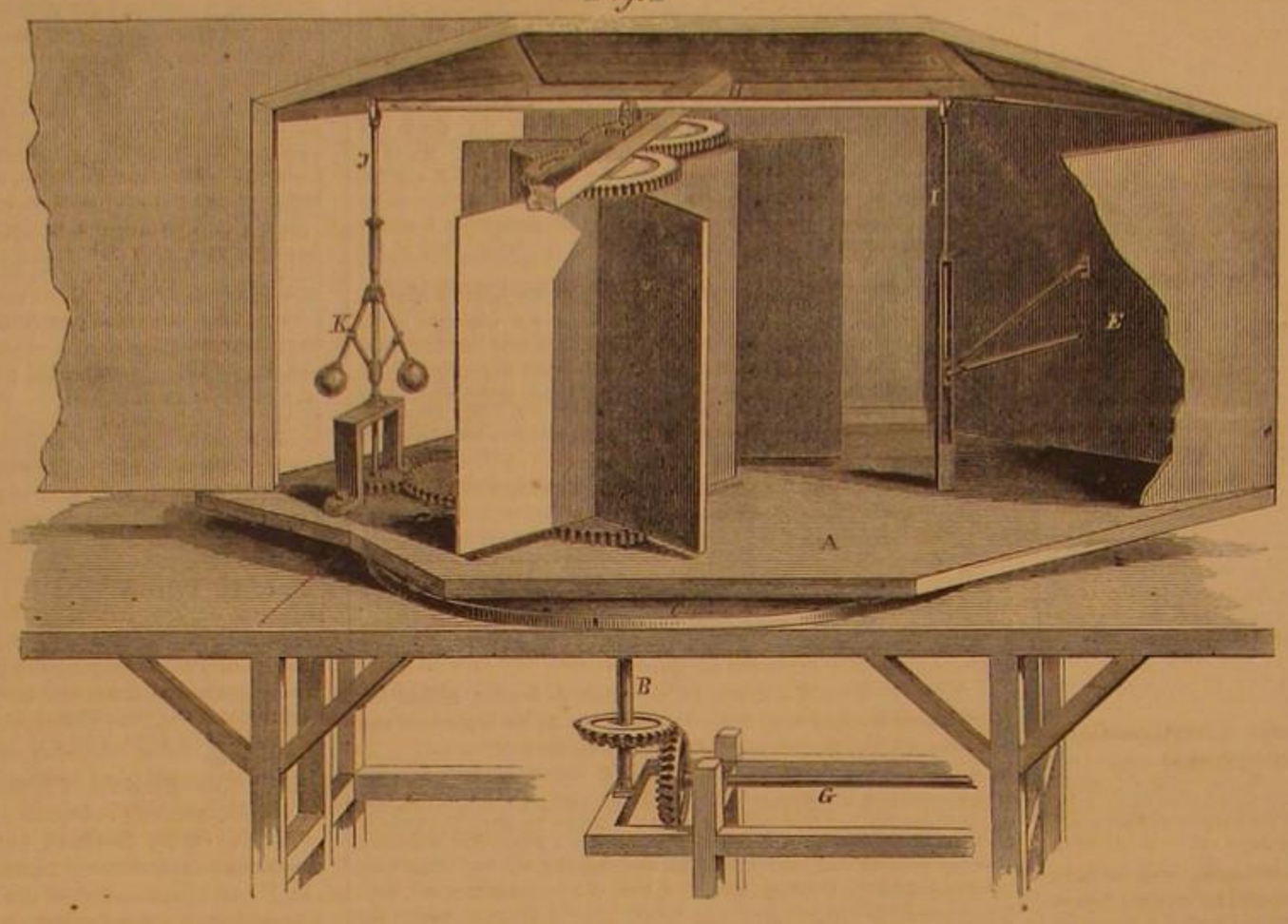


Fig. 2

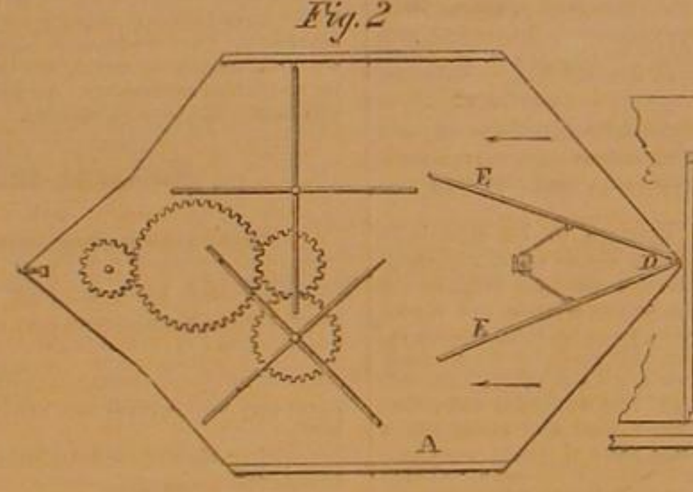
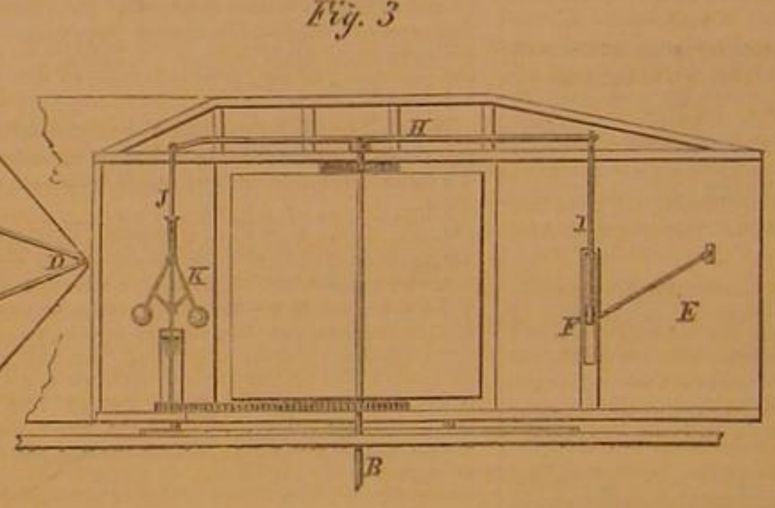


Fig. 3



FAY'S IMPROVEMENT IN WIND WHEELS

A Young "Inferno."

The Iron Works at Barrow-in-Furness, by the natural advantages of their position, and the grand scale and symmetrical simplicity of their arrangement, seem to be fitted almost to defy competition. They are situated on the shore, projecting their slag constantly farther into the sea and forming new and valuable land as sites for workshops and additional furnaces. Railways with improved coal and ore cars bring all the materials of the manufacture direct from neighboring mines, and minor railways on inclined bridges carry them to the tops of the blast furnaces. Practically unlimited capital applies every possible arrangement of economy in point of method or scale of operations, regardless of present cost, for the most profitable working in the long run. A reserve of 40,000 tuns of coke is kept in stock, to guard against any possibility of interruption by mining accidents or strikes.

Eleven blast furnaces are completed, thus far, standing in a straight line, each a gigantic cylindrical column, 56 feet high and 16½ feet in diameter, with the base of its pedestal formed by a circle of massive iron pillars; the whole united by their capitals in a grim porch worthy of some temple of Titans. A series of inclined railways carry all materials from the mixing sheds to the great roof where they are dumped into the fiery throats of the furnaces. We had thought to complete our picture with a rolling canopy of mixed smoke and flame, carrying the dark pile to the clouds. But no: the gases are entirely "taken off" the tops of the furnaces, and conducted away to be consumed under the boilers and hot-blast ovens, all of which are heated solely by these waste products which formerly served but to darken the sky and light up the night.

Each furnace has six tweers 2½ to 3½ inches in diameter, through which a blast heated to 600° or 650° is impelled at a pressure of 3 to 3½ lbs. to the square inch. There are thirteen blowing engines, with 30 to 52-inch cylinders, and with blowing cylinders of 72 to 100 inches diameter and 9 feet stroke. Four winding engines serve the four inclines for charging the furnaces. Forty-two boilers, all fired with the waste gases, supply steam to the different engines.

Each furnace is tapped every six hours, or four times in the day, and at each tapping runs off 40,000 lbs. of iron, or 560 tuns a week—all together over 6,000 tuns—into the pig beds which are arranged with the same convenience as everything else in the system, so as not only to receive the molten stream direct from the furnace, but to deliver the product direct upon the cars that take it to market without so much as changing its level. A large proportion of this vast amount of metal is used by the Barrow Hematite Steel Company, whose works are adjacent, in the manufacture of Bessemer steel. The whole works (remarks *Engineering*) are at present in the state of rapid growth. Understood as a beginning, merely, we have no hesitation in saying that the establishment we have outlined will "do" for the present.

The Grave and Granary of Life.

Putrefaction is probably not death but the contrary; the life that follows death—a sort of resurrection. Death seems to be as repugnant to nature as any other loss. The law of conservation and conversion applies to vital as well as inorganic forces. M. Pasteur has shown that the animalculæ into which not exactly the soul but the vitality of the dead organism transmigrates (and so far as this Pythagoras and the Brahmins were right after all) named *mucedines* and *bacteria*, occupy the atmosphere generally, and it may not be long before some vital relation may be discovered between them and all the re-ascending scale of organic powers that feed upon the air. These animalculæ may prove the primary reservoir from which animal life proceeds and to which it returns. The latter half of the supposition appears to be already proved. Fermentation or putrefaction is a vital process, reciprocally generated by and generating inconceivable millions of impalpable organisms, which charge the atmosphere and are everywhere at work, transmuting dead organisms into elementary living ones—and why not passing on the vital activity into higher forms?

Heavy Oil.

The pitch lake in the Island of Trinidad is one or two hundred acres in extent, and consists of a penetrable but tenacious pitch, of uncertain depth, being too dense for any kind of sounding, and yet not hard enough to sustain excavation. The pitch is mined out and shipped in large quantities to Europe, but closes over the chasms as fast as they are made, and appears to be fed from an inexhaustible "well" beneath the bottom of the lake. The English manufacture oil from it.

Telegraph Wire Drawing.

Messrs. Johnson & Nephew, Manchester, have drawn for the Paris Exposition, with Bedson's patent "continuous mill," a telegraph wire rod of No. 3 gage, 281 lbs. weight, and 530 yards long, direct from a single billet, at a single heat, without a weld or break. The billet, 60 feet long, was heated in seven minutes, and passed through the "mill" in three minutes more. The manufacturers are now building a furnace of size and shape to deliver heated billets of still greater size, and thus produce still more extensive lengths of wire for telegraph purposes. Their ordinary drawing is in lengths of 80 to 100 lbs., at the rate of 100 tuns per week.

In the patent continuous mill, pairs of grooved rollers are placed alternately horizontal and vertical, in a series of diminishing diameters of groove, each pair geared to run with an addition of speed proportioned to the drawing-out of the wire in length. The pair nearest the mouth of the furnace receives the end of the heated bar and draws it slowly forth, passing it through into the jaws of the next forward, and so the long tapering worm of glowing metal creeps onward faster and faster, until at last it coils itself upon the drum at the end of its course. By the addition of smaller grooves to the series, it is now intended to make smaller sizes at the same heat, and take off any gage at will by simply diverting the wire to a drum at the proper stage of its progress.

After passing through the mill, the wire is galvanized by being drawn at a red heat off one drum and upon another, passing through two successive baths between the drums; the first of hydrochloric acid and the second of molten zinc. It is then straightened and stretched by reeling off one drum upon another of the same size going two per cent faster, and passing, on its way between the two, in a serpentine manner and of course at a high tension, between pins set in a straight line with its course.

The wire works at Worcester, Mass., on the old plan, are capable of producing 3,000 tuns per annum, or 400 miles per week, of telegraph and fence wire, No. 9. In this establishment, the metal is first drawn from blooms to billets, then from billets to ¾ inch rods, then annealed, and finally reduced to wire by cold drawing through funnel-shaped steel dies, with repeated annealing between the successive sizes.

Revolution in "Shoddy."

It is reported that a new machine about to be introduced in England ravels (not tears in pieces) all fabrics, and reproduces the fiber, whether of wool, cotton, linen or silk, of the length in which it exists in the scrap operated on. The value which this utilizing process must add to rags of all kinds, may be partly computed from that imparted to woolen rags by the miserable work of the well-named "shoddy devil" (an unmitigated imposition upon mankind) which by tearing woolen rags into dust from perhaps one-hundredth to one-half an inch long, to be worked into the appearance of cloth, raised the price from $20 to $200 a tun. If the improved machinery be all that it is represented, garments of silk and wool will soon be re-manufactured nearly as good as new. It certainly seems as if means to this end must be within the ingenuity of man. The threads of the woof are neatly taken off the warp by fine hooked teeth of steel covering a cylinder which revolves at great speed, the edges of the rags being fed, not too fast, against it. The fiber falls at the end of the machine in long fleecy flakes, the warp coming out one way and the woof another, so that if of different material or quality, they need not be mingled in the product.

British Locomotive Works.—An English paper gives a partial list embracing over thirty establishments capable altogether of turning out at least 1,500 locomotives annually, of which 1,000 are required on the English railways.

SCIENTIFIC AMERICAN.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ Messrs. Trubner & Co., 60 Paternoster Row, London, are also Agents for the SCIENTIFIC AMERICAN.

VOL. XVI., No. 13....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, MARCH 30, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

*New System of Aero-Locomotion	197	Answers to Correspondents	203
Sodium—A Scientific Canard	197	New Publications	203
Harrison Steam Boilers	198	*Improvement in Wind Wheels	204
Iron Works in Alabama	199	A Young "Inferno"	204
Editorial Summary	199	The Grave and Granary of Life	204
*Improved Horse Rake	200	Telegraph Wire Drawing	204
Gold Hunting and Geology	200	Revolution in "Shoddy"	204
Why a Belt Runs on the Largest Diameter of a Pulley	200	Advantages of a Practical Knowledge of Mechanics to Inventors	205
Our Navy—One Step in the Right Direction	200	The Management of Boilers—Explosions	205
What is Clay?	201	Patentees at the French Exhibition	205
*Harris & Browning's Spring Friction Nuts	201	Credit	205
*Exploding Force of Cylindrical Boilers	201	A Grammatical Problem	206
Beet-root Sugar Machinery	201	Probable Influence of the Internal Revenue Laws upon Invention	205
Safety of Kerosene Lamps	202	British Steamships and Marine Engines	206
The Uses of Heavy Petroleum	202	Patent Claims	206, 207, 208, 209
Expansion and Non Expansion	202	*Improved Hand Stave Jointer	212
The Crank Motion	202	The Sun's Spots—A Discovery	212
A Perpetual Sunday	202	*A Superior Cap for Mucilage Bottles	212
Recent American and Foreign Patents	202	Prices and Wages	212

CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK Row, and not at No 39.

ADVANTAGES OF A PRACTICAL KNOWLEDGE OF MECHANICS TO INVENTORS.

As there are natural mechanics so there are natural inventors, and yet the two are so closely allied that it is difficult to draw the line of distinction. The mechanic may be successful in his department without that peculiar faculty of investigation and restless desire for making improvements which mark the inventor. But the inventor must share with the mechanic in constructive skill, at least of brain, if not of hand. Without this he would be merely a puller-down of other men's structures without the power to build, and at the best with only the ability to suggest improvements.

Now it is one thing, and a comparatively easy thing, to detect and point out the faults in a machine, but it is quite another and a far more difficult thing to remedy those faults, or to instruct others to do it. This is the inventor's department, and if he has the faculty of seeing not only where the wrong is, but discovering the right—if he can make a valuable improvement on a machine which before appeared complete, compassing all its details—he deserves the title and the reward.

And it is in this attention to details as much at least, as in the discovery of the principles of an improvement that the usefulness of the inventor is manifested. Between the first crude conception of a machine, or of an improvement on a machine, and its actual successful ultimation is a long road—not seldom a rough road. It is beset with obstacles which must be removed, or the inventor must retrace his steps and outflank then, a process sometimes involving the surrender of all he has already accomplished. It is often disheartening, but if the principle upon which the improvement is based is correct and the inventor has a sufficient amount of the necessary quality of persistence, he will in time overcome all the enemies to his progress and emerge from the contracted and gloomy ravine of endeavor into the level plain of assurance and the sunshine of success.

But he should have practical knowledge as well as speculative genius. While he holds to his idea he must ascertain whether he can reduce it to practice. And to do this it is not always necessary that he should be thoroughly acquainted with that department of industry for the improvement or which his idea is designed. In fact, many of the most valuable improvements which have blessed mankind have been made by men who had no practical acquaintance with the department of the arts which their inventions have advanced. But the inventor must have been a practical man in another sense. He must have been acquainted with the properties of matter and the laws of mechanics practically. Still many inventions which were first put forward as suggestions, have been made valuable by men who, not possesing the far-seeing qualifications of the original propounder, have by their knowledge of the necessary manipulations put these suggestions into living, active forms.

From these remarks the necessity, or, at least, the advantage of a knowledge of the properties of materials and the use of tools to the inventor is apparent. If the inventor, possessing what he considers a valuable idea, will, by visiting the shop of the mechanic, post himself in these necessary branches of knowledge he will find his "exceeding great reward" in a more rapid ultimation of his speculations into acting realities. We have known a natural inventor, without any practical experience in the use of tools or the manipulation of materials, to spend months in a shop doing the roughest work, but keeping his eyes open, in order to get the necessary knowledge by which to perfect his invention. It is an old saying that "if you want a job done do it yourself," and any one who has been compelled to direct another how to carry out his own ideas, being himself ignorant of the necessary means to the end, knows that he must expect to be misunderstood and to be compelled to sustain repeated failures.

Really, there is more depending upon the details of a mechanical improvement for its success, than upon its essential idea. Perhaps we state the case too strongly, but from the experience we daily have in the examination of models, some the workmanship of which would almost disgrace an Australian, although like Shakespere's toad, which "Ugly and venomous yet bears a precious jewel in its head," they bear the grand idea in a villainous looking carcass, we think we are justified in the assertion.

THE MANAGEMENT OF BOILERS---EXPLOSIONS.

We have received through Mr. W. P. Slensby, of New York city, an article on boiler explosions which contains some statements worthy the attention of those who have steam boilers in charge. Owing to the press of matter on our columns, we have not room for the communication in its entirety, but give the principal points.

He ridicules the idea that explosions are inevitable, and that they cannot be prevented. Steam is a powerful but governable element, not a mysterious or unknown power. The great cause of explosions, in his opinion, can be laid to the material, workmanship, size, and form of the boilers. A small boiler will withstand more pressure to the square inch than a large one, and a cylindrical boiler, than one with flat surfaces, unless the latter is well stayed with bolts. The bottoms of large boilers are subjected to from three to five pounds more pressure to the square inch than the upper surfaces, owing to the weight of the water.

When a portion of a boiler becomes red hot its strength is impaired and it is in a state to yield to a gradually increasing pressure and also to a suddenly produced force similar to that generated by the metamorphosis of a solid into a gas. When the solid body of the water gets below the iron surfaces exposed to the heat of the furnace there remains a foaming matter composed of about one-third water, and two thirds steam, a thick, saturated, moist steam, incapable of keeping the iron cool, but capable of being expanded by the heat into superheated steam very rapidly. Thus lowness of water decreases the strength of the iron and increases the pressure of steam.

The idea that if a portion of a boiler begins to give way he rupture acts as a safety valve is not correct. When the ron begins to go it requires much less force to complete the rupture, just as when forcing the hand through a sheet of strong paper, if the material be once parted, very little force is required to send the hand through.

The deposition of scale preventing the water from reaching the iron is another cause of explosion, although the water may be retained at the requisite hight.

Suddenly opening throttles when starting should never, except in cases of great emergency, be practiced. It is similar to firing a gun by letting the steam rush suddenly by at a high pressure into the cylinder. It there meets with an opposing force, and like the exploded gas in a gun, recoils with a force similar to that with which it struck the piston.

Boilers should be cleaned as often as once a month, and if the water is very dirty, more frequently, as the dirt held in solution does not pass off with the steam, but is deposited.

A boiler will make steam faster when the pressure is high than when it is low, with the same fire, so it is economical to carry a high pressure—even if it is not necessary to do the work—and to work the steam expansively.

Steam engines running at high speeds return a less percentage of power in proportion to the steam used than engines running slower, as high velocities decrease the power of the steam.

Tubular boilers make steam faster with less fuel then others, and if properly constructed and cared for will last as long.

The crank pin of an engine travels over one-third faster than the piston, which accounts for the unevenness of the power at certain parts of the stroke. The piston is never at half stroke when the crank is vertical.

PATENTEES AT THE FRENCH EXHIBITION.

The French minister of agriculture, commerce and public works, has written a letter in which he states that foreign manufacturers who have secured patents in France and who wish to introduce similar articles for exhibition, must first apply for authority from him pursuant to law, in order not to lose their patent rights.

The minister also states that a bill has been drawn up to authorize the issue of certificates of patent protection, which he hopes will be adopted.

In regard to the question of placing the articles on exhibition, the declaration of the minister confirms the views expressed by us on page 403 of our last volume. Exhibitors should not only apply for permission to exhibit, but they should also protect their rights by patent.

CREDIT.

The *Mechanics' Magazine*, London, says "'Quien Sabe' hands the following method of cleaning a foul gun to the *American Railroad Journal*." It should read the "SCIENTIFIC AMERICAN." The article was written for and published in this journal on the 22d of last Dec., page 426. Our able cotemporary *Engineering* gives credit to another railway journal for information about steel-headed rails which was originally borrowed from the SCIENTIFIC AMERICAN without credit. We do not like to have our labors credited to other journals.

A GRAMMATICAL PROBLEM.

A university philologist writes us in favor of forming the possessive case of substantives by the addition of *'s*, regardless of a sibilant preceding. Much may be said, and abundant authority cited, in favor of both the modes in use: *e. g.*, "Davis'" or "Davis's." Where the weight of argument and authority is thus divided, it is best not to dogmatize. We have, however, for our own part, a general aversion to surplusage in words, letters and points alike; and although it is not half so easy as some think, to attain a perfect or even consistent literary correction of newspaper proof, with all its variety of writers and correspondents, a tendency to drop whatever can be spared without loss will generally be recognized in these pages.

Intelligibility is the great virtue in printed signs; and if "Davis'" convey the right impression as readily as "Davis's," and to as many readers, an abortive show of theoretical precision, unattainable here at any rate, should not tempt us to prefer the clumsy to the terse expression, where no real violation of etymology is involved. As to the etymology, there is no room for dispute: as the double method is not in itself expressive of any additional sound right or wrong, and both concur in merely preserving a reminiscence more or less faint of the original possessive *his*: as "John, his book." Whether we shall suppress and represent by an apostrophe the three letters *his* or only the two letters *hi*, is but a question of taste and convenience, not of accuracy. If etymology absolutely requires any of the letters to show, it requires all, and remands us to the full *his* in singulars and *their* in plurals.

For a positive argument, on the other hand, the short possessive is the more consistent. The possessives of all plurals, of all "common nouns" ending with sibilant letters, and of all proper names ending with *s*, are naturally so formed by everybody. It would be very strange to see in print or hear in speech "the brewers's committee" or "the Lelands's hotel" or "mechanics's tools" or "Agassiz's lecture." We don't believe in following a rule as printers are sometimes pledged to "follow copy—if it goes out of the window:" but it is quite as well, *ceteris paribus*, to adopt a rule that can be followed. To form the possessive by attaching to a final sibilant letter the apostrophe, and to all other terminations *'s*, is a rule meeting all cases that occur to our memory, and generally coincides, just where the rival rule generally does not, with the better style of pronouncing possessives.

[For the Scientific American.]

PROBABLE INFLUENCE OF THE INTERNAL REVENUE LAWS UPON INVENTION.

The boundless resources of this country and the stirring energy of its people have developed more improvements and useful inventions in any given time since 1836 than can be shown by any other country of the world. The records of the various patent offices of Europe and America establish this fact beyond the necessity of further proof.

But this development of our industry and skill has taken place for the most part during a period of light taxation consequent on the small expense of national government. A huge national debt, an imposing navy and a large standing army have somewhat altered matters: still we are of opinion that a revenue many times greater than what is needed for the purposes of government might be raised without any sensible inconvenience to the community.

We much fear that advantage has been taken of the necessity for raising a large revenue, to impose a system of taxation upon the people the effect of which is not only not to raise but to diminish revenue, and more serious still, to impose trammels and restrictions upon trade, agriculture, and manufactures, calculated to paralyze (if anything can) the wonderful fertility of our resources.

But it is in the bearings of the existing fiscal system upon science and art, and especially upon industrial inventions, in which our readers—as readers of the SCIENTIFIC AMERICAN—will be interested, and leaving the commercial and international aspects of the subject to other students, we purpose to inquire how the progress of discovery is likely to be affected by the internal fiscal system adopted by Congress.

Let us appeal awhile to the history of England—to "philosophy teaching by example"—a history fertile in blunders from which we might so readily take warning, and let us take paper as an example.

Most of our readers are aware that until late years the London *Times* might be regarded as almost the sole exponent of public opinion in England, and that excise and custom laws prevailed by which a tax was imposed on all paper manufactured in Great Britain and customs duties on all paper imported.

The influence of the London *Times* had its origin in the energy and ability of its chief proprietor, the late Mr. Walters: but it retained it when, having the governing class for its supporters, the very condition of its existence rendered it the advocate of nearly every sinister interest in the United Kingdom. It owed the retention of its influence to the pernicious effects of the excise laws upon paper, which narrowed the supporters of the press to the wealthy, and rendered all healthy competition impossible.

The proprietors of the *Times*, partly foreseeing, but also in a degree misjudging, the consequences of the repeal of the great excise duties, struggled with might and main in support of those duties and their own monopoly, even to supporting the House of Lords in a gross and flagrant violation of almost the only well established rule of that congeries of uncertainties, the British Constitution, viz: the exclusive taxing power of the House of Commons.

It was probably this violation of the Constitution by the

House of Lords which gave to the earnest advocates of the repeal of the paper duties the leverage they needed to abolish them, and one result of such abolition was immediately seen in the establishment of a cheap newspaper press, many whereof are conducted with an ability exceeding that of the London *Times* (among which the London *Star* is a notable example), while many other dailies far surpass the *Times* in circulation.

Under the new system the influence of the *Times* has sensibly diminished: it is now but one organ of public opinion, and that of the existing governing class only. This result was probably in some measure anticipated by its proprietors: but one other result is the reverse of what they feared. As a commercial speculation it has improved: its profits are greater than ever they were!

Now what was the cause of all this? While an excise duty was imposed upon the manufacture of paper, a jealous surveillance had to be exercised, at an enormous expense both to Government and the manufacturer, to prevent the surreptitious manufacture of paper, the only parallel to which in this country is the surveillance exercised over the manufacture of alcohol. The premises of every paper manufacturer were closely watched, *not* to protect his property from robbery, against which the exciseman afforded no protection, but to see that the manufacturer delivered no paper on which duty had not been paid. The manufacturer could perform some of the nicest and most delicate and elaborate processes of his manufacture only after notice to the exciseman and under his inspection: a time convenient to the manufacturer, sometimes even essential to the success of the process and for that reason appointed by him, being sometimes an impossible one for the government officer!

Invention was at a stand still, for who could afford to experimentalize upon pulp or board on which duty had been paid, or to experimentalize in the presence of the exciseman?

But within a few weeks of the withdrawal of the excise officer on the repeal of the excise duty on paper, the country was alive with inventions of every kind. Paper was manufactured from the refuse matter of other manufactures, of straw, of different fibers heretofore regarded as useless. Articles of utility were manufactured of paper and brought within reach of the multitude, which but lately were the luxury of the rich. Reprints of valuable works at a cheap rate were abundant, and not only the newspaper press—the great instructor of modern civilized communities—but paper and paper manufactures, have made greater progress in England in the very few years which have elapsed since the abolition of the excise laws on paper, and especially since the further amendment of the English custom laws, than in the entire previous period since the invention of paper. L.

[From our Foreign Correspondent.]

BRITISH STEAMSHIPS AND MARINE ENGINES.

Manchester, Feb. 22, 1867

STAGNATION IN THE MANUFACTURE—BENEFIT OF "STRIKES."

One very important department of engineering I have left unnoticed hitherto, but we shall find it interesting now to take a glance at English steamship and marine engine construction. At present there is a great stagnation in this business, and where a couple of years ago there was an incessant din of riveters' hammers, and the shipyards which line the banks of the Thames and Clyde were crowded with vessels in various stages of construction, now the yards are empty and the noise of hammers has ceased. This is due partly to the terrible financial collapse of last summer—the bursting of the "Limited Liability" bubble, which had given rise to a good many ship building companies with too many of which the main object was to sell their shares and who were therefore obliged to keep busy whether the contracts they could secure would allow a profit or not, and partly also to the folly of the workmen in striking for high wages at a time when the state of business is such that to insist on these is simply to prohibit any work being done at all. The workingmen in many of the trades appear to think the masters can command an unlimited amount of money, and that this is wrongfully withheld from them, and their action is becoming such as seriously to interfere with business and to insure the success of foreign competition. If they could but see it, they are doing their best to deprive themselves of their means of support, which must always be dependent on the ability of the masters to compete successfully for orders with Continental manufacturers. But this is a theme which, though important and well deserving the sober consideration of our own mechanics who are perhaps not always free from the same delusions, is hardly an engineering one, and I will therefore leave it to others to pursue, and offer a few remarks on the work which has been turned out in former years.

WOOD VS. IRON—STRAIGHT OR HOLLOW LINES—STEEL.

It is unnecessary to say that wooden ships are no longer built in England, and yet the fact of this complete change having taken place in so few years is a proof of the rapidity with which new ideas are made to supplant old ones, though we do often complain of the slowness of progress. Wooden ships have one advantage over iron, and that they seem likely to hold for some time yet: namely, their freedom from fouling. There have been any number of inventions which promised to put iron on an equality with copper in this respect, but as yet this result has not been attained.

In regard to the forms of vessels, there has been in most cases a persistent adherence to the old straight lines. Mr. Scott Russell, one of the ablest men of science that the profession can boast, has demonstrated most clearly the advantages of hollow lines, and has determined with complete accuracy the laws which should regulate the length of the curved portion, as well as the other proportions of the vessel for any required speed; but still other forms prevail, at the sacrifice of the speed and the economy of power required to obtain it. There has been but little use made of steel as yet in the construction of vessels, owing in great measure to a degree of uncertainty as to the capabilities of that material to resist the alternate strains of extension and compression to which the sides of a ship are subjected. There is also a doubt how far the greater strength of steel may be taken advantage of to reduce the thickness of the plates without risk of failure from buckling. No doubt, as soon as business revives, experiments will be made to determine all these points, since with the present facilities for the production of steel plates at a low cost it can not be long before steel will be substituted for iron, if not in all parts of the vessel, at least in those for which it is known to be suitable.

FEATHERING PADDLE WHEELS AND WOODEN BEARINGS.

Paddle steamers are in the great majority of cases constructed with feathering wheels, the arms and floats being of wrought iron and the journals cased with brass and working in lignum vitæ bearings. The saving of power by the use of these is considerable, and that they have not come into use more generally with us must be attributed to the difficulties arising from the great quantities of ice in nearly all our harbors in winter, to encounter which requires the most substantial form of wheel possible. And again, with the very large wheels and light draft of our river boats the angle of the entering bucket is not sufficient to cause serious loss of power.

SCREWS.

The advantages of screw vessels over paddles have been most strikingly shown since the vessels of the French Compagnie Generale Trans-Atlantique commenced running. The consumption of coal per horse-power is not found to differ greatly in the two cases, but the amount of horse-power or of coal required is so much in favor of the screw that some of their paddle steamers are to be altered to receive that form of propeller. The Cunard line have also, as we know, abandoned the construction of paddle steamers, while the same may be said of the other large companies, such as the Inman, Peninsular and Oriental, etc.

ENGINES—DOUBLE HIGH AND LOW CYLINDERS—ECONOMY OF EXPANSION.

It is the engines, however, with which English ships are furnished that contribute most to their success in an economical point of view. England is fortunate in that she has no Isherwood and no Dickerson, and accordingly the greatest advantage is taken of expansion in engines of substantial mechanical construction. Messrs. Randolph & Elder, of Glasgow, have given their preference to the high and low pressure cylinder form of engine to obtain high degrees of expansion, and the performance of one of their engines was lately proved by a race, not at the dock, but for the distance of over a thousand miles on a regular voyage, and the consumption of coal was shown to be not over 2½ lbs. per horse-power per hour.

There was a class of engines built about three years ago by Messrs. Humphreys & Tinnant for the Peninsular and Oriental steamers, also of the double cylinder type, which, though not proving mechanically satisfactory, were acknowledged to be most economical in their consumption of coal. They were of the vertical overhead cylinder type, and the high pressure cylinder was placed directly on the top of the low pressure one, the two pistons being fastened to one rod. The diameter of the former was 43 inches and of the latter 96 inches, the stroke being three feet, so that the expansion was fivefold. The steam was carried at about 28 lbs., and the engines ran at from 75 to 80 revolutions per minute, or at a speed of piston of 450 to 480 feet. Both cylinders were jacketed and the steam introduced first into the jacket of the high pressure cylinder at a temperature of 360°, or about 86° above its temperature as saturated steam. On leaving the jacket its temperature was about 307°, or 33° superheated, at which temperature it entered the high pressure cylinder. The steam was discharged from the low pressure cylinder into a surface condenser and a vacuum of 27½ inches obtained. To supply steam for these engines four boilers were employed, with three furnaces in each, the total grate suface being but 180 square feet and the heating surface 4,800 square feet, and these boilers working with natural draft were able to supply an abundance of steam for the pair of engines driving a screw of 16 feet 6 inches diameter and 19 feet pitch at the above-mentioned speed, the horse-power developed being 2,486. These results I have given somewhat in detail, because they show what can be done by a combination of good elements in a steam engine. I can vouch for the accuracy of the figures, as they are the results of my own observations on the occasion of the trial trip of the Peninsular and Oriental Company's steamer *Baroda* in Stokes Bay, at which I had the pleasure of being present. The *Mecoltan*, another vessel and the first, I believe, of this class, had under favorable circumstances developed a horse-power with a consumption of but 1¾ lbs. of coal. Notwithstanding economy, however, these engines have fallen into disrepute on account of their great weight and costliness, together with the liability to accidents from the quick motion of such heavy reciprocating parts. With these results within their knowledge, it would be difficult to convince the engineers of the Peninsular and Oriental Company that no economy resulted from a greater degree of expansion than follows from cutting off the steam at seven tenths the stroke. Nor does it follow because these particular engines were not mechanically successful that expansive working must be abandoned: for other forms of engine by the same and other makers are doing nearly as well in regard to economy of coal and give no trouble in their operation. The *Lord Clyde*, an iron-clad 280 feet long and 58 feet 11 inches beam, was tried about a fortnight since at the measured mile in Stokes Bay, drawing 23 feet forward and 27 feet aft. She has a pair of engines with 116-inch cylinders, 4 feet stroke, and these worked at 65 revolutions per minute, developing 6,045 horse-power and driving the vessel at 13·342 knots on a mean of six runs. To supply steam for these engines there are nine boilers with a total heating surface of 19,000 square feet and 700 square feet of grate surface. This does not put our new sloops of the *Hassalo* class, with their 1,064 square feet of grate in the main boilers besides 76 square feet additional in the superheating boilers, in a very favorable light. If we allow 20 lbs. of coal as the rate of combustion per hour per square foot of grate in the case of the *Lord Clyde*, which is a large amount, we have a horse power produced for an hour at the expense of 2½ lbs. of coal. With the amount of heating surface given it is not probable that the combustion would be forced beyond this rate.

HYDRO-PROPULSION.

There have been some interesting trials of late with Mr. Ruthven's water, jet propeller as applied to the gunboat *Waterwitch*. The accounts of the performance of this vessel in October last gave rise to a good deal of discussion in the leading engineering papers as to the value of this means of propulsion as shown by the trial and as indicated by theory, and the general conclusion arrived at by those who took part in it was that it was very wasteful of power. Since then further experiments have been made and slightly better results obtained, and as the theoretical principles involved do not seem to be altogether clear in the minds of all, engineers are disposed to suspend judgment till further trials have been made. The nozzles which on the former trip were placed so as to discharge the water into the air above the level of the external water, have now been arranged so as to deliver below the water line, thus avoiding the loss of power in lifting the water through a vertical distance, and no doubt checking somewhat the velocity of escape of the water. The idea of this propeller is not new, but Mr. Ruthven has given a good deal of study to perfecting it. It of course gives considerable facilities for maneuvering in the case of a vessel of war, but it also involves carrying a large weight of water in the ship, thereby increasing its displacement. For merchant vessels it could not compete with the screw.

These few remarks, indicating in a general way what has been aimed at and accomplished in marine engineering, will serve as an introduction to more detailed descriptions of engines which I hope to send you from the Exhibition.

Slade.



ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING MARCH 12, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the Scientific American, New York.

62,724.—Dusting Brush.—Robert H. Aldrich, Northampton, Mass.

I claim the duster herein described, constructed of plumes formed by attaching strips of sheepskin to wires, a a, etc., which are fastened in the handle, A B, in the manner set forth,

62,725.—Porcelain Gas Burner.—T. G. Arnold and Benj. Irving, New York City.

We claim the making of a glazed porcelain gas burner by perforating or slitting it after being glazed, for the purposes and in the manner substantially as hereinbefore set forth.

62,726.—Heating Stove.—Wm. Bamford, Milwaukee, Wis. Antedated Sept. 12, 1866.

First, I claim the air heating chamber composed of an upper and lower cylinder connected by one or more air flues, and located entirely above the fire box, so as to bring all parts of the chamber and flues in contact with the heated products of combustion, substantially as set forth.

Second, The combination and arrangement of the upper cylinder, C, and lower cylinder, B, connected by the flues, c, and located above the fire box, with the pipe or flue, F, and the discharge pipe, I or E, and stove case, A, substantially as specified.

62,727.—Car Truck.—Levi Bissell, New York City.

I claim a two-wheeled truck in combination with a truck of four or more wheels, both trucks moving on king bolts and connected together by jointed braces, substantially as set forth.

62,728.—Flower Pot and Tub.—Jesse Booher, Dayton, Ohio.

I claim the cast iron plate, A and B, and their arrangement with reference to the staves, c, and rods, f f, in the manner substantially as and for the purpose described.

62,729.—Lifting Handle.—Purmort Bradford (assignor to Sargent & Co.), New Haven, Conn.

I claim the socket, A, formed with a vertical slot, d, provided midway with a seat to receive the trunnion, a, constructed and arranged to operate as herein described, as an article of manufacture.

62,730.—Potato Scoop.—E. Brown and Wm. Pool, Birmingham, Mich.

We claim as an article of manufacture a potato shovel, A A' B, constructed substantially as described.

62,731.—Artificial Leg.—Enoch Carleton and Eli Goss, Portland, Me.

We claim a knee joint made stiff, when the weight is borne upon the leg, by means of a movable rod or bolt attached to the leg, externally or internally bearing upon the heel and extending upward into a catch or slot upon the leg above the knee joint, which rod is worked by means of a spiral or other spring, in such a manner that when the weight is removed from the leg the rod is forced downward by the spring out of the slot or catch, thus liberating the joint and leaving the lower leg free and swinging, and when the weight is placed upon the leg by bearing upon the heel, the rod is pushed upward into the slot or catch, and the knee joint thus held stiff while the weight is borne upon the leg.

We also claim the rendering of the knee joint stiff or limber at pleasure by means of a spring rod and catch applied as above described.

62,732.—Fence.—Geo. R. Clark, Livonia, N. Y.

I claim the relative arrangement of the joint braces or jacks, J, and the sec

tions or lengths, B and A, when the parts are constructed and connected substantially in the manner and for the purposes herein set forth.

62,733.—BRAN DUSTER.—Isaac Cook (assignor to himself and M. Randolph & Co.), St. Louis, Mo.

First, I claim feeding the material through a pipe, L, and upon the receiving head, underneath the beaters, substantially as set forth.

Second, Passing the material upwardly from the head, I, by an upward air draft drawn from the lower air feed, K, substantially as set forth.

Third, The receiving head, I, constructed and operating substantially as and for the purposes set forth.

Fourth, Adjusting the beater, n, to any desirable angle, by means substantially as described.

Fifth, The combination of the beaters, n, and the distributing head, N, operating substantially as set forth.

Sixth, Returning the bran from the receiving surface, f', through the feed pipe, L, substantially as and for the purposes described.

Seventh, The combination of the feed pipe, L, head, I, distributing head, N, and adjustable beaters, M, substantially as and for the purposes described.

62,734.—BASIN.—Hugh H. Craigie, New York City.

I claim a stationary wash basin with a horizontal flattened water way around the upper portion of said basin and outside of the general curvature of the interior of the basin, said waterway opening into the basin through the sides thereof, so as to take away the surplus or overflow water from the basin as specified.

I also claim forming the descending horn or overflow pipe upon the outside of said horizontal waterway and opening into the same, as specified.

62,735.—GATE.—Geo. G. Curtiss, Rochester, N. Y.

First, I claim in combination with a sliding gate, A, the employment of the double inclined rails, B B', the one running the length of the gate and the other extending beyond and serving to hold the gate in place while at the same time it insures its self action, the whole arranged and operating as and for the purposes herein set forth.

Second, The combination of the brace, d, with the extended inclined rail, B', and gate, A, as and for the purpose specified.

Third, The combination and arrangement of the clip or stirrup, D, holding the roller, a, operating as herein set forth.

Fourth, The combination of the sliding guide, l, with gate, A, and inclines, B B', as set forth.

Fifth, The double-acting latch, C, employed in combination with the gate, A, as specified.

62,736.—CANAL AND NAVIGATION THEREOF.—Horace H. Day, New York City.

First, I claim in the construction of canals the double inclined planes in combination with floating dry docks or movable camels, and their combination with canals for the raising and transportation of vessels from one water level to another, substantially as described.

Second, The ratchet shafts or their equivalent for holding or moving the wire or other cable, when used in combination with inclined planes and movable locks, substantially as described.

Third, The water tanks, caissons or locks constructed with a wedge-shaped bottom, to hold water upon a level, for passing ships up and down inclined planes, substantially as described.

Fourth, The water tanks, caissons or locks containing water for passing vessels up and down inclined planes, in combination with stationary rollers or wheels placed in and revolving upon the bed of the inclined plane, substantially as described.

Fifth, The wedge-shaped camels, or a detached segment or portion thereof, or both, upon inclined planes for passing the same from one angle or inclination to another, and the combination of the wedge-shaped camels with one or more inclined planes when used to transport vessels, substantially as described.

62,737.—PRUNING SHEARS.—A. J. Doolittle, Hamden, Conn.

First, I claim the arrangement of the double-leg coil spring in the manner described, in combination with the two handles, B and D, substantially as and for the purpose specified.

Second, The combination of the loop, I, upon the one handle, and the hook, L, upon the other, so as to operate substantially as set forth.

62,738.—VACUUM PUMP.—Edward Dunscomb, Boston, Mass. Antedated Feb. 28, 1867.

I claim the peculiar construction of the vacuum pump, j j, that is so composed of the vessels, n and o, and pipes, h i K, with their stop cocks, as to operate both as a vacuum pump and vapor receiver and storer, substantially as and in manner described.

62,739.—VACUUM PUMP, PAN, ETC.—Edward Dunscomb, Boston, Mass. Antedated Feb. 28, 1867.

First, I claim the air induction pipe, c', with its stop cock, d', applied to the air-tight tank, g', for the purpose described, substantially as set forth.

Second, I also claim the pipe, f, with the stop cock, f', as applied to tank, g, and trough, c, as before described.

Third, I also claim the employment of the generator, C, in combination with the condenser, D, and pipes h and k, and vacuum pump, j j, substantially as set forth.

Fourth, I also claim in combination with the condensing apparatus before described, the air-tight tank, g, in the manner and for the purpose set forth.

Fifth, I also claim the combination of the condensing dome, d, and trough, c, with pipes, h i k and vacuum pumps, j j, essentially as set forth and explained.

62,740.—CHURN.—John E. Finley, Memphis, Tenn.

I claim the combination of the propeller wheels, B C, with the air cells or indented arms, D D, for the purpose herein set forth.

62,74[illegible]—BAG HOLDER.—J. H. Gano, Milwaukee, Wis.

First, I claim a platform, A, upright standard, B, and adjustable arm, C, in combination to fold up, substantially as and for the purpose described.

Second, Arm, C, with jaws, D, metal jaws, E, support, F, and spring, G, in combination, substantially as and for the purpose described.

62,742.—DUSTING BRUSH.—Aaron S. Hadley, Boston, Mass.

I claim the combination as well as the arrangement of the spreader with the handle, the flexile arms, and masses of fibrous material applied to and arranged with such arms or to them and the handle, substantially as specified.

I also claim the combination of the finishing masses of fibrous material, extending through the handle with the flexile arms or the same and the spreader, and the masses of yarns or fibrous material arranged within such arms, as explained.

62,743.—TRUSS.—Josiah Harrison, Frederick, Md.

I claim the arrangement on the flexible belt, A, of the pad or pads, B, adjusted by means of slides, D, bolt, E, and nut, E', substantially as described and represented.

62,744.—TRUCK.—John P. Hart, Chicago, Ill.

I claim the use of different sized car wheels of trucks upon the same axles, as and for the purpose set forth, to obviate the necessity of transferring passengers or freight on account of the difference in the gages of railroads.

62,745.—RAILROAD FROG.—John P. Hart, Chicago, Ill.

I claim the grooves, G, for allowing compound wheels to pass through the frog, substantially as set forth.

62,746.—PREVENTING THE LAPPING OF BELTS ON SHAFTING.—Wm. Hayes, Fall River, Mass.

I claim the device herein described for preventing belts from lapping around shafts, constructed, applied and operating as herein set forth.

62,747.—SPRING HINGE.—Franck Herrmann, Newport, Ky.

I claim, First, The stationary pintle, D', havin the notched collar, E e, and stop, J, in combination with the helical springs, H H', cheeks, I I, and slotted eye, G, constructed and arranged substantially as herein set forth.

Second, The square eye or socket, C, in combination with the toe, d, on the pintle, D', and collar, E e, for the purpose herein set forth.

62,748.—BENCH DOGS.—A. K. and H. P. Hood, Lowell, Mass.

We claim the cam spindle, c, and block, b, when operating substantially as described and for the purpose fully set forth.

62,749.—ORE CONCENTRATOR.—Morgan Hungerford, San Francisco, Cal.

I claim, First, A pan cut in two and dropped about one inch, so that the lowest depression shall be two inches, more or less, below the ridge or angle of such concentrator, substantially as described and for the purpose set forth.

Second, The slots or outlets, F F, above the line of the groove around the inner rim, as described.

Third, The outer rim, G, with stops, H H, also the discharge holes, J J, under the pan, around the said outer rim, substantially as described and for the purpose set forth.

62,750.—CONSTRUCTION OF STILLS FOR OIL, ETC.—John Huntington, Cleveland, Ohio.

I claim the flues, E J, and damper, M, or their equivalents, arranged in relation to an annular flue, K, surrounding the base of the still, and operating conjointly in such a manner as to be combined with a single or double furnace to diffuse a uniform heat without injury to the oil or burning of the still, and also to induce a current of cold air to reduce the heated oil and still as specified.

62,751.—BOXES FOR TRANSPORTING PLANTS.—Joshua Jenkins (assignor to himself and Samuel Williams), Salem, Ohio.

I claim a transplanting box, constructed and arranged substantially as and for the purpose specified.

62,752.—PEAT MACHINE.—Samuel P. Jenks (assignor to Edward A. Gallraith), Boston, Mass.

I claim, First, The combination of pockets or boxes, plungers and movable bottoms passing to the top of the pockets for the compression of peat and other substances, substantially as described.

Second, The arrangement of curved inclined planes, discharging shafts and ears, to bring the compressed cake of peat to the surface, substantially as described.

Third, The arrangement of the wiping belts and mops pressing by the sides of and in combination with the perforated boxes, and the squeezing or drying rollers to dry the mops, substantially as described.

Fourth, The general combination and arrangement of the whole machine, constructed as and for the purpose substantially as described.

62,753.—DOOR LOCK.—David C. Jordan, Sen., Brooklyn, N. Y.

I claim the combination of the bolts, revolving disk, and catch lever, substantially as described, operating as herein specified for the purpose set forth.

62,754.—AUGER.—T. C. Keith (assignor to Joseph K. Mallery), Valley Falls, R. I.

I claim the use, application, or employment of a clearing disk, C, substantially as described, in combination with an auger or center bit as described for the purpose specified.

62,755.—OAR.—B. J. Kellam, Tremont, N. Y. Antedated February 15, 1867.

I claim the construction of a balancing oar in the manner shown and described.

62,756.—MEASURING ROD.—A. D. King, Granville Corners, Mass.

I claim an extension rod, consisting of the frame formed of the parallel pieces, A and C, connected substantially as shown, and the extension piece, B, sliding in the same, the whole combined and arranged as herein set forth.

62,757.—CISTERN FILTER.—George W. Lampson, Waterloo, N. Y.

I claim the pans, B C D and E, and cone, F, in combination with the vessel, A, the whole constructed and arranged substantially as and for the purpose described.

62,758.—MANUFACTURE OF BARS OR RODS OF IRON OR STEEL.—Bernard Lauth (assignor to himself and James McCarty), Reading, Pa. Antedated Sept. 2, 1866.

I claim bars of metallic iron or steel treated substantially in the manner and for the purpose described.

62,759.—OINTMENT FOR CURING SPAVIN, SPLINT, ETC., IN HORSES.—Benedict Lehmann, Piqua, Ohio.

I claim the combination of the above-named ingredients, so as to procure an ointment for the purpose of curing the blemishes above mentioned.

62,760.—PREPARING FERTILIZER.—George A. Leinau, Philadelphia, Pa.

I claim the fertilizer made by the process set forth, in which vegetable matter is banked up with quick lime, and mixed with certain other-named ingredients at proper intervals of time, in the manner substantially as described.

62,761.—ANIMAL TETHER.—Isaiah Lincoln and Aaron Pratt, Cohasset, Mass.

We claim the device for tethering animals substantially as described.

62,762.—MEASURE FOR LIQUIDS.—Samuel Mainster and John F. Kirkwood, Thistle, Md.

First, We claim the arrangement of the gates, C D, in relation to each other and to the measuring vessel, A, as constructed substantially as and for the purposes specified.

Second, The arrangement and combination of the measuring vessel, A, its supporting frame, B, valves or gates, C D L, and the standards, N, substantially as and for the purpose set forth.

62,763.—DUST ARRESTER FOR RAKING STOVES, FURNACES, ETC.—John Martino, Philadelphia, Pa.

First, I claim the combination of the horizontal slot, a, and door, H, or its equivalent, with the fire door, or other vertical plate of a stove range or heater, substantially in the manner described and for the purpose specified.

Second, The combination and arrangement of the pendent valves, b and b', with the slot, a, substantially upon the principle and in the manner above described and for the purpose set forth.

62,764.—BRICK MACHINE.—Peter Marvin, Warsaw, Ind.

First, I claim the combination of the mixers, F, pickers, E, and molds, m, substantially as set forth.

Second, The cams, X Y Z, &, in combination with dies, n, molds, m, guides, P, and rim, D, substantially as and for the purpose set forth and described.

62,765.—WINDOW BLIND.—Charles G. Matchett, Greenville, Ohio.

I claim a flexible curtain, B, provided with bands or cords E E' F I, arranged substantially as set forth, to admit of rolling the curtain from the upper or lower end at will.

62,766.—PLOW.—Don Carlos Matteson and Truman P. Williamson, Stockton, Cal.

First, We claim the curved standards, A, with the lug, B, and the offsets, D and E, substantially as and for the purpose described.

Second, The curved mold board, F, with its two complete edges, H and H', attached to the standards as shown, and operated substantially as and for the purpose herein described.

62,767.—MACHINE FOR MOLDING THE BACKS OF BOOKS.—J. Kennedy Max, Springfield, Mass.

First, I claim the adjustable cylinder, D, constructed substantially as and for the purpose specified.

Second, The use of steam or the heated rods, x, for the purpose of heating the same, substantially as described.

Third, The adjustable bed, E, operating substantially as described.

Fourth, The combination of the cylinder, D, bed, E, slides, B B, and treddle, I, having the rods, F F, and springs, K K, with the table, A, operating substantially as and for the purpose set forth.

62,768.—BROOM HEAD.—H. B. Miller and M. P. Weston, Grand Rapids, Mich.

I claim the combination with the flaring case, C, of the bars, D D, with the teeth, d, projecting through the sides of the case into the broom corn, and connected by set screws, E E, substantially as described.

62,769.—HARROW.—D. C. Myers, South Bend, Ind.

I claim the arrangement of the series of angular jointed harrows, A B C, with their respective braces and connections, when constructed and combined as and for the purpose set forth.

62,770.—MANUFACTURE OF ARTIFICIAL STONE.—John Nagele, Duncansville, Pa.

I claim the composition of the ingredients when used in the quantities as herein described, and placed under water under a heavy pressure, for the purpose of producing a cheap and durable artificial stone.

62,771.—SLEIGH.—S. Henry Noble, Chicago, Ill.

First, I claim the rubber spring, I, or its equivalent, placed in the joint between the knee and the cross beam of a sleigh, substantially as and for the purpose set forth.

Second, The combination of the support, H, with the runner, A, knee, B, roller, I, and beam, C, substantially as described.

62,772.—CAR COUPLING.—J. H. Parsons, Quincy, Mich. Antedated March 1, 1867.

I claim the use of a spiral spring, y, and the slide-hook pin, S, or its equivalent, substantially as described.

62,773.—IRON MACHINE.—George B. Perkins, Bridgeport, Conn.

First, I claim the arrangement of the hollow revolving or rotating heated iron, M, in relation to the mechanism described, to permit the movement of the said iron over the surface to be ironed or polished, substantially as herein set forth.

Second, In combination with the foregoing, I claim the table, B, constructed and arranged so as to draw the front smoothly thereon, substantially as herein described.

62,774.—BOOK HOLDER.—Theron E. Platt, New Haven, Conn.

I claim the combination of the rack, J, the rod, F, with their socket, H, and with the socket, B, made adjustable upon a plate, A, the whole constructed and arranged substantially as described.

62,775.—MEASURING THE STRENGTH OF WATCH SPRINGS.—M. A. Plympton, Northborough, Mass. Antedated Feb. 25, 1867.

I claim the index lever, b, in combination with the chamber, A, slot, a, and pin, f, constructed and operating substantially as and for the purpose described.

62,776.—MODE OF COLLECTING GOLD AND SILVER FROM SWEEPINGS, WASHINGS, ETC.—J. H. Rae, M. D., Syracuse, N. Y.

First, I claim the within-described process of treating sweepings, filings, or washings containing gold or silver, by exposing the same to the combined action of a current of electricity and of suitable solvents or chemicals, substantially such as herein specified, or any others which will produce the same effect.

Second, Separating gold and silver from washings, filings, or sweepings containing said metals, by the action or aid of electricity, substantially as described.

Third, Using the bath, A, as an electrode and as an agitator, substantially as and for the purpose set forth.

62,777.—COTTON-BALE TIE.—Gustavus Ricker, Covington, Ky.

I claim the plate with slot, B, having angular projections, C, one above and the other below the plate on opposite sides of the same slot, substantially as represented and described.

62,778.—TRAVELING BAG.—E. A. G. Roulstone, Roxbury, Mass.

I claim connecting the bag leather or body to the frame, by first securing the edge of the flexible material in the fold of a strip, d, and then applying said strip to the frame between the groove, b, and plate, f, uniting the whole together substantially as set forth.

Also reinforcing the corner of the frame, by turning down the tail pieces, i, so as to form a backing for the plate, f, at the corner, substantially as described.

Also forming the angle, k, rounding or concentric to the corner, when constructed and arranged as set forth.

62,779.—TRAVELING BAG.—E. A. G. Roulstone, Roxbury, Mass.

I claim the attachment of the flexible body of a bag to the frame thereof, by inserting the edge between two lips, b d, one or both of which are formed on a strip or plate, c, riveted to the frame by rivets passing through the edge of the flexible body, the frame and the strip or plate substantially as set forth.

Also, by forming the corner, e, by producing folds, f, and flatly compressing the same, substantially as shown and described.

62,780.—CATTLE TIE.—S. C. Rundlett (assignor to himself and Joseph Grant), Portland, Maine.

First, I claim the center screw, g, to unite the two discs when placed within the rim.

Second, In combination with the two discs, a and b, when the disc, b, has the washer, c, the shoulder, m, on the inside of the rim.

Third, attaching the rope at the rim, as set forth, in combination with the center screw, g, shoulder, m, and washer, c, on the disc, b, for the purpose of allowing the two united discs to revolve within the rim.

62,781.—BRICK MACHINE.—James Sangster, Buffalo, N. Y.

First, I claim the combination and arrangement of the arms, H I, and J, and the piston, G, when constructed substantially as described.

Second, The grooved rollers, when used in combination with plain or straight rollers, as and for the purposes described.

Third, The construction of the lower part of the mold, by means of which the piston, K, as it descends, leaves the necessary ventilation as described.

Fourth, The segment, T', when constructed substantially as and for the purposes described and set forth.

Fifth, I claim the arms, A A, and crank wheels, T and T,' when used to give the reciprocating motion to the pressing piston of a brick machine, substantially as described.

62,782.—BRICK MACHINE.—J. Nottingham Smith, Jersey City, N. J.

First, I claim the revolving annular wedge, D, applied to a brick press, and constructed and operating substantially as and for the purpose herein specified.

Second, I also claim the mold carrier, H, in combination with the annular wedge, D, substantially as herein set forth.

Third, I also claim the plunger, I, in combination with the annular wedge, D, substantially as herein described.

Fourth, I also claim the combination and arrangement of the mold carrier, H, plunger, I, and annular wedge, D, substantially as herein specified.

Fifth, I also claim the combination of the suspended bed, C, in combination with the mold carrier, H, plunger, I, and annular wedge, D, substantially as herein set forth.

Sixth, I also claim the mold with chilled cast iron plates, r r, applied substantially as herein described.

62,783.—BOOT HEEL.—Heman S. Snow, West Meriden, Conn.

I claim the combination of the heel, C, with its notches, a, more or less, and the heel plate, B, with its projection, d, when constructed and arranged so as to be adjustable to different points, and secured at such point by a spring arranged substantially in the manner herein set forth.

62,784.—SECURING BUTTONS TO GARMENTS.—Chas. F. Spencer, Rochester, N. Y.

I claim the disc, f, constructed substantially as described, in combination with the stem or shank, c, of a button provided with a head i, i, arranged and operating substantially as and for the purpose set forth.

62,785.—CHURN.—W. H. Tambling, Mazo Manie, Wis.

I claim the arrangement of the boxes, A and C, the one provided with the arms, E E, and paddles, a a, and the other divided with gauze wire rings and bottom, the two being constructed and used as and for the purpose specified.

62,786.—CHURN.—William B. Tucker, Hillsborough, Ohio.

I claim combining the angular dasher blades, in alternating positions, upon the dasher arms of said churn, substantially in the manner and for the purpose herein set forth.

62,787.—ASH PAN AND FIRE GRATE FOR LOCOMOTIVES.—D. Upton, and C. H. Nichols, Rochester, N. Y.

First, We claim the application of the draft or flue plates, D, substantially in the manner and for the purposes herein shown and described.

Second, In combination with the said draft plates, D, the contracting plates, P, and grates, B, substantially as and for the purposes set forth.

62,788.—HOISTING MACHINE.—Samuel Van Emon, Cincinnati, Ohio.

First, I claim an elevator platform, provided with a spiral drum or worm, D, in combination with two or more vertical flights of rollers, r, arranged and operating as set forth.

Second, The provision of the anti-friction roller frame, E F G H, for the purpose specified.

Third, The gravitating pulley frame, P, and brake, operated in the manner and for the purpose specified.

62,789.—WAGON BRAKE.—Aaron Votaw, New Garden, Ohio.

First, I claim the bar, B, cam, E, as arranged, in combination with the links, F H I, levers, G, and adjustable frame, K, as and for the purpose set forth.

Second, The bar, B, cam, E, as arranged in relation to the wheels, A, and operated by the frame, K, levers, G, and links, F H, and I, for the purpose and in the manner described.

62,790.—BRICK MACHINE.—John Watson, Buffalo, N. Y.

I claim the stationary pins, F and G, or the equivalent thereof, when placed within the faces of the pressing pistons, and so arranged as to be dependent upon the motion of said pistons for their effect.

62,791.—LOOM.—John R. Weber, Bourbon, Ind.

I claim the combination of the lever, 16, cams, 17 and 18, with the hook, 19, pinion, 34, bar, 24, spring, 23, lever, 26, cams, 20 and 21, when constructed to operate the shuttle plate, 37, substantially as set forth.

62,792.—CLAMP FOR CLAPBOARDING.—William P. Wentworth, Detroit, Mich.

I claim, as a new article of manufacture, a clapboarding implement, arranged and operating as set forth.

62,793.—FORGING HAMMER.—Lorin Wetherell, Boston, Mass., assignor to himself and John H. Wells.

First, I claim the first pair of dies represented in Figs. 1 and 2, constructed and operating as described.

Second, The fourth pair of dies, represented in Figs. 11, 12 and 13, constructed and operating as described.

Third, The fifth pair of dies, represented in Figs., 15 and 16, constructed and operating as described.

Fourth, The process of forging hammers, by the use of a series of dies constructed and operating substantially in the manner specified.

62,794.—DENTIST'S CHAIR.—Otis C. White, Hopkinton, Mass.

I claim the combination as well as the arrangement of the bail, D, the clamp, C, and the pivoted rod, B.

I also claim the combination as well as the arrangement of the bail, D, the clamp, C, the slide rod, E, and the pivoted rod, B.

I also claim the combination of the bail and socket clamp, n, and the arm, o, with either or both the rods, B E, the clamp, C, and the bail, D, the whole being applied to the head rest and back of a chair, or their equivalents, substantially in manner and so as to operate hereinbefore set forth.

I also claim the clamp, C, constructed with the two openings, f g, the rear saddle, k, and the set screw, h, arranged in it substantially as specified.

62,795.—PUDDLING IRON.—Jacob G. Willans, Bayswater, England.

I claim the lining of that part of revolving or reciprocating puddling furnaces, which is exposed to friction of the iron in the charge while working with blocks or forms cut or shaped from the minerals above described.

62,796.—WAGON BRAKE.—James F. Wood, 2d, Cohocton, N. Y. Antedated March 1, 1867.

First, I claim the adjustable cam, E, on the lever, D, the plate, h, on the brake lever, as and for the purpose herein described.

Second, I claim the sliding plate, B, hasp, k, in combination with the sliding pole, A, fork braces, a a, and the brake blocks, I I, substantially in the manner herein described, and for the purposes set forth.

62,797.—CUT OFF VALVE GEAR OF STEAM ENGINE.—Walter Wright, Danvers Center, Mass.

I claim the construction of each of the trapezoidal projections, I I, with offsets or steps as set forth, to operate in combination with the arms, l m, and the two shafts, n o, arranged and connected in manner and to operate as described.

I also claim the combination and arrangement of the shafts, n o, the arms l m and r, when arranged in manner and to operate with the trapezoidal projections, I I, fixed to the auxiliary valves, G H, applied to the main slide valve, F, as described.

62,798.—PREPARING PETROLEUM FOR LUBRICATING.—W. H. Young, Athens, Ohio.

I claim the cleansing of oil by means of an underlying body of heated water, substantially as described.

62,799.—TOBACCO CUTTER.—Charles J. Addy, Roxbury, Mass.

I claim the combination of the adjusting arms, E E, and setting pin, t, and holes, s s, or the equivalent thereof, with the presser, D, combined with a knife, a, and feeder, C, arranged to operate substantially as specified.

I also claim the above described arrangement of the rack, k, the pinion, l, ratchet, h, and draw pawl, g, with the presser, D, the feeder, C, the knife, a, or knife lever, B, and its shaft, d.

And in combination with the knife lever, B, shaft, d, arm, f, draw pawl, g, ratchet, h, the pinion, l, rack, k, and the feeder, C, I claim the mechanism for varying the feed as described, such mechanism consisting of the bent prongs, g g, of the draw pawl, with the pin, p, and the holes, y y, arranged in the prongs, and the said arm f as specified.

62,800.—SMOOTHING IRON STAND.—Charlotte W. Allen, Newport, Ky. Antedated Feb. 28, 1867.

I claim the smoothing iron stand, consisting of the guard or rim, A B, and the screw clamp, C D, combined and arranged substantially as and for the purpose specified.

62,801.—HANDLE FOR BRUSH.—Clark Alvord, Westford, Wis.

I claim the application to and combination of an elastic strap with a brush, as above described and shown, and for the purpose above set forth.

62,802.—TOBACCO PIPE.—Solomon Andrews, Perth Amboy, N. J., assignor to Emmett Dinsmore, Erie, Pa., and Charles M. Plumb, New York City.

I claim the elongated pipe, A, with its opening, H, at its upper side, at the end, B, when its stem is constructed and applied in the manner herein represented and described.

62,803.—CAR COUPLING.—Richard S. Arnall, Wright City, Mo.

I claim the arrangement of the rod, D, with its arm and pin, C, and slot,

gated box, E, when used in combination with lever, F, rod, H, shoulder, x, spring, I, and box, H, the several parts being constructed and used as and for the purpose specified.

62,804.—Churn.—S. S. Ayers, Plainfield, N. J.

I claim the combination and arrangement of the dasher, O, churn lid or cover, P, dasher handle, L, guide rod, K, pitman, J, crank, I, fly wheel, H, pulleys and band, E D F, or equivalent, and crank, C, with each other, substantially as herein shown and described, and for the purpose set forth.

62,805.—Wringing Machine.—Selden A. Bailey (assignor to Bailey Washing and Wringing Machine Company), Woonsocket, R. I.

First, I claim the manner of assisting the increased rapidity of the driven roll, D', and easing the movement of the machine as set forth, by making the diameter of the driving pinion, E, greater than that of the driven pinion, F, both pinions having the same number of teeth substantially as described.

Second, The combination of the flanges, a, on the pinions, E or F, or on both of them, with the shafts of the opposite rolls, as and for the purpose set forth.

Third, The combination substantially as described, of the flanges, a, and hubs, b, with the pinions, E and F, for the purpose set forth.

Fourth, The springs, G G', and set screw, d, or other equivalents, with the journal blocks, H, operating substantially as set forth, in combination with the pinions, E and F, arranged and operating substantially in the manner and for the purpose described.

62,806.—Climbing Stage.—Loring J. Baker, East Machias, Me. Antedated March 1, 1867.

I claim the general construction and combination of the parts of a climbing machine, substantially as described and for the purpose set forth.

62,807.—Coal Scuttle.—A. Bardell and Smith, New York City.

First, we claim the combination of a body and base rim, with a bottom so constructed as to have a flange, which can be sprung into the recess formed upon the body, and thereby bring together three thicknesses of sheet metal, just above the bottom of the coal scuttle, substantially as and for the purpose herein described.

Second, A struck up and corrugated sheet-iron bottom B, in combination with the body and base rim, substantially as and for the purpose herein described.

62,808.—Cultivator.—A. S. Barnwell, Savannah, Ga.

I claim the two adjustable shares, G G, in combination with the fixed double share, D, applied to the beam, A, and arranged to operate in the manner substantially as and for the purpose set forth.

62,809.—Trap Door.—Samuel R. Bartlett, Detroit, Mich.

I claim the combination and arrangement of the arm, C, the rod, a, and the stop, b, when attached to a trap door, substantially as herein shown and described.

62,810.—Composition for Roofing.—Alonzo T. Boon (assignor to himself and Joseph Stafford), Galesburg, Ill.

I claim the composition for roofing compounded from the ingredients specified, substantially as herein set forth.

62,811.—Machine for Granulating Tobacco.—Nicholas H. Borgfeldt, New York City.

I claim, First, An apparatus for granulating tobacco composed of a closed box, A, movable toothed sieve, D, and yielding head, E, with projections, d, constructed and operating substantially as and for the purpose described.

Second, The arrangement of a sieve, D, with teeth, b, constructed and operating substantially as and for the purpose set forth.

Third, Making the sieve, D, shaft, C, and head, E, removable from the box, A, as and for the purpose described.

62,812.—Over-flow Basin.—Harkness Boyd, New York City.

I claim a stationary basin or vessel having an ordinary waste or discharge plug in combination with an over-flow pipe opening into said vessel near the bottom thereof and ascending as a siphon to the desired water level up such basin, as and for the purposes described.

62,813.—Saw.—Ira S. and Charles N. Brown, Providence, R. I., assignors to themselves and Mason Gross.

We claim the combination of the curved shank, b, with projections, b' b'', and means for locking or fastening the last tooth in the series, the whole operating together substantially in the manner and for the purpose above set forth.

62,814.—Whiffletree.—Melvin C. Chamberlin, Plainview, Minn.

I claim the arrangement of the bars, C C D and E, constructed as described and used in connection with the lever, F, and box, a, substantially as and for the purpose herein specified.

62,815.—Baling Press.—Moses D. Cheek, Clarendon, Ark.

I claim the nut wheel, F, constructed with the hub, C, and the bored recess J, substantially as and for the purpose set forth.

The nut wheels, F, pinion, L, provided with the two bevel gears, M and N, and dividing pinions, P and Q, combined, arranged and operated substantially as set forth.

The lever, S, and stirrup, T, in combination with the bevel gears, P and Q, substantially as set forth.

62,816.—Boiler-tube Cleaner.—John B. Christoffel, New York City.

First, I claim an improved tube cleaner formed by the combination of the series of spiral scrapers, C, the stationary head, B, and the movable head, D, with each other and with the rod, A, substantially as herein shown and described.

Second, The combination of one or more elastic or flexible scrapers, G, with the rod, A, substantially as herein shown and described and for the purpose set forth.

Third, The combination of the coiled spring D, or equivalent, and adjusting nut, F, with the rod, A, and movable head, D, substantially as herein shown and described and for the purpose set forth.

62,817.—Window-sash Lock.—J. K. Clark, Mount Pleasant, Iowa.

I claim the connected levers, g g', in combination with the friction rollers, d d', moving on inclines, c c', in the shell, A, arranged and operating as and for the purposes herein described.

62,818.—Combined Rake and Seeder.—Robert J. Colvin, Lancaster, Pa.

First, I claim the manner of attaching the rake piece, J, and corn-planter devices, P and Q, to the grain drill frame, as herein described.

Second, I also claim the adjustable bar, M, to which the hoes are attached, with the shifting sections, Q, by which measure the machine when used for planting corn or raking hay is clear or free of all unnecessary machinery.

Third, I also claim the construction of the cylinder with its devices, U V T so as to sow grain in different quantities, and plant one or more rows, as described.

Fourth, I also claim the adjustable feed board or apron, H, as combined with the hopper by which the hopper, F, can be shifted without obstruction.

Fifth, I also claim the using of drag bars in connection with their rear attachments, N N, as cleaner for the rake.

Sixth, I also claim the construction of the shifting axles, X X, with their devices, Y Z, as arranged for the purpose of widening the drill frame, B, the proper width for the rake.

Seventh, I also claim the shifting rods, P P, for the purpose of removing the extra drag bars that should be dispensed with when the machine is operating as a rake or corn planter.

Eighth, I also claim the combination of the grain drill, corn planter, and hay rake so arranged as to be easily and quickly adjusted, as herein described and for the purposes set forth.

62,819.—Manufacture of Iron.—Anson G. Cook, Burlington, Vt.

First, I claim the rectifier or apparatus consisting of a chamber or vessel lined with fire brick provided with recesses, a, or their equivalent, substantially as described.

Second, The perforated cover, A', provided with the points or flanges for securing the lining of fire clay, substantially as described.

Third, The process, herein described, of treating fused metal in a closed vessel or chamber containing charcoal, or its equivalent, substantially as described.

Fourth, The employment or use of the compound of oxide of manganese and coal tar for the purpose of refining iron, substantially as described.

62,820.—Manufacture of Soap.—Alfred A. Constantine, New Providence, N. J.

I claim the use of pine tar in its combinations with soap or soaps, and in the manufacture of soap or soaps, substantially as described.

I also claim as a new article of manufacture soap made with pine tar as one of its ingredients.

62,821.—Caloric Regulator for Boiler Furnaces.—John Geo. Cooper and Edwin W. H. Cooper, Hartford, Conn.

First, We claim the heater, B', working cylinder, G, piston, H, and rod, I, in combination with the sliding spring rod, P, pusher rod, U, and damper, V, constructed and operating substantially as described, so that the position of the damper is regulated automatically by the expansion of the air or other elastic fluid in the heater.

Second, The regulating chamber, G2, in combination with the heater, B', working cylinder, G, spring rod, P, and damper, V, constructed and operating substantially as and for the purpose set forth.

Third, The arrangement of an adjustable piston, H', in the regulating chamber, G2, to operate in combination with the heater, B, B', and cylinder, G, substantially as and for the purpose described.

Fourth, The valves, E f, and trips, d e, in combination with the chamber, G2, cylinder, G, and rod, P, constructed and operating substantially as and for the purpose set forth.

Fifth, The spring catch, b, and recess, a, in the rod, P, arranged to operate in connection with the rod, G, and latch, W, substantially as and for the purpose described.

Sixth, The perforated plate, c', and regulating slide, l, in combination with each other and with the furnace door, A2, and rear shield, e', constructed and operating substantially as and for the purpose set forth.

Seventh, The sliding pin, l, and cam, l', in combination with the damper, V, and furnace door, A2, constructed and operating substantially as and for the the purpose described.

Eighth, The chambers, b2 d1 f2, in the furnace door, A2, in combination with the damper, V, slide, l, shield, e', and perforated plate, g', constructed and operating substantially as and for the purpose set forth.

62,822.—Field Roller.—H. R. Crowe, Carondelet, Mo.

First, I claim hinging the frames, E and F, of the two end sections, A and B, to each other, substantially as herein shown and described and for the purpose set forth.

Second, Suspending the seat, K, by means of links, M, or their equivalent, from the springs, L, attached to the frames, E and F, of the roller, substantially as herein shown and described.

62,823.—Manufacture of Gas.—James Crutchett, Stroud, England.

First, I claim the manufacture of gas for lighting and heating purposes from pulverized or fine coal, or other carbonaceous materials injected into retorts or ovens in small quantities, either by separate successive injections or in small continuous currents, as herein described.

Second, I claim the injection into retorts or suitable ovens or chambers, of pulverized, powdered or small coal, saw dust, oils, or carbonaceous materials by means of steam supplied to such retorts in separate charges or in continuous currents, as herein described.

Third, I claim the injection of suitable carbonaceous materials, as aforesaid for the manufacture of gas into retorts, ovens or heated chambers by separate successive injections or currents by means of compressed atmospheric air, compressed gas, springs or other mechanical means, as herein before described, whether the interiors of such retorts be under a slight pressure or vacuum.

62,824.—Curtain Fixture.—John Cunningham, Philadelphi, Pa.

I claim the slide, B, fitted in a slot or opening, a, in the case, provided with a knob or pulley, C, at its outer side and with a rack, c, at its inner side into which a screw, C', on a rod, D, gears, said rod projecting through the end of the case and having a thumb wheel, E, on its end at the exterior of the case, all arranged substantially as and for the purpose set forth.

62,825.—Connecting Piston Rods for Steam and other Powers.—Edward P. Curtiss, Madison, Wis.

I claim the parallelograms, A A, the flanges, L L, that support them, the pin, B, that works on the angular sides of the parallelograms, A A, the pin, E, and slot, D, which moves the pin, B, to the opposite side of the piston, M, which reverses the motion, and the slot, C, which allows the piston rod, M, more stroke for the pin, B, to pass around the parallelograms, A A, coming in contact with their angular sides, forces the connecting rod, K, past the centers, to work, substantially as herein set forth.

62,826.—Stereotype Plate-holder.—Alexander T. De Puy, New York City.

I claim, First, A block or holder for stereotype plates, constructed of sections in the manner substantially as herein shown and described.

Second, The combination of independent or detached clamps with a sectional stereotype plate holder, substantially as and for the purpose set forth.

62,827.—Bridge for Billiard Table.—Thomas Dolan, Albany, N. Y.

I claim a billiard table bridge having its resting or bearing surfaces for the cue for use of rollers, substantially as described for the purpose specified.

62,828.—Soap.—G. H. Doney and Moses Clay, Lockhart, Ill.

We claim the use of the ingredients specified in the particular proportions and manner set forth to make soap.

62,829.—Machine for Cutting the Rolls of Window Blinds.—Lucius H. Dwelley, Dorchester, Mass.

First, I claim the arrangement of the vibrating hopper, F, which receives the sticks in mass, with magazine, G, which arranges them in a single column, so that they may be delivered one at a time to a carrier or holder that conveys them to the tool or tools that are to afterwards operate upon them, substantially as described.

Second, I also claim arranging within the magazine, G, or guide, 10, at one of its ends only, which guide arranges the sticks in a line at that end of the magazine, and allows all the inequalities in their lengths to project at the opposite end, substantially as described.

Third, I also claim the spring, r, with its rolls, q, in combination with its carrying disks, H I, substantially as and for the purpose described.

Fourth, I also claim the crank, P, with its eccentric, m, in combination with a slotted arm, K, and so arranged with a screw that when turned in a direction to throw the worm wheel, L, into gear with the wheel, O, it will clamp the arm, K, firmly in place, substantially as described.

Fifth, I also claim making the saw, E, adjustable on its arbor, D, by means of the split collar or sleeve, E, screw nut, v, with its recess, 14, and recessed collars, t u, substantially as set forth.

82,830.—Carding Engine.—O. F. Fitch, Morristown, Ind.

I claim, First, The conductor armed with slender pendent points presented to the roping in rear of the condensing rollers, as herein shown and described as and for the purpose specified.

Second, The shaft, H, uprights, I I, and pendent points, a, in combination with the condensing rollers, D D D, spool, F, and frame, A, when constructed and arranged as herein set forth and for the purpose specified.

62,831.—Portable House.—Daniel Fitzgeral (assignor to himself and R. Onderdonk), New York City.

I claim the cap, F, provided with grooves as represented when used in combination with the boards, A, A, the upper ends of which are held by said cap and which are bent to form the roof and sides of the house, said boards being prevented from warping, substantially as herein specified.

62,832.—Buckle.—Merwin Fowler, Wolcotville, Conn.

I claim a buckle formed of wire bow, a, attaching bow, b, and clamping bow, c, formed with eyes, e, passing around the wire of the bow, at the return bends, x, as and for the purposes specified.

62,833.—Machine for Washing Sand and other Materials.—David L. Furmer, Rostraver, Pa.

The combination of the inclined trays, A A, and stirrers, L L, constructed and acting conjointly, substantially as and for the purpose set forth.

The combination of the inclined trays, A A, and spouts, Y Y, or their equivalents to supply each tray separately with pure water, substantially as and for the purpose set forth.

The trays, A A, when located one above another and pierced centrally by the shaft, k, upon which the stirrers are located so as to wash and rewash the sand without rehandling the same and without occupying more space than the area of one tray requires, substantially as set forth and described.

The agitating screen, S, in combination with stirring mechanism of a sand washer to communicate the sand and earthy matters before being submitted to the action of said stirring mechanism, substantially as set forth.

The trays, stirring mechanism, water spouts, screen, driving gear and frame work herein set forth and described to form a machine for washing and cleaning sand of other earthy matters, usually mixed with it.

62,834.—Corn and Cotton Seed Planter.—Charles C. Garrett, Dayton, Ala.

First, I claim the stirrup lever, R, connected to the cylinder, Q, so that it can be raised and lowered, substantially as and for the purpose herein described.

Second, I claim the stirrup lever, R, and its connections with the seed cylinder, Q, in combination with the lever, O, for the purposes and substantially as described.

Third, I also claim the harrow, C2, and its means of attachment to the springs, D2 D2, in combination with the seed planter when constructed in the manner and for the purposes and substantially as described.

62,835.—Plow.—Lewis Gibbs (assignors to Bucher Gibbs & Company), Canton, Ohio.

I claim uniting the beam and handle of a plow by means of the castings, d f, and their lips, e g, and a screw bolt, I, substantially as described.

I also claim the beveled edges of the socket, j, with the beveled edges of the coulter, D, and the screw bolts, k, for the purpose of holding and tightening the coulter, substantially as described.

I also claim the bar, m, made and united to and with the land side and share, substantially as and for the purpose described.

62,836.—Garbage Box.—Marshall Gilbert, New York City.

I claim the vessel, c, formed with a ring or ledge, e, in combination with the movable grating, f, and receptacle, g, the whole constructed and applied in the manner specified to form a receptacle for ashes and other refuse matter.

62,837.—Low Water Detector.—James E. Gillespie, Boston, Mass.

First, I claim the hollow springs, g f, or their equivalents, in combination with the tank and boiler as specified.

Second, I claim the combination of the pipes and springs, g f, and tank, e, with the whistle of a boiler, whereby to raise an alarm in case of low water.

62,838.—Harvester Rake.—William F. Goodwin, Washington, D. C.

First, I claim the gear wheels, A A1 A2 A3, and A4 shaft, B5, crank, B6, lever, D and L' and block, M, arranged to operate in the manner and for the purpose, substantially as described.

Second, The yoke, A7, rod, A8, and vibrating arm, A9, arranged to operate in the manner and for the purpose substantially as described.

Third, The bars or levers, B B' B2, B3 and B4, crank, B5, and post, B6, with the rake, B7, attached, arranged and operating in the manner and for the purpose, substantially as described.

Fourth, The switch, S, and tracks, T and T', arranged on the side of a circular platform to operate in the manner and for the purpose substantially as described.

Fifth, The rake head, B7, hinged or jointed to the reciprocating and turning post, B6, arranged and operating substantially as and for the purpose described.

Sixth, The arrangement beneath the grain platform of the mechanism for communicating motion to a reciprocating, turning and lifting rake which operates from above, upon the platform, substantially as described.

62,839.—Machine for Bending Cable Links.—R. M. Green, Baltimore, Md.

First, I claim the slotted lever, D, provided with the wheels or pulleys, J J' in combination with the former, C, arranged as and for the purpose specified.

Second, The arrangement of the set screw, P, with the power, C, and lever, D, substantially in the manner and for the purpose herein specified.

62,840.—Fence.—C. S. S. Griffing, Geneva, Ohio.

I claim, First, The frame, A, provided with wires, C C', and compensating loop, k, as constructed and arranged in combination with the brace post, D, for the purpose and in the manner as described.

Second, I claim in combination with the above, the pannel, A', constructed and arranged in the manner as described.

62,841.—Steam Trap.—John Hague, Providence, R. I.

I claim the hollow valve stem, C, constructed and arranged substantially as described in combination with the air and water valves, B and E, and operated substantially as herein set forth.

62,842.—Dinner Bucket.—Joel Haines, West Middleburg, Ohio.

I claim a victual and provision bucket made with a double bottom or permanent horizontal partition to divide it into two apartments one above the other with a door in the side of the bucket opening into the lower division or apartment, substantially as described.

I also claim the cleats in the lower apartment in combination with the pans or trays.

62,843.—Wringer for Clothes and Mops.—Lewis Hannum, Cortland, N. Y.

First, I claim the rolls B C, and links, D, arranged relatively to the arms, E2, on the shaft, E, which latter is adapted for being partially rotated at will, all substantially in the manner and for the purpose herein set forth.

Second, I claim in connection with the above, the hand lever, E' foot lever, G, and connection, G' arranged substantially as and for the purpose herein specified.

Third, I claim the board, D' carried on the links, D, and arranged to serve relatively thereto, and to the rolls, B C, which are opened and closed thereby, substantially as and for the purpose herein specified.

62,844.—Machine for Making Cheese Boxes.—Thomas Hanvey, Elma, N. Y.

I claim the hinged section, D', constructed and operating in the manner and for the purpose, substantially as set forth.

62,845.—Grain Register.—L. O. Hayworth, New Cumberland, Ind. Antedated Feb. 28, 1867.

I claim the combination of the wheels, B B B, with ratchet center pieces of varying diameters and teeth, the wheel, A2, sliding frame, I, swinging pawls, J K, rod, B2, slotted arm, L, and arms, N O, operated with the grooved side bar, S, of the carriage, P, substantially as described, for the purpose specified.

62,846.—Machine for Cutting Heads and Bottoms of Wooden Boxes.—Edmund Hersey, Hingham, Mass.

I claim having the edge of the cutter C, formed of two gouge-shaped parts, substantially as and for the purpose shown and described.

62,847.—Car Brake.—Aaron Higley, South Bend, Ind.

I claim the ratchets X, and 2, in combination with windlass 7, substantially as and for the purpose set forth.

62,848.—Corset Clasp.—Lucian Hill, (assignor to Lawson M. Hill,) North Brookfield, Mass.

I claim the detachable clasp for corsets herein described consisting of the parts a a, and spring b, constructed as set forth.

62,849.—Auger.—T. Hofstatter, Jr., New York, N. Y.

I claim the countersink b, washer C, and thumb screw d, when constructed and arranged upon the screw thread a, of the auger A, and operating as herein set forth for the purpose specified.

62,850.—Self Attachment for Berths.—Edwin Hoyt and Edward P. Whitney, Stamford, Conn.

We claim the device herein described of the arm B, and folding step C, constructed substantially as herein specified, to serve as a resting place for the foot for facilitating ascent to and descent from berths in steam and other vessels and railway vehicles.

62,851.—Wringing Machine.—R. B. Hugunin, Cleveland, Ohio.

First, I claim the arrangement and combination of the double gear wheels A, and single gear wheels B, C and D, and toggles E E, or their equivalents as described, for the purpose described.

Second, I claim the arrangement and combination of the stiffening bar P, spring bars K and L, bolts M M, spring collars N N, and adjusting screws O O, as described, for the purposes specified.

62,852.—Boiler Form.—John S. Jennings, Medina, N. Y.

I claim the rim f, and lips d, the double acting screw b b', and the dowels a a, when combined with the two heads a a, the whole arranged and operating as herein set forth

62,853.—Governor.—Oliver A. Kelly, Slatersville, R. I. assignor to Lamb, Cook & Co.

First, I claim the weighted shoes F, in combination with the pauls b, b' dovetailed teeth a, of the ratchet 47 wheel B, lever G, rod H, and governor I, all constructed and operating substantially as set forth.

Second, I claim the cam groove D, in combination with the arm C, pawls b b', ratchet gear B, shoes F lever G, rod H, and governor I constructed and operating substantially as and for the purpose described.

Third, The yielding or self-adjusting shoes F, in combination with the pawls b b', dovetail teeth a, of the ratchet wheel B, lever G, rod H, and governor I, all constructed and operating substantially as and for the purpose set forth.

62,854.—Washing Machine.—Gilson Keyes, (assignor to himself and F. T. Payn,) Binghamton, N. Y.

I claim the combination and construction of the seeds box A, with the lever E, notched handle of the rubber B, and mode of securing the convas apron by means of the slides C C as described and for the purpose set forth.

62,855.—Apparatus for Carburetting Gas and Air.—Joshua Kidd, London, Eng.

I claim as new for carburetting gas or air by heat at the burner for obtaining light forming the apparatus with a heating aperture through its center, also with heat regulator D, together with the application of oil supplying arrangement substantially as described.

62,856.—Apparatus for Forming an Explosive Mixture of Air and Hydrocarbon Vapors for use in Motive Power Engines.—Joshua Kidd, London, Eng.

I claim as new for the purposes of this invention the general arrangement of apparatus substantially as described and set forth.

62,857.—Corn Sheller.—Martin, C, Kilgore, Washington, Iowa.

I claim a corn sheller having a box as described with plate a, springs d, b, bar c, and my device as described for the egress of cobs, all constructed, combined and arranged substantially as herein specified.

62,858.—Potato Digger.—H. J. Kintz, Greece, N. Y.

I claim the construction, combination and arrangement of the scraper A, consisting of the vertical side points a a, the central share b, extending backward and upward in a semi-circular ridge with its point projecting below the level of the side points, and the intervening shallow scoops with concave edges c c, and gradual upward inclination between the side and central points operating substantially in the manner and for the purposes herein set forth.

In combination with the scraper constructed and arranged as above described. I claim the double conical sifter E, and its cogged driving wheel G, operating in the manner and for the purpose specified.

I also claim the hinged adjustable and self-supporting conductor H, provided with the converging fingers p, and the concave k, when combined and arranged with the double conical sifter E, in the manner and for the purpose set forth.

I also claim the special arrangement of the machine, consisting essentially of the scraper A, with draft arms D, the sifter E, with driving wheel G, the conductor H, and the vine clearers I, operating as herein described.

62,859.—Tool for Cutting off Boiler Tubes.—Richard Lavery, South Boston, Mass.

First, I claim the eccentric cutter B, in combination with the head A, constructed and operating as and for the purpose described.

Second, The lip or nose e, on the eccentric cutter in combination with the shoulder f, in the head A, substantially as and for the purpose set forth.

Third, The pin c, provided with a key c, in combination with the eccentric cutter B, and head A, constructed and operating substantially as and for the purpose described.

Fourth, The ratchet handle D, in combination with cogs g, in the head A, and with the eccentric cutter B, constructed and operating substantially as and for the purpose set forth.

62,860.—Apparatus for Refrigerating, Cooling and Preserving.—Peter Lawson, Lowell, Mass.

First, I claim an upright shaft with one or more tables or shelves and suitable means to revolve the same in combination with the interior of a refrigerator, provision safe, or preserving house or similar structure, substantially as herein set forth and described.

Second, One or more shelves M, rack h, pinion g, in combination with the body of a refrigerator or similar structure substantially as herein described and set forth.

Third, The combination in a refrigerator or like structure of one or more revolving tables C, with one or more movable shelves M, substantially as herein set forth and described.

62,861.—Lantern.—Francois Leclere, (assignor to himself and J. S. Letrerd,) Watertown, N. Y.

I claim the combination of the ball F, with its eyes f, the wire G, and spring I arranged with the slotted chamber H, operating with the lamp A, and its flange a, all constructed and arranged in the manner and for the purpose herein described.

62,862.—Combination Pad-Lock.—Austin Leyden, Atlanta, Georgia.

First, I claim the disk bolt A, constructed substantially as described with indicating letters upon one side and the latch B, attached to the other side, and operating substantially as herein shown and described.

Second, I claim the catch C' C'' attached to the shell of the lock substantially as described in combination with the disk bolt A, for the purpose specified.

62,863.—Lock Seal.—Albon Man, Brooklyn, N. Y.

First, I claim a seal for lock seals or other analogous purposes, where it is important to keep a record of the number and kind of seals used, and the times, places and circumstances of the use thereof by the preparation of the seal upon a slip of paper with a marginal Register on which all the said facts may be noted.

Second, I claim constructing said seals variantly so as to operate as a check upon counterfeiting and so that it can not be known which design is used in any given case except by the person using it and by the record.

Third, I claim these varient designs combined in pass books on slips of paper, so as to allow a permutation of the designs for further security.

62,864.—BEER FAUCET.—Thomas Marsh (assignor to himself, John Balchom, and S. Perry), Smithfield, R. I.

First, I claim the faucet composed of the two parts, 1 and 2, the part, 1, to be attached to the barrel at any time after the filling and before the tapping of the same, and to act in combination with the part, 2, in forcing out the common wooden plug, the use of which is rendered unobjectionable by my invention, and which it is no part of my design to supersede.

Second, The combination of such faucet with a collar, C, affixed to the cask, such parts in combination constituting an apparatus for tapping a cask, substantially as described.

Third, Combining with the apparatus described in the first clause, a cutting bit, F, substantially as described for the purpose specified.

65,865.—SAFETY KEY HOLDER FOR DOOR LOCK.—Franklin J. May (assignor to himself and J. G. Barnum), Morrisania, N. Y.

I claim the weighted pawl, H, in combination with plate, E, operating directly against the square shank of the key, substantially as herein represented and described.

62,866.—MEASURING FUNNEL.—George W. McCann, Springfield, Ohio.

First, I claim the scale, I in combination with the cup, A, of a funnel, when said scale is constructed substantially as described, and retained in place by a spring pressure against the side of the cup.

Second, The guide bridge, E, in combination with the valve, C, stem, D, and cup, A, of a funnel, when constructed so as to be readily removable, substantially as and for the purpose set forth.

Third, The removable base, L, in combination with a cup and nozzle of a funnel measure, substantially as and for the purpose set forth.

Fourth, The nozzle, J, of a funnel constructed with the wire, k, wound spirally about its outer surface for the purpose of permitting the air to escape upward by the side of the nozzle, as set forth.

Fifth, The combined cup, funnel, and measure, constructed and arranged as set forth.

62,867.—HORSE-SHOE.—Donald L. McDonell, Detroit, Mich.

I claim the combination of the iron shoe, having a continuous groove in its upper surface, and spurs projecting upwardly therefrom, with the elastic shoe, having a contiguous tongue fitting said groove, all constructed and arranged as described.

62,868.—CULTIVATOR.—C. F. Megquier, Eureka, Ill.

I claim the plow standards, F F, pivoted at their upper ends, in metal straps, c, which encompass loosely the shaft, G, in the frame, A, so that staid standards and the plows, H, attached may be moved vertically and laterally in combination with the plow standards, I I, pivoted to the outer sides of the frame, A, the lever, k k, to which the plow standards are connected, and the rods, N, attached to the plow standards, all being arranged to operate in the manner substantially as and for the purpose set forth.

62,869.—AUTOMATIC WAGON BRAKE.—W. D. Miller, Enon, Ohio.

First, I claim the axle, G, and slotted bolster, H, in combination with the rollers, J, substantially as and for the purpose set forth.

Second, The automatic brake, A, operated by means of the connecting rod, C, and the axle, G, in combination with the slotted bolster, H, slotted perch, I, and bolt, F, as and for the purpose set forth.

62,870.—FLOATING BATTERY OR LIGHT SHIP.—John Moody, York, England.

I claim the construction of floating lights, beacons, floating batteries, and other vessels with radiating arms, as described, for the purpose of preserving their steadiness in a rough sea, as herein set forth.

62,871.—BED BOTTOM.—Thomas B. Moore, Bridesburg, Pa.

First, I claim an improved spring for bed bottoms formed by combining the spring, B, having a loop or hook, b', formed upon its upper end, with the bar, C, and cars, D, having notches formed in their rear sides, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the loops or bridles, F, with the springs, B, substantially as herein shown and described and for the purpose set forth.

62,872.—STRAINER.—Frank Morton, Kingston, Mass.

I claim the arrangement and combination of the handle, C C', with the strainer cloth, A, and the supporting frame, B B' B''.

62,873.—BREECH-LOADING FIRE-ARM.—Alfred S. Munger, Chicopee Falls, Mass.

I claim the lever catch, G, formed with the foot, g, which in the act of firing is interposed between the back of the hammer and the post, c, of the frame to relieve the pivot, b, of the pressure, and in the act of cocking is retracted to release the hammer, as and for the purposes described.

62,874.—TUBE GEAR FOR OSCILLATING ENGINES.—James H. Murrill, Baltimore, Md.

I claim the arrangement of the arc, e, lever, D, valve rod, d, crank shaft, F, and oscillating cylinder, A, substantially as described and for the purposes set forth.

62,875.—HARROW.—George Ogg, Lacon, Ill.

I claim the manner of connecting the arms with each other by the bolts, B, and rings, D, and the arrangement and combination of the chain, E, passing through the ring, D, by which any width of harrow desired may be readily effected.

62,876.—CANE STRIPPER.—I. E. and J. A. Overpeck, Overpeck's Station, Ohio.

I claim, First, The double-edged knife, arranged and operating in combination with hook, a, for cutting and stripping stalks, substantially as and for the purpose described.

Second, The handle, b d, and shield, A A', in combination with a hook and knife arranged, substantially as specified for the purpose set forth.

62,877.—MACHINE FOR REMOVING BURRS FROM WOOL.—Ziba Parkhurst, Milford, Mass.

I claim the application of the induction plate, G, or its equivalent to, or its combination with the burring machine so as to operate with the main cylinder thereof, substantially as and for the purpose specified.

I also claim the combination and arrangement of one or more combs with the burring machine, so as to operate with the main cylinder thereof, substantially as and for the purpose hereinbefore explained.

I also claim the application of the induction plate and combs, or either of them, to the burr box so as to be movable therewith as described.

62,878.—PREVENTING INCRUSTATION OF STEAM BOILERS.—George T. Pary, Philadelphia, Pa.

First, I claim the mode, substantially as described, of removing the scale from, and preventing the incrustation of, boilers by means of electricity generated without the boiler by jets of steam impinging upon one or more points or equivalent means, said electricity being conducted into the boiler by suitable means.

Second, The combination of the try cock, B, and the insulated brush of points, H, set in the bulb, G, or its equivalent, when connected by a suitable conductor, K, with the shell of the boiler, and arranged to operate substantially in the manner and for the purpose set forth.

62,879.—REIN HOLDER FOR CARRIAGES.—Elias C. Patterson, Rochester, N. Y.

I claim the improved rein holder, constructe substantially as described.

62,880.—FID.—H. H. Pember, New York City.

I claim the fid consisting of a series of transversely divided sections, B, of conical form, resting on each other, fitted on the shaft, C, and adapted to receive the thimble between the sections relative to size, substantially as represented and described.

62,881.—PLOW.—Daniel Peters and John W. Pauly, Keokuk, Iowa. Antedated March 4, 1867.

We claim the combination of the friction wheel, H, and adjustable supporting bar, G, with the moldboard, E, of the plow, when said wheel and bar are constructed and arranged substantially as herein shown and described and for the purpose set forth.

62,282.—CALCULATING MACHINE.—Albert C. Pierson, Rahway, N. J.

First, I claim, in calculating machines, presenting to the eye only the columns which are wanted to complete the units, tens, etc., substantially as herein specified, when the several columns for each of the nine digits, with the blank column for the cipher, are arranged to be presented simultaneously so that they may be read off for units, tens, hundreds, etc., and added mentally, with the ease and rapidity of adjustment and of use, herein set forth.

Second, I claim the belt or sliding calendar-column, E, when used in combination with columns of calculated interest, or equivalent calculated columns, the quantities in which vary according to the number of days, substantially as and for the purpose herein set forth.

Third, I claim the combination of the bar, G, having a parallel motion, with the several columns on the rollers, B C and c, with or without the columns, M, or other columns, substantially as and for the purpose specified.

Fourth, I claim the slide, I, fitted on the bar, G, and adapted to operate in combination with calculated columns so as to expose different columns according as it is moved, and allow only one to be visible for the units, one for the tens, etc., at one time, substantially as and for the purpose herein specified.

62,883.—MACHINE FOR BORING AND TENONING.—Thomas Place, Alfred Centre, N. Y.

I claim the sliding carriage, D, having adjustable rack, i, adaptable stop, n, and elbow lever, k, and operated by the treadle, h, and operated substantially as described for the purpose specified

62,884.—CIDER MILL.—E. S. Purdy, Croton, N. Y.

I claim the alternate arrangement of the teeth, a a', on the cylinders, B B', the teeth of one cylinder passing closely between the teeth of the other cylinder, and adapted for grating the fruit instead of crushing it, the whole being constructed, arranged, and operated substantially as and for the purpose set forth.

62,885.—STEAM GAGE.—Emmett Quinn, Washington, D. C.

First, I claim the tubes inserted in plates as described, with the channels cut therein from one tube to another, and with the cap or outer plate covering the channels and ends of the tubes, as and for the purpose described.

Second, The packing and diaphragms between the plates with the plungers for the purpose of cutting off communication between the tubes, as described.

Third, The means provided for adjusting the mercury in the final or index tube to the zero point on the scale, or for adjusting said zero point to the mercury, in the manner described.

Fourth, The construction of the index tube by a combination of a back piece, containing a groove of a suitable caliber, with a glass face cemented to or clamped thereon, in the manner substantially as described.

Fifth, The construction of channels from tube to tube of a size sufficient for the necessary operation of the gage, but too small to allow of a rapid movement of the fluids when pressure is suddenly applied.

62,886.—CORN PLANTER.—Leonidas M. Reamy, Kokomo, Ind.

First, I claim, in the described combination, the two ridging shares, c c', followed by the seed-dropping drill, E, substantially as and for the purpose set forth.

Second, A corn planter, consisting of two shares, c c', making a central ridge on which to plant, combined with the drill, E, and crescent-shaped rake, H, the whole arranged and operating substantially as set forth.

Third, In this connection, I claim the crescent-shaped grain coverer or rake, H.

62,887.—GLASS FURNACE.—Samuel Richards, Philadelphia, Pa.

First, I claim the furnace constructed with doors and of the width described, in combination with the tapering pots, the whole arranged and operating in the manner and for the purpose substantially as described.

Second, Constructing refining pots with the projections, b, with or without the strainer, c, in the manner and for the purpose substantially as shown and described.

62,888.—CORN PLANTER.—Josiah S. Rickel, Genesee, Ill.

I claim the seed slide, G, placed within a chamber, c, in the tube, F, having a hole, d, made through it and operated by the levers or hands, E E, in combination with the fixed partition, H, provided with an elastic projection, i, and flap, I, and the recess, e, with a glass, f, at its outer side, all arranged substantially as and for the purpose set forth.

62,889.—CONSTRUCTION OF DIKES AND LEVEES.—Louis S. Robbins, New York City.

First, I claim the employment of a removable cap, D, substantially as and for the purposes herein shown and described.

Second, I claim the employment of a grinding clamp, E, or its equivalent, in one or more parts, substantially as shown and described.

Third, I claim the combination of one or more longitudinal timbers with the lower portions of the upright planks or timbers, substantially as and for the purpose herein shown and described.

62,890.—TORPEDO FOR OIL WELLS.—Edward A. L. Roberts, Titusville, Pa.

First, I claim the combination of the quick match, F, with the priming chamber, H H, for the purposes set forth.

Second, I claim the torpedo with the priming chamber, in combination with the quick match, substantially as and for the purposes set forth.

62,891.—METHOD OF DRIVING WELL TUBES.—Ezra M. Robords, Avoca, N. Y.

I claim the metallic case or cap, C, provided with a block or plug of zinc, c, or its equivalent, substantially in the manner and for the purpose as herein set forth.

62,892.—TRAVELING BAG.—E. A. G. Roulstone, Roxbury, Mass.

I claim the construction of the frame with the groove or recess, c', to receive the edge of the leather or cloth body, b, and the confining strip, d, all being formed, arranged, and connected together, substantially as set forth.

62,893.—FLUID EJECTOR.—Joseph Ryan, St. Louis, Mo. Antedated Feb. 27, 1867.

First, I claim the method of economising the heat produced by the condensation of steam in a syphon, by application thereof to one or more air currents, then caused to act in combination with the steam current or currents upon the fluids to be raised, substantially as set forth.

Second, The arrangement of the tube, F2, its feed of steam and stop cock, or their equivalents, with the tube, f2, its feed of air or throttle valve, or equivalents, in such a manner that the steam current shall impart to the air current velocity and heat, and bring said air current in acting contact with the water to be discharged, thus avoiding greater loss of power by condensation which would ensue if steam alone were used, substantially as set forth.

Third, The tube, F2, arranged to utilize the expansion of steam by widening the inner diameter thereof, substantially as set forth.

Fourth, The globes or other increases of surfaces of the air feed tube, f2, thus favoring an expansive action of air, substantially as set forth.

Fifth, The combination of the supply pipe, g', the steam chamber, G, stop cock, g, and feed pipes starting from G, for the purposes described.

Sixth, The arrangement and combination of the chambers, F, the bulbs, E, with the necks, A5, and the bulbs, C and D, when used as set forth.

Seventh, The arrangement for packing the valve rods to effect the perfect exclusion of air from the vacuum, the same consisting of a stuffing box, arrangement, c1 c2 and c3 (fig. 4), and this surrounded by a liquid usually water, as in c4, and this backed by a second stuffing box, as at c6 and c7, or any equivalent arrangement which uses a liquid to prevent the egress and ingress of air, in combination with some mechanical stuffing box contrivance to prevent the leakage of the air-checking fluid.

Eighth, The combination of the male and female screwlparts, c and c, of the valve stem, c, with the pin, c, worm wheel, c8, worm shaft, c9, and hand wheel, c10, as and for the purposes set forth.

Ninth, The joint of the pipe, D, with the foot piece, D'', by means of a flange, d', and lead cement, or equivalents, filling the space surrounding d', of D', substantially as described.

Tenth, The valve ball, b2, when arranged of an inner wooden kernel and coated with vulcanized rubber, or its equivalent, as set forth.

Eleventh, The combination of the bulb, B, diaphragm on plate, b', and drop valve, b2, as and for the purpose set forth.

62,894.—PLANKING SCREW.—George Savage, Jr., Bangor, Me.

First, I claim the planking screw consisting of lever, D, with the prop or fulcrum, E, screw, F, and dogs, d d, attached to lever, D, by the clevis, G, or its equivalent, all arranged to operate in manner substantially as described and shown.

Second, The rollers, a a a, in fulcrum, E, in combination with sliding clevis, G, whereby to allow the adjustment of screw, F, substantially in manner as and for the purposes specified.

62,895.—WASHBOARD.—David Smith, Hartfield, N. Y.

I claim the combination of the hinged pressure board and lever, C e, hand rubber or rubbers, f, and rod or rods, g, with the washboard, A, arranged and operating substantially as and for the purposes described.

62,896.—DAMPER.—James Smith and Samuel C. Brown, Richmond, Ind.

First, We claim a conical or bell-shaped damper, constructed and applied substantially in the manner set forth.

Second, We claim the internal pipe, A, when provided with a damper and arranged substantially as described and for the purposes set forth.

62,897.—PUNCHING MACHINE.—Oliver Snow (assignor to the Meriden Manufacturing Company), West Meriden, Conn.

I claim the combination of the wrist box, D, adjustable center piece, E, and endless screw, I, operating substantially in the manner and for the purpose specified.

62,898.—CULTIVATOR.—Alexander F. and T. M. Stansbury, Louistown, Ill.

We claim the slotted shoe or bearer, F, the double trees, K and G, the clevis, H, draft rods, I, and pendent staples, J, all substantially as and for the uses and purposes hereinbefore set forth.

62,899.—CHURN.—B. B. Stanton, Scott, N. Y.

I claim the churn box, A, with the eccentric frame, s s c e, and teeth, m, the shaft, W, with its arms, t t t, operated by the wheels, B y x and d, when constructed and used in the manner substantially as specified.

62,900.—METHOD OF ATTACHING HOES TO THEIR HANDLES.—William H. Startzman, Big Lick, Va.

I claim attaching the handle, C, having its lower edge wedge shaped to the hoe, A, by means of the wedge-shaped eye, B, tongued cap, D, nut, E, and bolts and nuts, F G, as herein shown and described.

62,901.—APPARATUS FOR MAKING EXTRACTS.—Abraham Steers, New York City, assignor to himself, Henry L. Elder and S. H. Kennedy, Philadelphia, Pa.

First, I claim the revolving brush, F, in combination with the still, A, and coil, C, constructed and operating substantially as and for the purpose described.

Second, The floating rake, G, in combination with the still, A, constructed and operating substantially as and for the purpose set forth.

62,902.—HAWSE-PIPE STOPPER.—James Stewart, Bangor, Me.

I claim the plates, a a, in combination with hawse pipe, B, when arranged to operate in manner substantially as described and shown.

62,903.—REVOLVING TABLE.—James Stewart, Bangor, Me.

I claim the combination of table, A, desk, D, and arm, k, in manner substantially as shown and specified.

62,904.—HARROW.—Svan Svanson, Sweedepoint, Iowa.

I claim the frame, a, carrying the toothed rollers, B B B, adapted to be reversed and drawn along the surface of the ground by the top side becoming the bottom, in the manner and for the purpose specified.

62,905.—CHURN POWER.—Henry Swarthout, Altay, N. Y.

First, I claim the arrangement of the roller, E, lever, F, and pivot box, C, when applied and used as specified, and for the purpose of changing the inclination of the wheel, H, as set forth.

Second, I claim roller, I, lever, J, and weight, K, when made and applied as and for the purpose herein specified.

62,906.—IRONING MACHINE.—Joseph W. Thorp, Sanbornton Bridge, N. H.

I claim the compound levers, e h g, provided with handle, d, the end of the levers, e e, being pivoted to bar, c, which is connected to swinging arm, D, by a swivel joint, and the end of levers, g g, being connected to the guides, a a, which slide in sleeves, b b, in combination with the iron, E, the whole operating substantially as described and for the purpose specified.

62,907.—BOOTS AND SHOES.—George W. Tolhurst, New York City.

I claim the counter, D, heel, E, shank, E, and slide flanged strips, G, made of one piece of metal, in the manner described for the purpose specified.

62,908.—KNOB LATCH FOR DOORS.—Albert W. Upton, Lowell, Mass.

I claim the combination of the inclines, a a, and the projections, c c, on the rear end of the latch bolt, B, and the horns, e e, on the tumbler, A, with the sliding arbor and knobs, the whole arranged to operate substantially as and for the purpose set forth.

62,909.—LIFE PRESERVING RAFT.—C. W. Wailey, New Orleans, La.

I claim a life preserving raft embracing the combination of the bars A A A, with the cross pieces B B B, etc., (so grooved as to receive the chime of a barrel) and mortices a a a a. The slats D D D, with pin holes and pins the ropes f f, the bolts C C C C, with hand nuts d d d d, and the barrels E E E E, all arranged and constructed as specified for the purpose herein before set forth.

62,910.—MITER BOXES.—W. S. Wheeler and S. E. Bickford (assignors to S. E. Bickford and F. Flanders), Franklin, N. H.

We claim the guide frame E, so hung and pivoted to a standard A, that it can be swung around an axis vertical to the work, and also inclined to the said vertical axis whereby the proper direction can be given to the saw to cut a miter or a bevel, or both simultaneously, substantially as set forth.

We also claim providing the frame E, with an index or indices for fixing or adjusting its position around its vertical axis or at the required inclination for a miter or a bevel, in combination with a suitable clamp or clamps or equivalent mechanical device for locking it when adjusted substantially as set forth.

62,911.—CAR STARTER AND BRAKE.—John Wiley, 2d, South Reading, Mass.

I claim the slide E, provided with the oblong opening a, and cylindrical projection b, working through the cross bar c, spring F, wheel D, upon the axle C, treadle K, eccentrics I I, sliding bar H, chain e, and windlass G, when all are constructed and arranged to operate as herein set forth for the purpose specified.

62,912.—CAR BRAKE.—John H. Williams, Somerville, N. J.

I claim the drum, I, lever, K, spring, T, chains, H J and N, when all are constructed and arranged as herein set forth for the purpose specified.

Second, The arrangement of the lever, c, connecting chains or wires, d, and horizontal swinging arm, g, in combination with the pawl, W, substantially as described for the purpose specified.

Third, The foot lever, y, connected with the brake chain and arranged substantially as and for the purpose described.

62,913.—PEN HOLDER.—Orin O. Whitherell, Plaiston, N. H. assignor to himself and J. B. Bracket, Lewiston, Me.

I claim the application of the tongue or ink retainer to the pen and its carrier in the manner so that the said retainer may be movable and adjustable with respect to the nib of the pen, as set forth.

I also claim the construction of the pen carrier with the depression or notch, a, and the terminal slots, b b, arranged together and in it and for the reception and holding of an ink retainer to operate with the pen as specified.

62,914.—TILE AND PIPE MACHINE.—Richard Woodcock, Joliet, Ill.

First, I claim the self revolving core shaft, c, in the hollow shaft, b.

Second, The receiver, i, answering the double purpose of receiving the tile from the mill and holding the same while in a green state.

Third, A combination of the self revolving core shaft, c, the main shaft, b, and the receiver, i, when used and operating substantially as described.

62,915.—COAL SCUTTLE.—D. Wright and W. A. Kirby, Auburn, N. Y.

First, We claim the use of a lip or flap as a part of the coal scuttle and in front thereof so that the coal may be discharged through an aperture the bottom of which shall be at a level sufficiently below that of the upper edge of the scuttle, substantially in the manner described.

Second, the manner of affixing the said lip to the scuttle, substantially as above described.

62,916.—MODE OF APPLYING MEDICINES AND REMEDIAL AGENTS, AND AN APPARATUS THEREFOR.—John Allen, M.D., New York City.

First, I claim the peculiar construction and arrangement of the apparatus for administering vapor baths, substantially as hereinbefore described, and for the purposes set forth.

Second, The peculiar construction and arrangement of the bath armor, No. 1, the frame, flexible impervious casings and hood, and the armor, No. 2, body and hood or head box, with glass front, substantially as hereinbefore described, and for the purpose set forth.

Third, The flexible supply and escape pipes, combined and arranged with the apparatus, substantially as described, and for the purposes mentioned.

Fourth, The gasoline stove, or other suitable device, the heat of which can be readily graduated, in combination with a boiler or retort for generating vapors for vapor baths, substantially as described.

Fifth, The combination and arrangement of the cup, with water in it, lamp and plate, constituting the sulphur vaporizing apparatus, substantially as described, and for the purposes stated.

Sixth, The introduction into a boiler or retort, of medicines which are soluble in water, or which may be vaporized by a moderate degree of heat, particularly the perchloride of mercury (otherwise known as corrosive sublimate) and iodide of potassium, together or separately, and their compounds or equivalents for converting them into vapor, substantially as hereinbefore described, and for the purposes set forth.

RE-ISSUES.

2502.—GALVANIC BATTERY.—Edward A. Hill, Chicago, Ill. Antedated April 9, 1862. Patented August 18, 1863.

I claim the combination and arrangement of the battery cup, and the positive and negative electrodes, as and for the purposes specified.

2503.—PRESERVING FRUIT, MEAT AND OTHER SUBSTANCES.—Nathaniel S. Shaler, Cambridge, Mass. Patented Oct. 11 1864.

First, I claim the preservation of animal, vegetable or other matter liable to decay in the ordinary atmospheric air and temperature by means of carbonic acid gas and a refrigerating temperature together and relatively to such substances substantially in manner as herein before set forth.

Second, Also the combination of a preserving chamber, a, a moisture refrigerating apparatus and a means of circulating the carbonic acid gas of such chamber through or so in contact with the surfaces of the refrigerating apparatus as to not only cool the gas but cause such moisture to be frozen or condensed and abstracted from the gas substantially as specified.

Third, Also the preservatory as constructed of one or more dumb waiters or elevators D, or the equivalent thereof, the gas chamber A, the gas refrigerating apparatus E, and the gas circulating apparatus, the whole being arranged and combined substantially as and so to operate in manner and for the purpose specified.

Fourth, I also claim carbonic acid gas as a means of preventing or arresting decay in animal or vegetable matter when proper buildings or compartments are filled with such gas to the exclusion of atmospheric air and the substances to be preserved are placed and kept therein for this purpose.

2504.—SUBMARINE TUNNEL.—The American Submarine Tunnel Company, New York City, assignors of Joseph R. Miller. Patented Aug. 2, 1853.

I claim the construction arrangement and formation of submarine and subterranean avenues, by means of cast iron sections united together by flanges and bolts, in the manner and for the purpose herein described.

2505.—METHOD OF EXTRACTING CREAM FROM WHEY.—Kilian Egger, South Cortland, N. Y. Patented Sept. 25, 1866.

I claim the process above described for extracting the cream from the whey, substantially as specified.

2,506.—TOBACCO PIPE.—George W. Francis and W. L. Woods (assignors to W. L. Woods), Washington, D. C. Patented April 11, 1865.

We claim, First, A tobacco pipe, having an inverted bowl, with the stem or vent at the top, and the opening at the bottom, substantially as and for the uses and purposes as above described.

Second, We claim the inverted conical bowl, B, combined with the cap, C, with its air holes, E, substantially as described, fig. 3.

Third, We claim the conical bowl, B, combined with the case, A, substantially as described in fig. 2.

Fourth, We claim the bowl, B, solid or in sections, combined with the cap, C, and the vent, D, substantially as and for the uses and purposes, as above described.

2,507.—MODE OF PREPARING ANIMAL MATTERS FOR USE AS A FERTILIZER.—Amor Smith, Cincinnati, Ohio. Patented Jan. 1, 1867.

I claim the herein described process for preserving the perishable parts of animal matter, consisting of the fleshy portions alone, or mixed soft and hard parts, from decomposition by subjecting the same to pressure after being boiled, substantially as and for the purpose set forth.

2,508.—CONSTRUCTION OF BURGLAR-PROOF SAFES, AND THE PREPARATION OF MATERIALS FOR THE SAME.—William Terwilliger, William H. Terwilliger, and John S. Lockwood, New York City. Patented July 24, 1866.

We claim, First, The alternating of iron and steel, welded together in plates or bars, in making the lining, case, or shell of burglar-proof safes.

Second, The process of welding iron and steel plates by the use of a solution of borax and saltpeter (or their chemical equivalents for welding purposes), in paint form, laid on the surfaces to be united, by being then heated to the proper heat, say 1500° Fah., or thereabout, and rolled under great pressure, or hammered till chemically united or welded.

Third, The alternating of iron and steel plates or bars, united or welded by the use of the welding composition, applied as above described, to make better and cheaper materials than those now used for burglar-proof safes.

DESIGN.

2,595.—MILITARY MONUMENT.—John S. Armstrong, Prairie du Chein, Wis.

HOW TO OBTAIN PATENTS.

The first inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them; they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

We (MUNN & CO.) have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century*. Many thousands of inventors have had benefit from our counsels. More than one-third of all patents granted are obtained by us.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person, at our office, or to advise them by letter. In all cases they may expect from us an *honest opinion*. For such consultations, opinion, and advice, *we make no charge*. A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly—do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential*. Address MUNN & CO., 37 Park Row, New York.

Extensions.—The applicant for an extension must file his petition and pay in the requisite fee at least ninety days prior to the expiration of his patent. There is no power in the Patent Office to renew a patent after it has once expired. The preliminary business to extend a patent should be commenced at least six months prior to the expiration.

Many valuable patents are annually expiring which might readily be extended, and, if extended, might prove the source of wealth to their fortunate possessors.

All the documents connected with extensions require to be carefully drawn up and attended to, as any failure, discrepancy, or untruth in the proceedings or papers is liable to defeat the application.

In case of the decease of the inventor, his administrator may apply for and receive the extension; but no extension can be applied for or granted to an assignee of an inventor. Parties desiring extensions will address MUNN & CO., 37 Park Row, N. Y.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

The general rule is, that whatever is really embraced in the original invention, and so described or shown that it might have been embraced in the original patent, may be the subject of a reissue.

Reissued patents expire at the same time that the original patent would have done. For this reason, applications for reissue will be acted upon immediately after they are completed.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts.

One or more divisions of a reissue may be granted, though other divisions shall have been postponed or rejected.

In all cases of applications for reissues, the original claim is subject to re-examination, and may be revised and restricted in the same manner as in original applications.

But in all such cases, after the action of the Patent Office has been made known to the applicant, if he prefers the patent originally granted to that which will be allowed by the decision of the Office, he has the privilege of abandoning the latter and retaining the old patent.

The documents required for a Reissue are a Statement, Petition, Oath, Specification, Drawings. The official fee is $30. Our charge, in simple cases, is $30 for preparing and attending to the case. Total ordinary expense, $60. Reissues may be applied for by the owners of the patent.

By means of Reissue, a patent may sometimes be divided into several separate patents. Many of the most valuable patents have been several times reissued and subdivided. Where a patent is infringed and the claims are doubtful or defective, it is common to apply for a Reissue with new claims which shall specially meet the infringers.

On making application for Reissue, the old or original patent must be surrendered to the Patent Office, in order that a new patent may be issued in its place. If the original patent has been lost, a certified copy of the patent must be furnished, with affidavit as to the loss. To enable us to prepare a Reissue, the applicant should send to us the original patent, result as stated, and give a clear statement of the points which he wishes to have corrected. We can then immediately proceed with the case. Address MUNN & CO., 37 Park Row, New York. We have had great experience in obtaining Reissues.

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the subject admits. A Caveat consists of the Petition, Oath, Specification, and Drawings. The Government fee for filing a Caveat is $10, and our ordinary charge to prepare the documents and attend to the whole business from $10 to $15. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words, and fees, $25 in full. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

Quick Applications.—When, from any reason, parties are desirous of applying for Patents or Caveats, in GREAT HASTE, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions for them. We can prepare and mail the necessary papers at less than an hour's notice, if required.

Interferences.—When each of two or more persons claims to be the first inventor of the same thing, an "Interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public.

Other Information.—If you wish for *general information* as to the rules and law of Infringements, Reissues, Claims, etc., state your inquiries clearly, and remit $5. Opinions, in special cases of infringement, cost more.

If you wish for advice in regard to assignments, or upon the rights of parties under assignments, joint ownership in patents, contracts, or licenses, state the points clearly upon which information is wanted, and remit $5.

If you desire to know in whose name the title to a Patent is officially recorded, at Washington; or if you wish for an abstract of all the deeds of transfer connected with a Patent, send us the name of the patentee, date of patent, etc., and remit $5.

If you desire a sketch from the drawings of any Patent, and a description from the specification, give the patentee's name, date of the patent, and remit $5.

If you desire to have an assignment of a Patent, or any share thereof, or a license, made out in the proper manner, and placed on record, give us the full names of the parties, residences, title of the invention, etc., and remit $5. This includes record fee.

Inventions or shares thereof may be assigned either before or after the grant of a patent. Agreements and contracts in regard to inventions need to be recorded, like assignments, at Washington. For any agreement or contract that you wish prepared, remit $5.

☞ Remember that we (MUNN & CO.) have branch offices in Washington, and have constant access to all the public records. We can therefore make for you *any kind of search*, or look up for you *any sort of information* in regard to Patents, or Inventions, or Applications for Patents, either pending or rejected, that you may desire.

Infringements.—The general rule of law is, that the prior patentee is entitled to a broad interpretation of his claims. The scope of any patent is therefore governed by the inventions of prior date. To determine whether the use of a patent is an infringement of another, generally requires a most careful study of all analogous prior patents, and rejected applications. An opinion based upon such study requires for its preparation much time and labor.

Having access to all the patents, models, public records, drawings, and other documents pertaining to the Patent Office, we are prepared to make examinations, and give opinions upon all infringement questions, advice as to the scope and ground covered by patents, and direct with vigor any legal proceedings therewith connected. Address MUNN & CO., 37 Park Row, N. Y.

The expense of these examinations, with written opinion, varies from $25 to $100 or more, according to the labor involved.

When an application is found to conflict with a caveat, the caveator is allowed a period of three months within which to present an application, when an interference may be declared.

Upon the declaration of an interference, a day will be fixed for closing the testimony, and a further day fixed for the hearing of the cause. The arguments of counsel must be in the office on the day of hearing.

If either party wishes a postponement, either of the day for closing the testimony, or of the day of hearing, he must, before the day he thus seeks to postpone is past, show by affidavit a sufficient reason for such postponement.

The management of Interferences is one of the most important duties in connection with Patent-Office business. Our terms for attention to Interferences are moderate, and dependent upon the time required. Address all letters to MUNN & CO., No. 37 Park Row, New York.

Our Book of Instructions, containing the Patent Laws, Official Rules, 150 engravings, valuable tables for calculations, and full instructions concerning the cost of patents, method of proceedure, forms for assignments, etc., is *sent gratis* on application.

Address all letters (post-paid),

MUNN & CO.,
No. 37 Park Row, New York City.
Office in Washington, Cor. F and 7th streets.

Foreign Patents.

American inventors should bear in mind that, as a general rule, an invention which is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. In England the law does not protect the right of a foreign inventor as against the first introducer of an invention from abroad. For twenty years past the great majority of patents taken out by Americans in foreign countries have been obtained through Munn & Co's agency. Patents are secured with the utmost dispatch in Great Britain, France, Prussia, Belgium, Russia, Austria, Italy, The Netherlands, Spain, Sweden, Australia, and other foreign countries. Models are not required, but the utmost care and experience are necessary in the preparation of applications. Patentees who intend to take out Foreign Patents should send to us for a Pamphlet of full advice. Address

MUNN & Co., No. 37 Park Row, N. Y.

Advertisements.

The value of the Scientific American *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

RATES OF ADVERTISING.

Back Page.....75 *cents a line.*
Back Page, for engravings.....$1.00 *a line.*
Inside Page.....40 *cents a line.*
Inside Page, for engravings.....60 *cents a line.*

THE CARVALHO STEAM SUPERHEATER MANUFACTURING COMPANY.

Capital Stock.....$60,000

Board of Directors.
S. M. BEEKLEY, ADDISON SMITH,
H. D. BULKLEY, S. HASTINGS GRANT,
HENRY W. BULKLEY.

Carvalho's Steam Super-Heater, awarded a silver medal at the Fair of the American Institute, 1865, is simple, durable and effective. Guaranteed to prevent "priming," furnish Pure Steam of any required temperature, saving 20 per cent in fuel, time, etc. In daily operation at South Brooklyn Iron Works, South Brooklyn, near Hamilton Ferry; Jones & Smith, corner of 42d street and 10th avenue; Weston, Covel & Co., corner of 7th avenue and 29th street, and elsewhere. For circulars, terms, etc., address
HENRY W. BULKLEY,
13 2*] General Agent, 70 Broadway, N. Y.

THE BISHOP GUTTA PERCHA COMPANY—The original and only manufacturers in the United States of pure Gutta Percha Goods, Gutta Percha Insulated Submarine Telegraph Cables, Insulated Telegraph Wire, Water, Beer and Soda Pipe, Chemical Vessels, Tissue Sheet for hatters, Artificial Flower Makers, etc. Factory, Nos. 208, 210 and 212 East 25th street. Office and salesroom, No. 115 Liberty street (west of Broadway), New York. SAMUEL C. BISHOP,
13 4] General Agent.

SCIENTIFIC AMERICAN for sale—New Series—Vols. 1, 6, 7, 8, 9, 10, 11, 12, 13, 14. Also, 12 vols. Old Series. Apply to F. C., Box 4,232, Boston, P. O. 1*

IMPORTANT TO CAPITALISTS. I wish to consult immediately with any party having a factory or building, with or without tools, suitable for manufacturing an entirely new machine never introduced; work similar to sewing machine work. The machine bears the same relation to articles in it line that Howe's invention bears to sewing machines, but is more valuable than his invention. Twenty-five to fifty thousand will be wanted the first year; profits five to eight hundred per cent. Factory to be put into a new stock company to be formed to take that and the machine. Part of stock to be taken in place where factory is located. At least one hundred thousand dollars necessary to be subscribed besides amount for factory. Any community desiring to secure a large and thriving manufacturing business in its midst will find this an extraordinary opportunity. Address C. A. S., care of S. R. Niles, Newspaper Advertising Agent, Scollay's Building, Court street, Boston. 13 2—N

FOR SALE—One 24-foot Hadley Falls Lathe, 50 in. swing, with extension to swing 40 in. Back and follower rests, gibbed without screw. Also, one 7-foot pulley, 20-in. face, 6¾ bore. Address
13 2*] THOMAS MANF'G. CO., Thomaston, Conn.

ESTABLISHED
1842. Hardware and Tools. 1842.
A. J. WILKINSON & CO.,
No. 2 Washington street, Boston, Mass.,
Offer a superior Stock of Tools, in which may be found Bangor Squares; Center and Universal Squares; U. S. Scales; Protractors; Vernier Callipers; Thread Gages; Surface and combination Gages; Stubbs' Fine Tools, Files, Drill Wire, and Cast Steel; Morses' Twist Drills, Sockets, and Chucks; Lathes—20, 28, and 26-in. beds, with or without foot motion; Hand Tools for turning; Addis Carving Tools; Monk's Molders' Tools; Pond's Carriage Tools; Bailey's Iron Planes; Wilkinson's Polished Planes (unequaled); John Martin's Files. Agents for Horton's, Chushman's, and Blache's Chucks; Pattern Letters; Rolled Brass, German Silver, and Wires; Wellington Mills Emery, Emery Cloth, Emery Wheels; Chests of Tools, all sizes, etc., etc.
Their reputation for a full assortment, superior quality, and all the new inventions, will be fully sustained. Orders promptly filled. 13 6eow

RICHMOND'S Empire Conical Bran Duster and Bolt. Adjustable while running. Warranted the best in use or no sale. For Circular and Price List, address [13 6eow*] JAS. RICHMOND, Lockport, N. Y.

WANTED—New or Second-hand self-setting Shingle-sawing Machine. Address, with description of Machine, price, etc., J. C. SHMUCKER,
1*] Kokomo, Ind.

FOR SALE OR LICENCE ON ROYALty. A new wrench; Munn & Co. say "'tis the best we have seen." Patent just ordered to issue. Address S. S. BARNABY, Macon, Ga.

LEVIATHAN STUMP & TREE PULLER
Patented August 14, 1866.
Took First Prize and Silver Medal at Michigan State Fair, last fall, in competition with seven other Machines, besides several Prizes at the County Fairs. It has never failed. As I own more territory than I can manufacture for, I will sell a limited number of State Rights. For description and cuts, address J. W. HOUGHTELIN,
13 1] Detroit, Mich.

EVERY MAN HIS OWN PRINTER!—No business man should be without a portable printing office! 75 per cent can be saved by doing your own printing. Send for a circular of the best, cheapest, and most durable Portable Printing Press ever invented. Address [13 1] C. C. THURSTON, Pawtucket, R. I.

WOOD-WORKERS' GREAT TIME Saver—the finest glue joints, end grain, sides, or miter, with common glue—no sizing or preparing of wood. On receipt of 50 cts. (the only possible expense), this new process, plain and simple, will be sent to any address. JOHNSON & TAIT,
13 tf] 1,554, Vienna street, Philadelphia, Pa.

LAFLER'S NEW IRONCLAD BRICK Machine makes two kinds of Brick from the same Machine, viz: Common and Pressed. For descriptive circular address J. A. LAFLER, Inventor and Manufacturer, Albion, Orleans County, N. Y. 13 2*

TURBINE WATER WHEEL, VALENTINE & CO., Ft. Edward, N. Y. This is thoroughly proved a first-class wheel. New improvements, prices moderate. Agents wanted in every Co. Circulars gratis. 13 4*

FABRICATION OF VINEGAR.
Prof. H. DUSSAUCE, Chemist, is ready to furnish the most recent methods of manufacturing Vinegar by the slow and quick processes, with and without alcohol, directly from corn. Also, process to manufacture vinegar and acetic acid by distillation of wood. Methods of assaying vinegars. Address
1*] New Lebanon, N. Y.

TO SOAP MANUFACTURERS.
Plans of Factories, drawings of apparatus, recipes to prepare every kind of lyes, and the following soaps:—Hard, Soft, Castile, Fancy, Rosin, Family, Wax, Palm and Cocoa, Toilet, Powder, Transparent, Silicated. Assays of alkalies, lyes, limes, acids, greases, oils, soaps.
Address Prof. H. DUSSAUCE, Chemist,
1] New Lebanon, N. Y.

PRESSURE BLOWERS—Equal in Force to Piston Blowers, and a perfect substitute for both Fan and Pistons—running more easily than either. Adapted for Blast, and Cupola, and Heating Purposes, Forges, Steamships, Boilers, Ventilation, etc., etc. Prices according to sizes, ranging from $25 to $1,500. Address, for Circular B. F. STURTEVANT,
13 tf] 72 Sudbury street, Boston, Mass.

JOSEPH C. CLAYTON,
COUNSELLOR-AT-LAW,
ADVOCATE IN PATENT CAUSES,
Intelligencer Building, Washington City, D. C. 13 10*

WHITON'S PATENT CENTERING Machines for centering all sizes of Lathe work, a very useful tool for machinists. Also, Lathe Chucks (Patented Oct. 9, 1866), from 3-in. to 24-in. diameter, made of the best materials by D. E. WHITON,
West Stafford, Conn.
Cuts and description sent on application. 13 2

FORD'S TIMBER CLAMP—FOR SECURING the feet of uprights in erecting buildings. By this simple and cheap device the feet of the uprights on a frame building are securely held in place in the act of raising and until secured above. It dispenses with the labor of men, and by its use all danger of slipping is avoided. For particulars and circulars address
1] E. G. FORD, Delphos, Allen Co., Ohio.

VALUABLE PATENT FOR SALE.—Cooper's Patent Mill for Rolling Railroad Car Axles, which will turn out 25 axles an hour, saving $1·50 on each axle, will be sold for District, State and United States, on reasonable terms. Send for circular containing cut and full particulars. THOS. COOPER,
Box 2,377, Cincinnati, Ohio.

T. N. HICKCOX & CO., 280 Pearl St., New York, Manufacturers of
STAMPED BRASS GOODS,
Plain and Fancy Pomade and Patent Brass Mucilage Caps, Brass Labels for Oil Cans, Insurance Companies, etc.
Light Machinery manufactured to order.
Prompt attention paid to articles of new manufacture and Patent Goods.
Models for the Patent Office neatly executed. 13 2*

WANTED—GOOD MEN TO SELL Andrew's Gas Generator. Can be attached to any lamp; makes gas from common oil, and burns it conveniently as a candle; will not blow out; the best gas light in use. Retail for $1 each. Will furnish any good man with $10,000 to operate with. No reference required.
Terms sent free. Address
13 2*] J. C. TILTON, Pittsburgh, Pa.

HICKCOX'S Stencil Establishment, 280 Pearl St., N. Y.—Marking Plates, Canceling Stamps and Seal Presses, Burning Brands, Steel Stamps, Dies and Punches, Machine Brass Alphabets, Frames, Brushes, Indelible and Stencil Inks, wholesale and retail, at lowest prices. 13 2*

A RICH, RARE, AND RACY 8-PAGED illustrated paper. Full of fun. Cheapest paper printed. Only 50 cts. a year, and valuable gift to EVERY subscriber, worth from $1 to $25. Subscribe NOW. Only 50 cents, or specimen for 10 cents. Address STAR SPANGLED BANNER, Hinsdale, N. H. 13 1—R

MACHINERY.—WANTED, TO CONtract to build some staple article, of wood or metal, or both combined, by a first-class workman, with good tools and power. Machinery and patterns got up. Workmanship and materials of the best. Address Box 550, Post-office, Paterson, N. J. 13 2

FOR SALE.—A LARGE, SELECT, AND valuable collection of Minerals, Ores, Fossils, Shells, etc., embracing trilobites, ammonites, precious stones, and ornamental specimens, suitable for the cabinet of a college or institute. Address J. M. COVINGTON, office of the Scientific American, 37 Park Row, N. Y.

To Inventors and Others.

Notice is hereby given that the members of a Commission, acting under the authority of the Secretary of the Treasury, will meet in the City of New York at the Office of the Supervising Inspector of Steamboats, No. 23 Pine street, on the SECOND MONDAY in April proximo, for the purpose of examining and testing the merits of such Inventions of a life-saving character as may be brought before them.

Said Inventions will embrace Boilers or Steam-engines, Anti-incrustators, Safety-valves, Steam-gauges, Water-gauges, Steering Apparatus, Life-boats, with detaching apparatus, &c., &c., &c.

Inventors may appear in person before the Commission, for the purpose of explaining their inventions; but no expenses will be allowed under any circumstances.

H. McCULLOCH,
Secretary of the Treasury.
Washington, D. C., March 15, 1867. 13 3

THE PRACTICAL DRAUGHTSMAN.

THE PRACTICAL DRAUGHTSMAN'S Book of INDUSTRIAL DESIGN, and Machinist's and Engineer's Drawing Companion; forming a complete course of Mechanical Engineering and Architectural Drawing. From the French of M. Armengaud the elder, Prof. of Design in the Conservatoire of Arts and Industry, Paris, and MM. Armengaud the younger, and Amoroux, Civil Engineers. Rewritten and arranged with additional matter and plates, selections from and examples of the most useful and generally employed mechanism of the day. By William Johnson, Assoc. Inst. C. E., Editor of "The Practical Mechanic's Journal." Illustrated by fifty folio steel plates and fifty wood-cuts. A new edition. 4to.....$7 50

Among the contents are:—Linear Drawing, Definitions and Problems, Plate I. Applications, Designs for Inlaid Pavements, Ceilings, and Balconies, Plate II. Sweeps, Sections, and Moldings, Plate III. Elementary Gothic Forms and Rosettes, Plate IV. Ovals, Ellipses, Parabolas, and Volutes, Plate V. Rules and Practical Data. Study of Projections, Elementary Principles, Plate VI. Of Prisms and other Solids, Plate VII. Rules and Practical Data. On Coloring Sections, with Applications—Conventional Colors, Composition or Mixture of Colors, Plate X. Continuation of the Study of Projections—Use of Sections—details of machinery, Plate XI. Simple applications—spindles, shafts, couplings, wheel patterns, Plate XII. Method of constructing a wooden model or pattern of a coupling. Elementary applications—rails and chairs for railways, Plate XIII. Rules and Practical Data—Strength of Material, Resistance to compression or crushing force, Tensional Resistance, Resistance to flexure, Resistance to torsion, Friction of surfaces in contact.

The Intersection and Development of Surfaces, with Applications.—The Intersection of Cylinders and Cones, Plate XIV. The Delineation and Development of Helices, Screws, and Serpentines, Plate XV. Application of the helix—the construction of a staircase, Plate XVI. The intersection of surfaces—applications to stopcocks, Plate XVII. Rules and Practical Data—Steam, unity of heat, heating surface, calculation of the dimensions of boilers, dimensions of fire grates, chimneys, safety valves.

The Study and Construction of Toothed Gear.—Involute, cycloid, and epicycloid, Plates XVIII. and XIX. Involute, Fig. 1, Plate XVIII. Cycloid, Fig. 2, Plate XVIII. External epicycloid, described by a circle rolling about a fixed circle, inside it, Fig. 3, Plate XIX. Internal epicycloid, Fig. 2, Plate X X. Delineation of a rack and pinion in gear, Fig. 4, Plate XVIII. Gearing of a worm, with a worm-wheel, Figs. 5 and 6, Plate XVIII. Cylindrical or Spur Gearing, Plate XIX. Practical delineation of a couple of Spur-wheels, Plate XX. The Delineation and Construction of Wooden Patterns for Toothed Wheels, Plate XXI. Rules and Practical Data—Toothed gearing, angular and circumferential velocity of wheels, dimensions of gearing, thickness of the teeth, pitch of the teeth, dimensions of the web, number and dimensions of the arms, wooden patterns.

Continuation of the Study of Toothed Gear.—Design for a pair of bevel wheels in gear, Plat XXII. Construction of wooden patterns for a pair of bevel wheels, Plate XXIII. Involute and helical teeth, Plate XXIV. Contrivances for obtaining differential movements—The delineation of eccentrics and cams, Plate XXV. Rules and Practical Data.—Mechanical work of effect, the simple machines, center of gravity, on estimating the power of prime movers, calculation for the brake, the fall of bodies, momentum, central forces.

Elementary Principles of Shadows.—Shadows of Prisms, Pyramids and Cylinders, Plate XXVI. Principles of Shading, Plate XXVII. Continuation of the Study of Shadows, Plate XXVIII. Tuscan Order, Plate XXIX. Rules and Practical Data—Pumps, hydrostatic principles, forcing pumps, lifting and forcing pumps, the hydrostatic press, hydrostatical calculations and data, discharge of water through different orifices, gaging of a water course of uniform section and fall, velocity of the bottom of water courses, calculations of the discharge of water through rectangular orifices of narrow edges, calculation of the discharge of water through overshot outlets, to determine the width of an overshot outlet, to determine the depth of the outlet, outlet with a spout or duct.

Application of Shadows to Toothed Gear, Plate XXX. Application of Shadows to Screws, Plate XXXI. Application of Shadows to a Boiler and its Furnace, Plate XXXII. Shading in black. Shading in Colors, Plate XXXIII.

The Cutting and Shaping of Masonry, Plate XXXIV. Rules and Practical Data—Hydraulic motors, undershot water wheels, with plane floats and a circular channel, width, diameter, velocity, number, and capacity of the buckets, useful effect of the water wheel, overshot water wheels, water wheels with radical floats, water wheels with curved buckets, turbines. Remarks on Machine Tools.

The Study of Machinery and Sketching.—Various applications and combinations; The Sketching of Machinery, Plates XXXV and XXXVI. Drilling Machines; Motive Machines; Water Wheels—Construction and setting-up of water wheels, delineation of water wheels, design of a water wheel, sketch of a water wheel; Overshot Water Wheels, Water Pumps, Plate XXXVII. Steam Motors; High-pressure Expansive Steam Engine, Plates XXXVIII., XXXIX., and XL. Details of construction; Movements of the Distribution and Expansion Valves. Rules and Practical Data—Steam engines; Low-pressure condensing engines without expansion valve, diameter of piston, velocities, steam pipes and passages, air pipe and condenser, cold-water and feed pumps, high-pressure expansive engines, medium pressure condensing and expansive steam-engine, conical pendulum or centrifugal governor.

Oblique Projections.—Application of rules to the delineation of an oscillating cylinder: Plate XLI.

Parallel Perspective.—Principles and applications, Plate XLII.

True Perspective.—Elementary principles, Plate XLIII. Applications—flour mill driven by belts, Plates XLIV. and XLV. Description of the mill, representation of the mill in perspective, notes of recent improvements in flour mills, Schiele's mill, Mullin's "ring millstone," Barnett's millstone, Hastie's arrangement for driving mills, Currie's improvements in millstones. Rules and Practical Data—Work performed by various machines, flour mills, saw mills, veneer sawing machines, circular saws.

Examples of finished Drawings of Machinery.—Plate A, Balance water meter; Plate B, Engineer's shaping machine; Plates C, D, E, Express locomotive engine; Plate F, Wood planing machine; Plate G, Washing machine for piece goods; Plate H, Power loom; Plate I, Duplex steam boiler; Plate J, Direct-acting marine engines.

Drawing Instruments.

☞ The above, or any of my Books sent by mail, free of postage, at the publication price.

☞ My new Catalogue of Practical and Scientific Books, will be sent free of postage to any one who will favor me with his address.

HENRY CAREY BAIRD,
Industrial Publisher,
1s 11 406 Walnut street, Philadelphia.

Zur Beachtung für deutsche Erfinder.

Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten. —

Erkundigungen über die, zur Erlangung von Patenten nöthigen Schritte, können in deutscher Sprache schriftlich an uns gerichtet werden und Erfinder welche persönlich nach unserer Office kommen, werden von Deutschen prompt bedient werden. Man adressire

Munn & Co.,
37 Park Row, New York.

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports, etc., on the useful arts. 1 tf

CARPENTERS & BUILDERS.

SEND for Circular of Cummings & Millers' New Architectural Work in detail.
13 tf] A. J. BICKNELL, 282 River st., Troy, N. Y.

MARBLE DEALERS

J. SCHUMACHER'S Monumental work, 45 plates and 114 designs, price $10. R. E. Lauritz's work, 20 large folio plates, and 73 designs, price $10. Prang's Text Book of Alphabets, $3. Sent Post-paid, or by Express, C. O. D. A. J. BICKNELL, Troy, N. Y. 13 tf

FIRE, POWER, AND WATER-WORKS PUMPS.
The Holly Manufacturing Company, Lockport, N. Y., are now occupying their new buildings, 245 feet in length by 135 feet in width, and 4 stories in hight, and are now prepared to furnish, on call or short notice, Holly's celebrated Rotary Power Pumps, of sizes varying in capacity from 4000 to 2,000,000 gallons daily. These pumps are not surpassed by any made, both as regards efficiency and durability. Also, Holly's Turbine Water Wheels, which have given universal satisfaction wherever introduced. Send for our new and enlarged catalogue and price list.
T. T. FLAGLER, President.
J. K. McDONALD, Treasurer. 1

MANUFACTURERS TAKE NOTICE.—The undersigned will sell, or give on a Royalty, his Patent for his improved Vise. It closes at a half turn, and opens to any width. For further particulars address
I. S. RALSTON, Patentee,
Indiana Town, Indiana County, Pa.
P. S.—No. of Pat. 61,457. 13

HUTCHINSON & LAURENCE, 8 Dey st., Have on hand, and furnish to order, Steam Engines and Boilers, Circular-saw Mills, Cotton Gins, Iron & Wood-working Machinery, Shafting Belting, etc. 12 4*

PLATINUM—In ALL FORMS, for ALL purposes. Platinum scrap and ore purchased.
12 3*] H. M. RAYNOR, Office 748 Broadway, N. Y.

IMPORTANT to EVERY HOUSEKEEPER—Read advertisement, No More Poor Bread, in No. 11 Scientific American. 12 4

GRIST MILL AND FACTORY SITE near New York, for sale cheap. Address
12 3] H. D. BEACH, Tom's River, N. J.

TO STOVE FOUNDERIES — Valuable Patent for sale. Wilson's combined funnel elbow and damper. See Scientific American of March 9, 1867.
Address WILSON & WOOD,
12 tf] Wilmington, Del.

NATIONAL INVENTORS' EXCHANGE, 208 Broadway, New York.
BRANCHES THROUGHOUT THE UNITED STATES.
Send stamp for Circular. 12 2*

TAYLOR'S PATENT GROOVERS.—These groovers will cut a perfect groove, across and with the grain, ¼ to 1¼ inch wide and ¾ deep—price $35. Sold only by S. C. HILLS, 12 Platt street, N. Y., who has for sale all kinds of machinery 12 4

FOR SALE.—Foundery, Machine Shop and Planing Mill, at Waukegan, Ill., thirty-five miles north of Chicago, on the Lake Shore, with a good supply of patterns suited to the times, including patterns for four sizes Stationary Engines, Shop-right Patterns and Flasks for Leonard's Seamless Thimble Skeins, suitable Machinery for Finishing and for Sash, Blinds, and Doors, Planing and Resawing Lumber, with sufficient Power. Will be sold low to a cash customer.
Apply to the subscribers, TIFFANY & LUCAS,
12 tf] Waukegan, Ill.

HEADS AND CHARACTERS.—Hons. B. F. Wade, John B. Alley, B. F. Boyer, J. W. Patterson, J. H. Farquhar, R. B. Hayes, R. P. Buckland, Wm. Lawrence, Martin Welker, S. E. Ancona. Also, Mr. Thomas C. Durant, N. P. Willis, with Portraits, Biographies, and Characters. Indian Legends; Mental Telegraph; Woman's Rights and Woman's Wrongs; Plain Words to Big Boys: The Teacher; Hints to Travelers; Visiting the Sick; Health at Home; A Trip to Omaha; Flogging; Parental Influence; Going to Paris; Pope's Essay on Man, etc., in March number Phrenological Journal. Only 20 cents, or $2 a year. News men have it. Address
12 2] FOWLER & WELLS, 389 Broadway, N. Y.

THE "McGOWAN" AND "BUCKEYE" Double-acting Hand and Power Pumps, for railroads, factories, mills, etc. Manufactured by McGOWAN BROTHERS, 94 and 96 Elm street, Cincinnati, Ohio.
☞ Send for circular. 12 4



CHASE'S IMPROVED Dollar Microscope, illustrated full size in Scientific American, Jan. 26. Most valuable, amusing, interesting, instructive, and useful thing in the world for old and young, adapted to counterfeit money, cloth, flowers, pictures, living insects, etc., etc. Sent by mail on receipt of $1, with directions, etc. Trade supplied. Address O. N. CHASE,
9 La Grange street, Boston, or,
FOWLER & WELLS, New York.

FOREMAN WANTED—For a medium size Foundery in Massachusetts. A man of character and stability, thoroughly acquainted with his business, will find a desirable situation. Kind of castings—Machinery. Quality required—*the best*. No person connected with the "Molder's Union" need apply. Box 6029 New York Post-office. 12 2*

GUN MACHINERY.—For Sale, part or or the whole of a select lot of special machines, in perfect working order, comprising among others, Rifling Machines, Barrel Drills, Barrel Lathes, Barrel Polishing, Edging Machines, Revolving Head Lathes, etc., etc., and many valuable fixtures. Address W. NICHOLS, JR.,
12 2—N.] Box 1013, Boston, Mass.

AGENTS WANTED IN EVERY TOWN and City in the U. S., to sell my improved Pad-iron Holder, Patented Feb. 19, 1867. Can be sold in every family. Sample Boxes, containing 1 doz. Holders, sent to any address on receipt of $5. LEWIS HOVEY,
12 2*] Box 23, Chicago, Ill.

S. HEALD & SONS, Barre, Mass., build the most accurate Lever-setting Portable Circular Saw Mills. Prices low. Send for Circular. 5 8*

LE COUNT'S IMPROVED HOLLOW Lathe Dog, the lightest, strongest, neatest, and cheapest made. A set of 8 dogs, from ¾ to 2 inches, $8. 12 dogs to 4 inches, $17 50. Send for circular. The trade supplied. C. W. LE COUNT,
10 13*] South Norwalk, Conn.

A MESSIEURS LES INVENTEURS—Avis important. Les inventeurs non familiers avec la langue Anglaise, et qui préfereraient nous communiquer leurs inventions en Français peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications recived in confidence.
MUNN & CO.,
Scientific American Office, No. 37 Park Row, New York.

AMES' Celebrated Portable and Stationary STEAM ENGINES,
All Sizes, and Superior to all others. Also, PAYES' PATENT TRIP HAMMER.
Write for Circular. [11 4*] H. M. AMES, Oswego, N. Y.

500 AGENTS Wanted in a new business.
11 13* N.] H. B. SHAW, Alfred, Me.

$25 A DAY! Fifteen new articles for Agents. [11 13*N.] O. T. GAREY, Biddeford, Me.

$125 Per Month and expenses. Shaw & Clark S. M. Co., Biddeford, Me. 11 4 N.

ROLLING MILL ENGINES—WITH Sault's patent Frictionless Slide Valve, link motion reverse gear, shafting, hangers, mill gear, etc. Address
11 23* tf] M. & T. SAULT, New Haven, Conn.

PATENTEES TAKE NOTICE.
Having made large additions to our works, we can add one or two machines to our list of manufactures. The machines must be strictly first class, and well protected. BLYMYER, DAY & CO., Manufacturers of Agricultural Machines and Tools Mansfield, Ohio. 9 tf

THE CELEBRATED "SCHENCK" WOODWORTH PLANERS, WITH NEW AND IMPORTANT IMPROVEMENTS, Manufactured by the
SCHENCK MACHINE CO., MATTEAWAN, N. Y.
JOHN B. SCHENCK, President.
T. J. B. SCHENCK, Treas. 11 tf

TO SPECULATORS AND MANUFACturers of Agricultural Implements.—For Sale—The right of an improved Potato Digger. Territory to suit purchasers. N. B.—There are two very great improvements in this machine. For particulars address M. T. DRAKE, care McCullough & Kennedy, Cincinnati, O. 10 4*

ANTI-Incrustation Powder. — Prevents scale, saves cleaning, fuel, and repairs, never foams, stops leaks. H. N. WINANS, 11 Wall st., N. Y. 10 4*

1866. — TOPLIFF'S PATENT PERPETUAL LAMP WICK, received First Premium at N. Y. State Fair, and special premium, Book of Transactions. Needs no trimming. Rare inducements to Agents. Sample sent for 20 cents; two for 30 cents. MURPHY & COLE, 81 Newark ave., Jersey City. 3 tf 6

HARRISON STEAM BOILER.
NO MORE DESTRUCTION OF LIFE AND PROPERTY BY STEAM BOILER EXPLOSIONS.
GREAT REDUCTION IN PRICE.
From the rapid manner in which the HARRISON STEAM BOILER is coming into use, but little need be said of its conceded merits.
They may be summed up briefly as follows:—
Absolute safety from explosion, as it cannot be burst under any practicable steam pressure.
Less first cost.
Economy in fuel equal to the best in use.
Facility of transportation.
It occupies but about one third the ground area of ordinary boilers, with no increase in hight.
In consequence of recent improvements in its manufacture, this Boiler can be furnished to the public AT LESS COST than heretofore, and is now much the cheapest article in the market.
For Price and Circular apply to
JOSEPH HARRISON, JR.,
5 12*] Harrison Boiler Works,
Gray's Ferry Road, Philadelphia.
Branch Office, 119 Broadway, New York, Rooms 9 and 10
I. B. HYDE Agent

R. BALL & CO.,
SCHOOL STREET, WORCESTER, MASS.,
Manufacturers of Woodworth's, Daniell's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood.
Send for our Illustrated Catalogue. 1 25*

WOOD, LIGHT & CO.—MANUFACturers of Machinists' Tools and Naysmyth Hammers, Lathes from 4 to 30 feet long, and from 15 to 100 inches swing. Planers from 24 to 60 inches wide and from 4 to 46 feet long. Upright Drills. Milling and Index Milling Machines. Profile or Edging Machines. Gun Barrel Machines Shafting, Mill Gearing, Pulleys and Hangers, with Patent Self-oiling Boxes.
Works, Junction Shop, Worcester, Mass.
Warehouse at 107 Liberty street, New York. 10 tf

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address
J. C. HOADLEY & Co., Lawrence, Mass. 1 tf

SPOKE AND HANDLE MACHINE.—For turning Spokes, Yankee Ax, Plow, Pick, Adze, and Hammer Handles, Whiffletrees, and irregular forms generally. Capacity 180 Spokes and 200 Hammer Handles per hour. For cut and description, address the Subscriber, Manufacturer and Patentee, at Warren, Trumbull county, Ohio. [7 10*] E. R. WISELL.

RICHARDSON, MERIAM & CO.,
Manufacturers and Dealers in
DANIELS'S AND WOODWORTH PLANERS,
Boring, Matching, Molding, Mortising and Tenoning Machines, Scroll, Cut-off, and Slitting Saws, Saw Mills, Saw Arbors, Spoke and Wood-turning Lathes, and other wood-working Machinery. Warehouse, 107 Liberty street, New York. Manufactory, Worcester, Mass. 10 tf

THE EUROPEAN INVENTOR'S AGENCY CO., 96, Newgate street, London, E. C.
MR. T. BROWN, C. E., Manager.
This Company undertake the purchase, sale, or licensing of Patents in any part of the World, on Commission only.
No business as Agents for procuring Letters Patent undertaken.
Information for Inventors or Owners of Patents, or for those desirous of purchasing Patents, will be freely given.
The Offices of the Company are at the disposal of Inventors and those interested in Inventions; also, for the convenience of those having no London address their letters can be addressed to the offices.
Further particulars on application. 1 13*

MILL-STONE DRESSING DIAMONDS Set in Patent Protector and Guide. Sold by JOHN DICKINSON, Patentee and Sole Manufacturer, and Importer of Diamonds for all mechanical purposes; also, Manufacturer of GLAZIERS' DIAMONDS, No. 64 Nassau street, New York City. Old diamonds reset. N. B.—Send postage stamp for descriptive circular of the Dresser. 9 12*

PATENT SHINGLE, STAVE, AND Barrel Machinery, Comprising Shingle Mills, Heading Mills, Stave Cutters, Stave Jointers, Shingle and Heading Jointers, Heading Rounders and Planers, Equalizing and Cut-off Saws. Send for Illustrated List.
FULLER & FORD,
9 8* tf—C.] 282 and 284 Madison street, Chicago, Ill

HYDRAULIC JACKS and HYDRAULIC Punches manufactured by E. LYON, 470 Grand street. Send for a Circular. 1 13* eow

WOODWORTH PLANERS—IRON Frames 18 to 24 inches wide. $125 to $150. H. F. Bachelier, Sterling, Ill., says:—"The planer gives perfect satisfaction. I am surprised that so perfect a machine can be sold at that price." Address
S. C. HILLS, 12 Platt street, New York.

CASTINGS.—THE UNDERSIGNED are now prepared to do every variety of Brass and Composition Castings. HAYDEN, GERE & CO.,
3 12* 84 Beekman street.

HAYDEN, GERE & CO., 84 BEEKMAN street, New York, manufacture every variety of Brass Work for steam, water and gas.
Globe Valves, Steam, Gage and Air Cocks, Whistles, Oil Cups, Water Gages, Plain Bibbs, Stops, Hose Pipes, Couplings, etc.
Address as above for price lists. Illustrated catalogue furnished to customers. 3 12*

PORTABLE AND STATIONARY Steam Engines and Boilers, Circular Saw Mills, Mill Work, Cotton Gins and Cotton Gin Materials, manufactured by the ALBERTSON & DOUGLASS MACHINE CO., New London, Conn. 6 8* tf

GOULD MACHINE COMPANY, Of Newark, N. J., and 102 Liberty street, New York.
IRON AND WOOD-WORKING MACHINERY, STEAM ENGINES, BOILERS, SAW MILLS, ETC. 1 tf

FOR ENGINE BUILDERS' AND STEAM Fitters' Brass Work, address
F. LUNKENHEIMER,
10 26*] Cincinnati Brass Works.

SPOKE-LATHES, TENONING AND Spoke-Polishing Machinery of approved Patterns manufactured by J. GLEASON,
10 10*] 1060 Germantown Avenue, Philadelphia, Pa.

TO THE CONSUMERS OF LUBRICATING OILS.
THE LESTER OIL MANUFACTURING COMPANY
Is now offering for sale an oil for lubricating purposes which is superior to any other oil in use for either light or heavy machinery.
This oil is fluid at a temperature far below that at which sperm or lard oils chill.
It does not gum, but dissolves what has been before deposited from other oils.
It is manufactured for this company at Peter Cooper's factory, Williamsburgh, L. I., and is for sale by
BENJ. COLLINS,
Agent for the Company,
43 Broad street, New York.
Samples furnished upon application as above. 10 4*

NITRO-GLYCERIN.—UNITED STATES BLASTING OIL CO.—We are now prepared to fill all orders for Nitro-Glycerin, and respectfully invite the attention of Contractors, Miners and Quarrymen to the immense economy in the use of the same. Address orders to
JAMES DEVEAU, Sec.,
2 52*] 32 Pine street, New York

AIR SPRING FORGE HAMMERS ARE made by CHAS. MERRILL & SONS, 556 Grand street, New York. They will do more and better work, with less power and repairs, than any other Hammer. Send for a circular. 4 tf

ANDREWS'S PATENT PUMPS, ENGINES, etc.—
CENTRIFUGAL PUMPS, from 90 Gals. to 40,000 Gals. per minute, capacity.
OSCILLATING ENGINES (Double and Single), from 2 to 250 horse-power.
TUBULAR BOILERS, from 2 to 50 horse-power, consume all smoke.
STEAM HOISTERS to raise from ½ to 6 tuns.
PORTABLE ENGINES, 2 to 20 horse-power.
These machines are all first-class, and are unsurpassed for compactness, simplicity, durability, and economy of working. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO.,
1 tf No. 414 Water street N. Y

WHEELER & WILSON, 625 BROADway, N. Y.—Lock-stitch Sewing Machine and Buttonhole do. 1t

FIRST-CLASS MACHINISTS' TOOLS.
PRATT, WHITNEY & CO.,
Flower street, Hartford, Conn.,
Manufacturers of Engine Lathes, (15) fifteen inches to (8) eight ft. swing; Power Planers, (16) sixteen inches to (5) five feet wide, and of any length desired, and special machinery. Also only makers of Engine Lathes with Slate's Patent Taper Attachment, conceded by all who have used it to be most perfect and simple in its construction and almost indispensable for good workmanship.
For a circular and price list address as above. 3 26*

FOR HYDRAULIC PRESSES, HYdraulic Pumps, Steam Heaters, and all kinds of Linseed Oil Machinery, address
8 6*] McGREGOR & CALLAHAN, Dayton, Ohio.

T. F. RANDOLPH & BRO.,
—MODEL MAKERS,—
7 8*] 67 West 6th st., Cincinnati, Ohio.

SHAW & JUSTICE'S POWER HAMMER is Moderate in Price, is driven with one-tenth the power used by other Hammers, and will not cost the one-hundredth part of what is usually spent in repairs. Its power is far in excess of any Hammer known. Manufactured by PHILIP S. JUSTICE,
14 North 5th street, Phila., and 42 Cliff-st., New York.
Shops 17th and Coates-sts., Philadelphia. 8 8* tf

JUST PUBLISHED—THE INVENTOR'S and MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO., 37 Park Row, N. Y.

PATENT POWER AND FOOT-PUNCHING PRESSES, the best in market, manufactured by N. C. STILES & CO., West Meriden, Conn. Cutting and Stamping Dies made to order. Send for Circulars. [1 13* tf

PATENTED JAN. 1, 1867.—GRAY'S Wear Plates for the Soles and Heels of Boots and Shoes. State and County Rights for sale. A model heel, with wear plate inserted, sent to any address on receipt of 75c. Address John Gray, Box 58, East Aurora, N. Y. 10 4*

MODELS, PATTERNS, EXPERIMENTAL and other Machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos. 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN Office. 1 tf

MASON'S PATENT FRICTION CLUTCHES, for starting Machinery, especially Heavy Machinery, without sudden shock or jar, are manufactured by VOLNEY W. MASON,
1 13* tf] Providence, R. I.

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

WROUGHT-IRON WELDED TUBE of all sizes, for Steam, Gas, or Water purposes. Brass work and Iron Fittings of every kind to suit the same; also, PEACE'S Improved Gas-Pipe Screwing and Cutting off Machines, for both Hand and Steam power, to screw and cut off from ⅜ to 4-in. pipe, and all other tools used by Steam and Gas-Fitters. Manufactured and for sale by CAMDEN TUBE WORKS, Second and Stevens streets, Camden, N. J. 9 13*

STEAM ENGINES—OF ANY POWER desired for manufactories, of superior construction, with patent frictionless slide valve and variable expansion. Address M. & T. SAULT, New Haven, Conn. 11 23*tf

VAN DE WATER CELEBRATED WATER WHEEL.—For Sale at the Eagle Iron Works, Buffalo, N. Y. [5 11*] DUNBAR & HOWELL.

LATHE CHUCKS—HORTON'S PATENT—from 4 to 24 inches. Manufacturer's address, E. HORTON & SON, Windsor Locks, Conn. 5 25*.

ERICSSON CALORIC ENGINES OF GREATLY IMPROVED CONSTRUCTION.—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton Gins' Air Pumps, Shafting, Pulleys, Gearing Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON,
1 tf—D] 164 Duane street, cor. Hudson, New York.

$200 A MONTH IS BEING MADE with our IMPROVED STENCIL DIES, by Ladies and Gentlemen. Send for our free Catalogue containing Samples and Prices. Address
1 15*tf—R.] S. M. SPENCER & CO., Brattleboro, Vt.

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, N. Y. 1 tf

WOOD & MANN STEAM ENGINE CO.'S CELEBRATED PORTABLE AND STATIONARY STEAM ENGINES AND BOILERS, from 4 to 35 horse-power. Also, PORTABLE SAW MILLS.
We have the oldest, largest, and most complete works in the United States, devoted exclusively to the manufacture of Portable Engines and Saw Mills, which, for simplicity, compactness, power, and economy of fuel, are conceded by experts to be superior to any ever offered to the public.
The great amount of boiler room, fire surface, and cylinder area, which we give to the rated horse-power, make our Engines the most powerful and cheapest in use; and they are adapted to every purpose where power is required.
All sizes constantly on hand, or furnished on short notice. Descriptive circulars, with price list, sent on application. WOOD & MANN STEAM ENGINE CO.
Utica, N. Y. Branch office 96 Malden Lane N. Y. City.
1 32*

STATIONARY ENGINES
Built under the
BABCOCK & WILCOX PATENTS.
An entirely novel arrangement of valve gear, guaranteed to give a more regular speed, and to consume less fuel per horse-power than any engine in use Call or send for a circular.
HOWARD ROGERS,
1 20*] 50 Vesey street, New York.

MATCHES.—FOR SALE—A set of machines for the Manufacture of the Square Match, with frames, slats, and tools complete, for sale at a low price. THOMAS ALLEN,
11 4*] 321 Olive street, St. Louis, Mo.

BARNES' Patent SHINGLE MACHINE.—State and county Rights of this unsurpassed machine for sale. It will cut shingles, box stuff, veneering, staves, laths, etc., more rapidly than any other machine, with less power, and can be changed from one to the other instantly. Address H. D. BARNES,
11 4*] Fair Haven, Conn., for machines or information

SPICE CAN and BLACKING-BOX Makers will find it to their interest to use Painter's Patent Method of Fastening without Solder, a neat and secure joint being expeditiously made from the tin at a fraction of the cost of soldering. Thirty machines in use by leading manufacturers. Full particulars, references, and samples furnished by the proprietors,
WM. PAINTER & CO.,
10 4] 45 Holliday street, Baltimore, Md.

—MACHINERY.—
FOR SALE—Six Double Engines, Boilers etc., 30-H. P., made in England, first-class work, complete and new. Will be sold at much less than cost.
10 4*] OBER NANSON & CO., 43 Broad street.

SHEET AND ROLL BRASS.
German Silver, Brass, and Copper Wire, etc. Especial attention to particular sizes and widths for Machinists and Type Founders.
Manufactured by the THOMAS MANUFACTURING COMPANY, Thomaston, Conn. 1 24*

TAYLOR, BROTHERS & CO.'S BEST YORKSHIRE IRON.—This Iron is of a Superior Quality or locomotive and gun parts, cotton and other machinery, and is capable of receiving the highest finish. A good assortment of bars in stock and for sale by JOHN B. TAFT, sole agent for the United States and Canadas. No. 18 Batterymarch-st., Boston. 1 40*—R.

THE BEST POWER HAMMER MADE is the Dead Stroke Hammer of Shaw & Justice. Sizes suited for manufacturing awl blades or engine shafts; consume but little space, and require but little power. Manufactured by PHILIP S. JUSTICE,
14 North 5th street, Phila., and 42 Cliff-st., New York.
Shops 17th and Coates-sts., Philadelphia. 8 8* tf

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven, Ct. 1 tf

CAN I OBTAIN A PATENT?—For Advice and instructions address MUNN & CO., 37 Park Row, New York for TWENTY YEARS Attorneys for American and Foreign Patents. Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN $3 a year; 30,000 Patent cases have been prepared by M. & Co.

MANUFACTURERS of Agricultural Implements, and machinery generally, please send address, descriptive, and price lists to M. L. Parry, Agricultural Implement Warehouse and Machine Depot Agency, Galveston, Texas, for circulars. Refers to any of the old merchants of Galveston and Houston. M. L. PARRY, 10 4*

IMPORTANT.
A MOST VALUABLE MACHINE for all kinds of irregular and straight work in wood, called the Variety Molding and Planing Machine, indispensable to competition in all branches of wood-working. Our improved guards make it safe to operate. Combination collars for cutters, saving 100 per cent, and feed table and connection, for waved moldings and planing, place it above all others. Evidence of the superiority of these machines is the large numbers we sell, in the different states, and parties laying aside others and purchasing ours, for cutting and shaping irregular forms, sash work, etc.
We hear there are manufacturers infringing on some one or more of our nine patents in this machine. We caution the public from purchasing such.
All communications must be addressed "Combination Molding and Planing Machine Company, cor. 1st ave. and 24th-st., New York, where all our machines are manufactured, tested before delivery, and warranted.
Send for descriptive pamphlet. Agents solicited. [1 13*tf

OIL! OIL!! OIL!!!
For Railroads, Steamers, and for machinery and Burning, PEASE'S Improved Engine Signal, and Car Oils, indorsed and recommended by the highest authority in the United States and Europe. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American", after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No 51 and 53 Main street, Buffalo N. Y.
N. B.—Reliable orders filled for and part of the world
1 tf

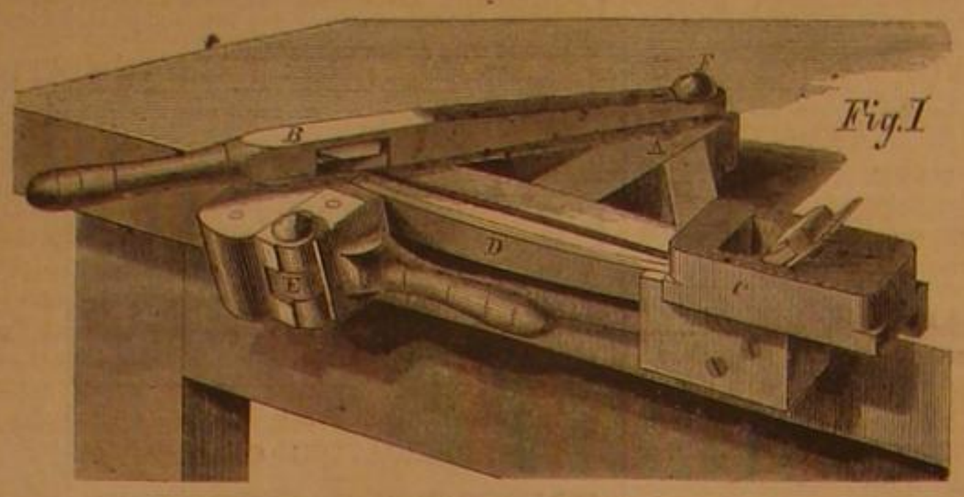
Improved Hand Stave Jointer.

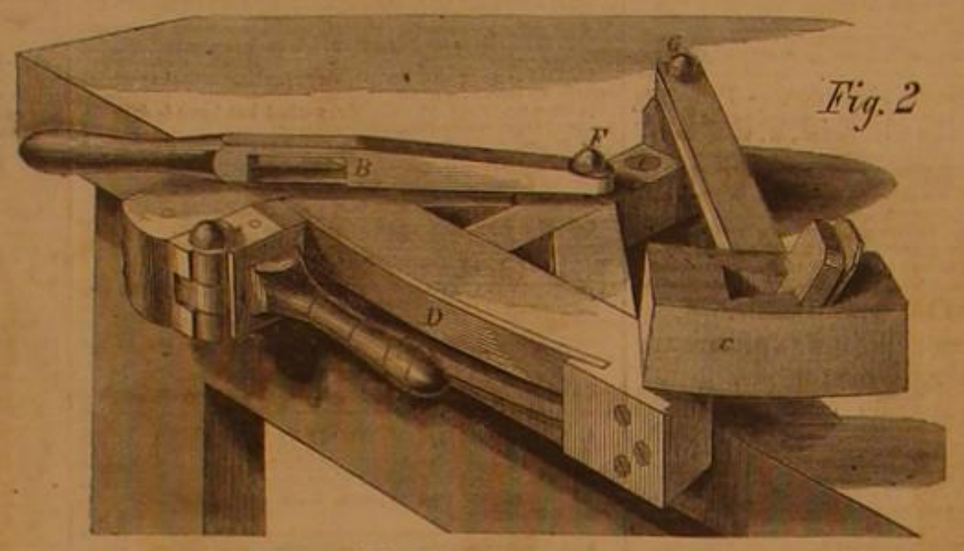
The advantages of a hand implement for the jointing of barrel staves will be conceded by coopers, who, not possessing steam or water power with the necessary machinery, are compelled to the tedious and laborious process ordinarily employed.

The engravings represent two forms of a device for this work which are the subjects of two patents, issued Aug. 21 1866 and Jan. 29, 1867. The machine, when in use, is secured on a bench by the screw, A. The working parts consist of a knife, B, and plane, C, as seen in the engravings. In Fig. 1, the plane is guided straight across by means of a rabbet, cut in the front piece of the frame, in which the plane runs by means of a projection on the inner edge of its bottom. The front of this frame is curved both longitudinally and transversely to conform to the bilge and lengthwise curve of the cask. At one end a recess receives the end of the stave, D, the other end of which is secured by the rule-joint holdfast, E. The knife, B, being pivoted at F, is swung across the stave from end to end, and is sufficient, without the plane, to produce a joint close enough for dry materials, while the plane will insure a perfect water-tight joint.

The inventor considers the machine represented in Fig. 2 as in some respects an improvement on that shown in Fig. 1, inasmuch as the joint produced is of the same relative bevel from end to end as the plane, being pivoted at G, the plane iron presents itself at all points at the same angle to the stave.

The efficiency of this contrivance is too apparent not to be seen, and its simplicity of construction and ease of operation are sufficient recomendations for its adoption. Rights for territory, etc., can be obtained by addressing the patentee, James F. Sayer, Pope's Mill, St. Lawrence Co., N. Y.





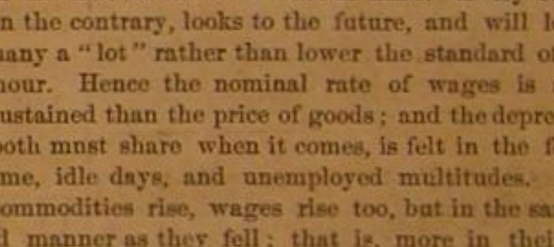
SAYER'S HAND-STAVE JOINTER.

The Sun's Spots—A Discovery.

The astronomers of Kew Observatory have been engaged in observing and comparing with great nicety, from time to time, the spots on the sun, with a view to discovering some cause with which their changes may be connected. They have found that the expansion and contraction of the spots proceed at a regular rate according to their varying position in the apparent disk; the spots increasing invariably from left to right, and attaining their maximum at intervals of about nineteen or twenty months. The revolutions of the planet Venus, which proceed in like manner from left to right and occupy also about twenty months, were next compared with the changes in the spots and were found to correspond. The area of spots exposed to view toward the earth was found to be uniformly greatest when Venus was on the opposite side of the sun, and least when the observed side was exposed most directly to her influence. Jupiter also, from its great mass, exercises an influence upon the spots, although from its distance it is not predominating. When Jupiter and Venus were both in opposition to the earth, the spots were much more enlarged than when Venus was in opposition and Jupiter in conjunction with the earth. The nature of the influence evidently exerted, is thought to be suggested perhaps in an opinion expressed by Prof. Tate, "that the properties of a body, especially those with respect to heat and light, may be influenced by the neighborhood of a large body;" and an influence of this kind would naturally be most powerful upon a body possessed of a very high temperature, like the sun: a very small increment of heat causing a mass of liquid to assume a gaseous form, and *vice versa*. So that the heat withdrawn by Jupiter and Venus from the side exposed toward them, might be sufficient to cause a copious condensation of gases which might have a visible effect directly, or produce mechanical changes by means of altered reflection varying the distribution of a great amount of heat. This conjectural explanation must be held subject to the results of a more extended comparison of facts.

A SUPERIOR CAP FOR MUCILAGE BOTTLES.

It is within our recollection when for ordinary pasting purthe material must be home-made and the vessel containing it, any ordinary utensil. But mucilage has come into such general use that even so simple a thing as the bottle containing it and the appurtenances for using it are important. The cap represented in the engraving appears to be superior to any other we have seen, being free from the excessive friction of



those which admit the handle through a threaded hole, and the cutting and scraping action of those made from thin metal, having a sharp edged hole. In this the hole is made by cutting radial slits, the metal between them being bent downward and acting as a spring against the brush handle. It is tenacious enough to hold the brush in place, but yielding enough to allow it to be elevated or depressed as required. Its advantages are obvious.

This cap was patented Oct. 2d., 1866 by T. N. Hickcox, and is manufactured and sold by Messrs. T. N. Hickcox & Co., 280 Pearl street, New York.

Prices and Wages.

Labor (says Walker) does not rise in price equally with commodities, because for the latter there is both an actual and a speculative demand, while for the former there can be only the actual present demand. If this be true, it is not subject, on the other hand, to the glut and depreciation produced by speculative accumulation, to the same extent as commodities. But in an indirect manner, a speculative demand for labor is produced by the speculative demand for goods or the products of labor, and again, when demand and prices fall below par from speculative accumulation of goods, operatives are discharged or their time and wages reduced to correspond. The main difference, after all, between the fluctuations of labor and commodities, is that the former take a less obvious form. The seller of goods (after the manufacturer) has no care but to get as much as he can for the lot in hand. Every seller of labor, on the contrary, looks to the future, and will lose entirely many a "lot" rather than lower the standard of value for an hour. Hence the nominal rate of wages is always better sustained than the price of goods; and the depreciation which both must share when it comes, is felt in the form of short time, idle days, and unemployed multitudes. Again, when commodities rise, wages rise too, but in the same unobserved manner as they fell; that is, more in their bulk than their rate. The unemployed hands are filled, and the laboring class is benefited collectively by the larger distribution of wages which are quoted no higher than before.

Advertisements.

A limited number of advertisements will be admitted in this page on the following terms:—Seventy-five cents a line, each insertion, for solid matter; one dollar a line for space occupied by engravings.



BLANDYS' PORTABLE STEAM ENGINES AND SAW MILLS.
The best in the World. Will saw from 6,000 to 15,000 feet per day. For illustrated circulars, with descriptions, prices, and reports of operators, address the manufacturers. H. & F. BLANDY, Zanesville, O.
11 os ow 3]

BEET SUGAR MAKING.—AN EXPERience of twenty-five years as makers of the most improved cane sugar machinery and refining machinery, as well as the possession of complete drawings of the MOST SUCCESSFUL EUROPEAN BEET-SUGAR FACTORIES, with details of the machinery and processes employed, enable the undersigned to give correct estimates and to execute orders for such work with fidelity and promptness. MERRICK & SONS,
13 los 3t] Southwark Foundery, Philadelphia.

TINSMITH'S POCKET CARDS—CONtain 90 patterns; table of circumference. Price 50 cts.
10os] ROLLIN A. SMITH, Fond du Lac, Wis.

ZIMMERMAN'S PATENT STEAM COOKING APPARATUS.
For cooking all kinds of vegetables and meats at one time and together, without flavoring each other in the least. All offensive odors done away. Saves labor, fuel, and time. Dinner can be cooked over one stove hole. Fit any kind of stove. Several sizes; within reach of all. Soup can be made in lower receptacle, vegetables and meat cooked in center, and puddings steamed on top, at one time. Seeing is believing.
No patent ever issued has met with a greater success in the same period—300 steamers sold in this city in six weeks; none returned. Fifteen States sold in same time.
We offer Massachusetts, Connecticut, Rhode Island, New York State, western half of Michigan, and Illinois without Cook county.
Large profits in their manufacture and sale.
Send for illustrated circulars to
S. W. JOHNSON & CO.,
Detroit, Mich.
Full description and cut appeared some months ago in Scientific American. 13 30s

LUMBER can be Seasoned in from Two to Four Days, by Bulkley's Patent, at an average cost of $1 per M. For circulars, with information, address, C. H. BULKLEY, No. 2 Case Building, Cleveland, O. 11 30s*]

EUROPEAN AGENCY for the Exhibition and Sale of American Patents and Manufactures.
BLANCHARD & McKEAN,
No. 61 Boulevard de Sebastopol, Paris, France.
089. A. BLANCHARD.] 10 os13* [J. A. McKEAN.

CIRCULAR SAWS,



WITH
EMERSON'S PATENT MOVABLE TEETH.
These Saws cut More and Better Lumber in the same time, and with Less Power, than any other Saw in the world, with Less Expenditure of Labor and Files to keep in order, and never Wear Smaller. Also,
EMERSON'S PATENT GAUGING AND SHARPENING SWAGE,
For Spreading the Points of Saw Teeth. Send for Descriptive Pamphlet, with New Price List.
AMERICAN SAW COMPANY,
2 Jacob street, near Ferry street, New York.

TINNERS' MACHINES AND DRILL Stocks. For the best in the world. Address
6 8*] A. W. WHITNEY, Woodstock, Vermont.

ASAHEL DAVIS, Manufacturer of PLAIN AND FANCY BOXES.
Also, Exclusive Maker of A. & A. Davis' Patent Dovetailing Machines. Post-office Box 509, Lowell, Mass. 11 os5*

PATTERN LETTERS To put on Patterns, for castings. KNIGHT BROS., Seneca Falls, N. Y. 12 6*

MACHINERY.—
We are prepared to furnish
FIRST-CLASS MACHINISTS' TOOLS OF EVERY DESCRIPTION, ON SHORT NOTICE AND REASONABLE PRICES.
SAMPLES of the TOOLS manufactured by us may be seen at our Warerooms, and we invite an inspection of their Workmanship and Design by those in want of superior Machinery.
NEW YORK STEAM-ENGINE CO.
Office and Warerooms
7 os 13* 221 Pearl street, New York.

TURBINE WATER WHEELS.



The REYNOLDS PATENT embodies the progressive spirit of the age. Simplicity, Economy, Durability, Accessibility all combined. The only Turbine that excels Overshots. Awarded the Gold Medal by American Institute.
Shafting, Gearing and Pulleys furnished for all kinds of Mills, made on Mechanical Principles, under my personal supervision, having had long experience. Circulars sent free.
GEORGE TALLCOT,
4 os 13* tu—H] No. 96 LIBERTY STREET, NEW YORK.

[Certificate.]
JOHN McDUFFIE, Esq., Long Eddy, Sullivan County, N. Y., having one of the largest Circular Saw Mills in the country, driven by one of our Turbines, in letter Feb. 21, 1867, says: "Your wheel comes fully up to our most sanguine expectations. It now works most *beautifully, smoothly, and steadily*. I feel proud of our wheel, and candidly believe that it is superior for a greater amount of work, less liable to get out of repair, and takes less water to run it, according to its size and power, than any other Water Wheel in the world.
(Signed) [12 os2—H.] JOHN McDUFFIE.

DRAWING INSTRUMENTS
OF EVERY DESCRIPTION—
Swiss, German Silver, and French
TRANSITS, LEVELS, SURVEYOR'S COMPASSES, etc.,
DRAWING PAPER, WATER COLORS, etc.,
And all supplies for Engineers, Architects, and Machinists.
Sets of Instruments furnished for schools, and cases made to order. A Priced and Illustrated Catalogue sent free by mail on application.
WILLIAM Y. McALLISTER,
8* os] 728 Chestnut street, Philadelphia, Pa.

PATENT CLAIMS.—Persons desiring the claim of any invention, patented within thirty years, can obtain a copy by addressing a note to this office, giving name of patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO. Patent Solicitors, No. 37 Park Row, New York

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of their funds.

CITY SUBSCRIBERS.—The SCIENTIFIC AMERICAN will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

Disclaimers.—Where, by inadvertence, accident, or mistake, the original patent is too broad, a Disclaimer may be filed either by the original patentee, or by any of his assignees.

SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVI.—No. 14. [NEW SERIES.] NEW YORK, APRIL 6, 1867. $3 per Annum. [IN ADVANCE.]

Improved Screw and Stud Machinery.

Want of uniformity in the screws used in connecting parts of machinery is a source of trouble and expense both to the manufacturer and operator, so that in many cases what was at first supposed to be the cheapest article becomes in the end the most expensive. The difficulty in producing studs and screws of various kinds perfectly uniform and interchangeable, has been principally owing to the imperfect machinery used; imperfect not only in workmanship but in construction, and especially wanting in devices to compensate for the wear which will unavoidably take place in the running parts. To furnish machinists and others requiring a variety of screws with a tool that will make them rapidly and accurately has been the aim of the machines engraved in our present number.

Fig. 1.

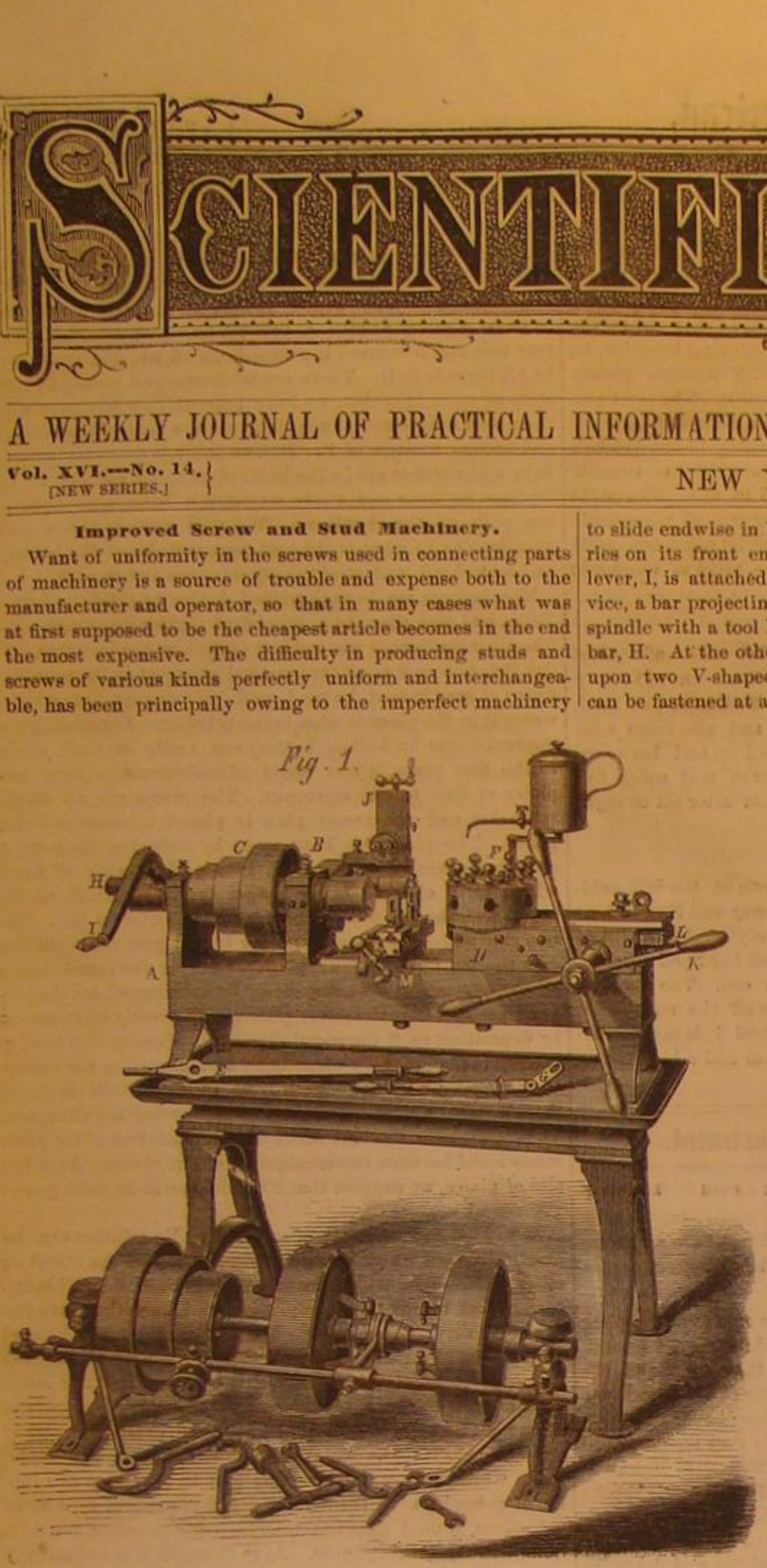


Fig. 2.

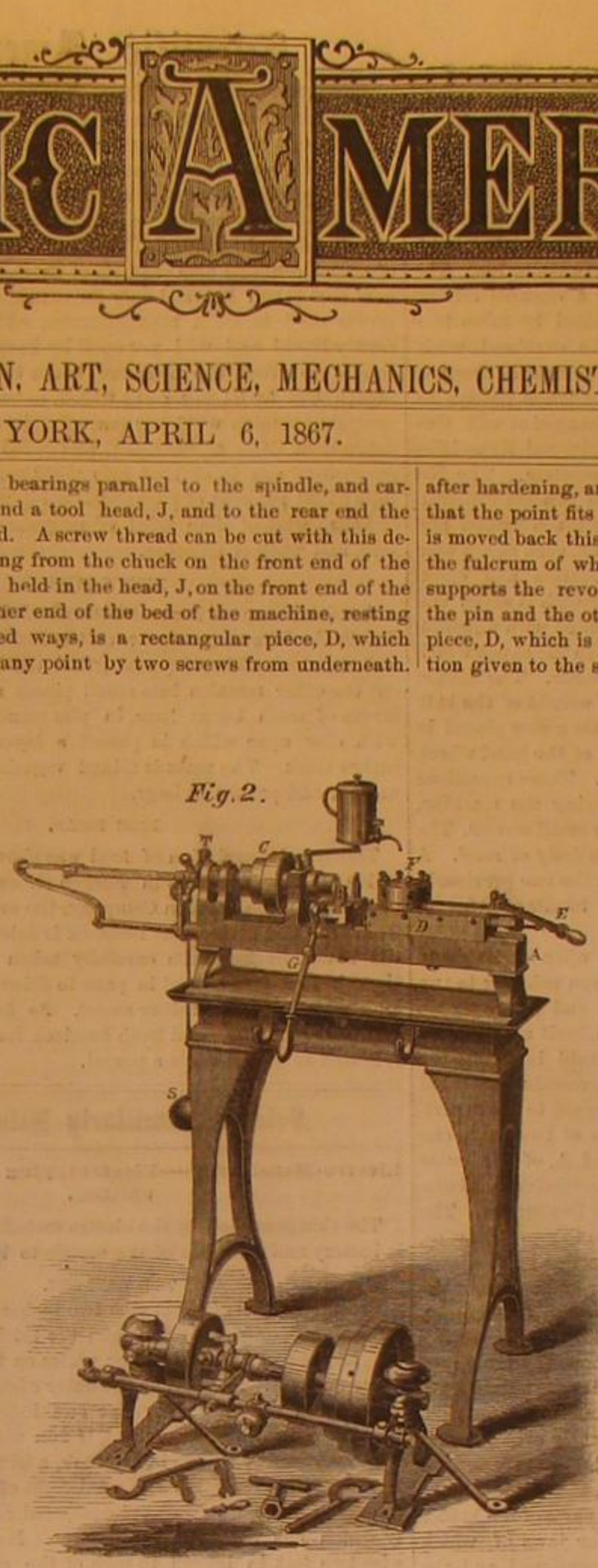
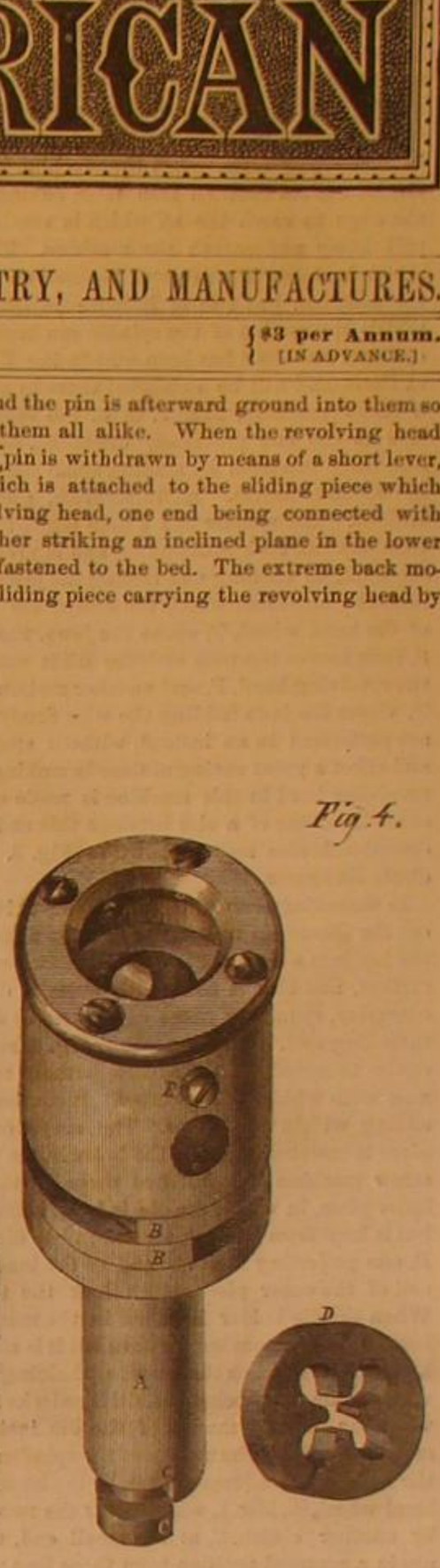


Fig. 4.



J. R. BROWN & SHARPE'S SCREW AND STUD MACHINERY.

The annexed engraving, Fig. 1, represents a machine suitable for making from bar iron all kinds of screws and studs ordinarily used in a machine shop, and at less than half of the usual cost for labor. It is styled the "No. 1 Screw Machine." Nuts can be drilled, tapped and one side faced up, and many small parts of sewing machines, cotton machines, gas, and steam fittings made on this machine, with a great saving of time and labor.

The bed, A, which is of cast iron is very heavy, and has at one end two uprights cast solid with it containing bronze boxes to support the spindle. The front box, B, is made in four parts that it may be closed up to compensate for wear, the two middle pieces being forced in horizontally toward the center of the spindle by the screws on each side of the box. The spindle is of steel and has only one flange or collar, which is outside of the front box. Between this flange and the end of the box is a hardened steel washer. The cone pulley, C, is kept from turning on the spindle by a spline. Back of the pulley is a nut by which it can be forced forward and its hub kept up to the rear end of the front box. By these devices the front journal can readily be kept tight though considerable wear should take place. Should the spindle heat by continued use it will not bind endwise nor will its expansion lengthwise affect the accuracy of the work done on the machine. The spindle is hollow, the hole being one and a quarter inches diameter, and has on the front end a steel chuck with screws and jaws for adjusting and holding the iron bar or wire from which the screws are made. On the rear end of the spindle is a leading screw and in the hand lever, I, a section of a nut, which fits into this screw. The bar, H, is fitted to slide endwise in bearings parallel to the spindle, and carries on its front end a tool head, J, and to the rear end the lever, I, is attached. A screw thread can be cut with this device, a bar projecting from the chuck on the front end of the spindle with a tool held in the head, J, on the front end of the bar, H. At the other end of the bed of the machine, resting upon two V-shaped ways, is a rectangular piece, D, which can be fastened at any point by two screws from underneath. Upon and attached to this is another piece, which is fitted to slide in a direction parallel to the bed, and is moved by the hand wheel, K, connecting by means of a pinion and rack, or, for light work, by the hand lever, E, substituted for the hand wheel, K. On the end of this sliding piece nearest the spindle, a round head, F, is so arranged as to revolve horizontally. In the edge of this head are seven holes which serve to hold the mills, cutters, and dies used in making screws. The head is held very firmly in its place, while the cutters are operating by a steel pin which comes up through the piece on which the revolving head rests, at the point nearest the line of the spindle. This pin is hardened and slides through a hardened steel bushing, and the upper end, which is tapered, enters into hardened bushings in the bottom of the revolving head. These steel bushings are ground inside and out after hardening, and the pin is afterward ground into them so that the point fits them all alike. When the revolving head is moved back this pin is withdrawn by means of a short lever, the fulcrum of which is attached to the sliding piece which supports the revolving head, one end being connected with the pin and the other striking an inclined plane in the lower piece, D, which is fastened to the bed. The extreme back motion given to the sliding piece carrying the revolving head by the hand wheel, K, brings a star wheel on the under side or the revolving head in contact with a dog projecting upward from the lower piece, D, which causes the head to revolve far enough to bring the next tool in a position ready to operate on the screw. When the revolving head is brought forward, the star wheel slips over the dog and the pin enters the hole in the head, being forced up by a spring acting on the rear end of the short lever, after which the tool commences to operate.

Fig. 3

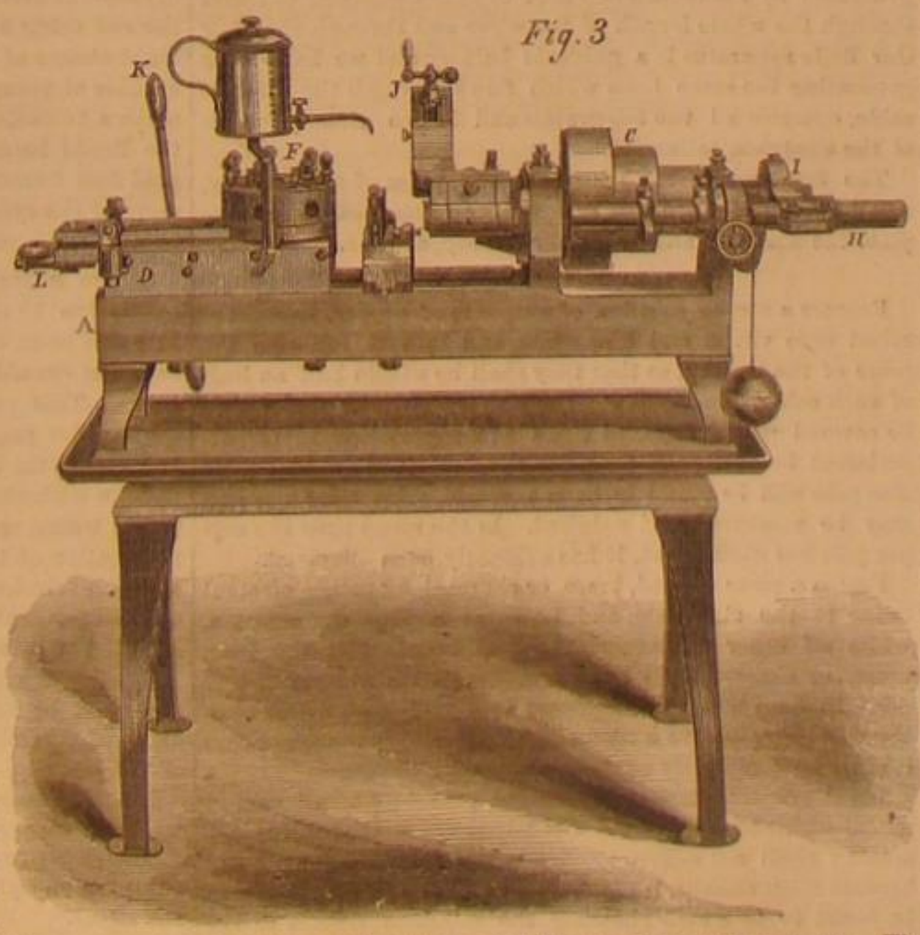
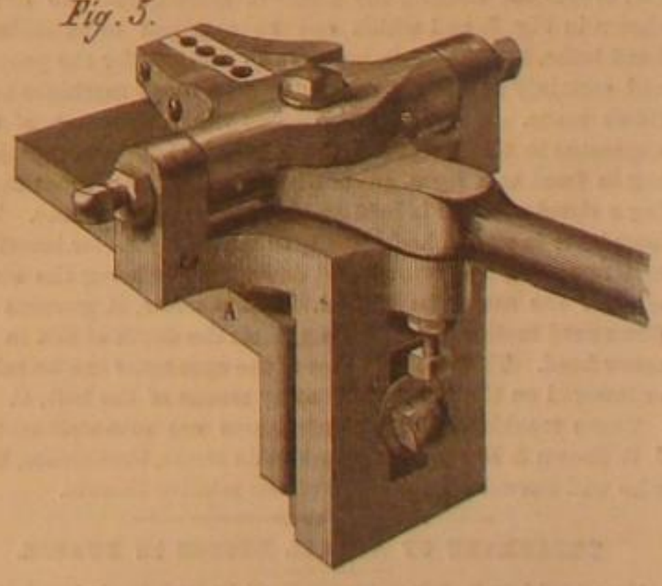


Fig. 5.



There is an arrangement whereby any wear in the center hole of the revolving head can be compensated for, and there are two gibs, one on each side of the sliding piece, carrying the revolving head, to adjust its position or to close up for wear. At the outer end of the sliding piece, projecting underneath it, is a screw, L, which can be set to limit its motion. The tools in the revolving head are each held by two screws, by which they can be adjusted as required for the different cuts on the work. Shoes are inserted underneath these screws to prevent the tools they hold from being injured. Between the spindle and revolving head, and attached to the bed is a slide rest operated by a crank, M, attached to a screw or for light work, by the hand lever, G. It has two steel posts, one at the back sliding in a groove parallel with the ways of the machine, and one in front sliding in either one of two grooves, side by side, but which are at right angles with the one at the back end. Both of these tool posts can be raised or low

ered to adjust the tools. The bottom piece of this rest is planed on the ways of the bed, and can be moved upon them to any position required. The tools in this rest may be used for cutting off, pointing, or grooving, and their movements may be limited by set nuts upon a screw underneath the rest. Oil is supplied from the can placed above the revolving head, to the cutting tools, when the machine is in operation. The machine is set upon an iron table having a channel around the edge to catch the oil which is conducted by tubes to a pail hung underneath the machine. The overhead work, which is shown in a reversed position on the floor in front of the machine, has two of Brown's patent friction pulleys by which the motion of the spindle can be changed at will. One of these machines has been sent to the Universal Exposition at Paris, and will be exhibited there in operation. The No. 4 screw machine, Fig. 2, is of the same general construction as the one previously described, but much lighter and especially intended for making small screws, such as are used by sewing-machine manufacturers, gunsmiths and clock-makers. The spindle has a hole bored through it seven sixteenths of an inch in diameter, and is provided with a patented device for opening and closing the jaws in the chuck which hold the wire from which the screws are made. The motion of the hand wheel, T, opens the jaws, the weight of the ball S, then moves the wire endwise till it meets a stop placed in the revolving head, F, and another motion of the hand wheel, T, closes the jaws holding the wire firmly. These operations are performed in an instant, without stopping the machine, and effect a great saving of time in making small screws. The revolving head in this machine is made entirely of steel. A screw machine of a size between this and the one previously described is also made; shown in Fig. 3. Similar letters indicate like parts.

In threading screws and in tapping it is often desirable to cut the thread up to a shoulder or to a given point, or to run the tap into a shoulder or a given distance and positively no further, and this is necessarily quite a difficult and delicate operation, requiring great expertness to avoid breaking the threading tool. The engraving, Fig. 4, represents a patented device to remedy this difficulty, without regard to the expertness with which it is operated. It consists of two parts, one sliding within the other. The small end, A, of the outer piece is inserted in one of the holes in the revolving head of a screw machine and fastened there by the two screws. The inner piece, in which the die is held, is free to move endwise, but is kept from turning around in one direction by two jaws, B, one projecting from the end of the inner and one from the end of the outer piece which lock the two parts together. When the die holder is in use in the machine, the revolving head, F, is kept moving forward till it is stopped by the screw, L, Figs. 1 and 3, when the inner part holding the die is drawn forward by the screw being cut, till it unlocks from the outer part, when the forward motion of the die instantly ceases and it merely revolves. The motion of the spindle is then reversed and the revolving head moved back by the lever, E, Figs. 1 and 2, or hand wheel, K, Fig. 1, which locks the two parts of the holder by another clutch, C, at the small end, the jaws of which are in a reversed position from those first mentioned, and the screw turns out of the die. The large end of the holder has a recess for the die, D, which is held in its place by a cap screwed over the outer end. The die used is split on one side and two screws, one shown at E, Fig. 4, are inserted in the holder to close it up when wear takes place. The engraving shows the actual size of die holder used in a No. 4 screw machine. In tapping, the large end of the inner part of the holder is made with a socket to receive a tap which is held in its place by a set screw.

Quite an expensive machine is often used by gunmakers and others for slotting the heads of screws, but the device shown in Fig. 5, and which can be attached to an ordinary hand lathe, is believed to be quite as efficient for the purpose and certainly much less expensive than many machines heretofore made. A single bolt fastens the platform, A, of this apparatus to the bed of a hand lathe, the long lever projecting in front at a right angle with the bed. An arbor carrying a circular cutter is held in the centers of the lathe. The long lever is moved horizontally to open the jaws for inserting and removing the screws, and downward to bring the screw against the saw to be slotted. A stop screw, B, governs its downward motion, and thus regulates the depth of slot in the screw head. The working part of the apparatus can be raised or lowered on the platform front by means of the bolt, C.

These machines and appurtenances are manufactured by J. R. Brown & Sharpe, 115 South Main street, Providence, R. I., who will answer all communications relative thereto.

TREATMENT OF ANIMAL REFUSE IN EUROPE.

[Translated from the "Erganzungsblätter" for the Scientific American.]

WORKING UP DEAD HORSES.

Two manufactories for the utilization of dead horses have been established in Germany, one in Leipsic, Saxony, and another in Linden, Prussia. The blood is manufactured into blood albumen, dried blood or blood manure; the hides are sold to tanners; the hair is separated into tail hair, carded hair for stuffing, and very short hair for manufacturing carpets; and the hoofs are used for manufacturing common buttons, manure or blood alkali.

The skinned animal is quartered and put into large cylindrical boilers, which are hermetically closed and kept under a steam pressure of two atmospheres. The condensed water softens the meat off and is then run off through a cock. When this water begins to run quite clear the cock is shut, and the steam is allowed to operate for about eight hours. It melts the grease out, converts the skinny and stringy parts to glue, and even softens thin bones. Each cylinder contains three or four carcasses lying on a sieve bottom, under which an impure deposit of glue is formed, with a layer of pure grease above the glue. The melted grease flows off through a cock. It is liquid when kept at a medium temperature, is especially good for oiling machinery and wool, and makes a soap which is well adapted for the cloth manufacture. The glue, which of course contains also extracts of meat, is so changed by the heat that it can be used only for manufacturing bonesize, an article used in cloth manufactories, which remains permanently liquid and will not spoil by keeping. The next process is to crush the meat and bones to a yellowish powder (worth $3½ to $4 per cwt.) which, according to Mr. Wicke's analysis, contains ·0568 per cent of moisture, ·5687 of organic substances, ·0653 of nitrogen, and ·3745 of ash. The ·3745 per cent of ash is divided into ·2989 per cent of phosphoric salts (·1391 per cent of phosphoric acid), ·0033 of potash, ·0034 of soda, ·0441 of lime ·0041 of magnesia, ·0104 of sulphuric acid, and ·0043 of chlorine.

FISH GUANO.

Artificial manure is manufactured of fish offal and spoiled fish, in the following manner, on the Lofoden Islands (Norway and Sweden).—They dry and grind the back bone and head, cut the other remains into small pieces and pile them with layers of fresh burnt lime, in pits stoned up and bottomed with clay upon which is placed a layer of turf ashes five inches thick. The mass is mixed together after six or eight months and packed in bags.

FISH MEAL.

This novel description of food was shown at the late exhibition of fishery articles in Bergen (Norway and Sweden), as prepared by the Lofoden Company, the only establishment of its kind. The flesh of the haddock is dried hard and crushed, the bones having been carefully taken out. The meal is then heated and stirred in pans to drive off the rank odor, after which it tastes rather sweet. As food it is said to surpass beef four times and fresh haddock four and a half times. It is sold at fifteen cents a pound.

Science Familiarly Illustrated.

Electro-Metallurgy----Electrotyping and Electroplating.

The things needed by the electro metallurgist are a galvanic battery and solutions of the metals to be deposited.

THE BATTERY.

Procure a piece of sheet zinc two inches square and a piece of sheet copper of the same size; the thickness is not material. Lay one of these pieces or plates on the tongue and the other under it. Now bring the outer edges of the plates into contact and instantly a peculiar and indescribable sensation will be felt on the tongue, and, if you are very sensitive and the experiment be made in the dark, a faint flash of light will be seen. This sensation is a mild form of the electric shock; the plates and the saliva have generated a current of electricity which has pervaded the tongue. Now solder a copper wire two feet in length to each of the plates and immerse them in a mixture of water 15 parts and sulphuric acid 1 part contained in a large tumbler or earthen cup, taking care that neither the plates nor the wires touch each other. Bring the ends of the wires in contact with the tongue, each one touching at a different spot. The same sensation as in the first case will be felt. Place one wire in the mouth and bring the end of the other in contact with any part of the body which is peculiarly tender and sensitive as where the skin has been broken by a fresh cut or scratch and a slight shock will be felt instantly as the wire touches. The current of electricity generated by the metals and acid is here compelled to travel through the whole length of the wires and through the body Our little apparatus is a galvanic battery and we have been generating the same force which flows through the Atlantic cable, operates all the telegraphs and is the friendly genius of the electro-metallurgist.

The free ends of the wires are the poles of the battery, and for distinction we will call the one attached to the zinc plate the zinc pole and the other the copper pole.

THE METALLIC SOLUTIONS.

Procure a strong solution of sulphate of copper, sometimes called blue vitriol and blue stone, and into it immerse the poles of the battery, so that they shall be within half an inch of each other. Immediately the zinc pole will be observed to be covered with a layer of clean new copper, and if the experiment be continued for a day the deposit of copper on the zinc pole will be found to have a considerable thickness and may be measured and weighed. In the mean time the copper pole has diminished, it has evidently been dissolved.

Fasten a piece of lead, brass, or charcoal, by means of stout twine to the zinc pole, and immerse it into the solution, while all other arrangements are as before, and the lead, brass, or charcoal, will be soon covered with a layer of copper. In short it is only necessary that the object attached to the zinc pole shall be a conductor of electricity to ensure that it shall be completely coppered.

Let the object attached to the zinc pole be a small coin or medal which has been oiled and wiped dry so that the copper coating shall not adhere too firmly and after the copper has become thick enough it may be peeled or stripped off and will be found to be a copy showing the minutest details of the original. No process is known by which copying can be done so perfectly. It should be noticed that the copy is the reverse of the original as to right and left, and relief. But the copy may now be used as a model and a copy from it will be a fac simile of the original.

If in place of our solution of sulphate of copper we had used a solution of silver or gold without changing anything else, we would have had deposits of silver or gold. In short we might have used a solution of almost any metal, and in the same way have obtained a deposit or coating of it.

The readers of this article surely now begin to perceive that the fog which in their minds has enveloped the subject of electro-metallurgy begins to lift; the mystery may prove to be no mystery at all. A battery, an object attached to its zinc pole and immersed in a metallic solution—that appears to be all there is in it. There are without doubt plenty of men with no more hint than we have here given who might with their own brains and hands elaborate the art in all its details and become masters of it. But we think it desirable in these days when people are in the habit of running and find so little time for labor and study, to throw a little more light on the path of the beginner. We will answer a few such questions as to what is the best form and size of the battery, and what kind and strength of solutions to use with it.

The battery we have described is the original battery of Volta, and was thought a great deal of fifty years ago. But like all inventions it was not left perfect by the inventor. To day it is not used at all for practical purposes in its primitive form; it may indeed be used with fair success, but no one wants it in the place of what is vastly better. Fortunately the improvements in Volta's battery can easily be made plain. In the first place, it was found advantageous to have two plates of zinc to one of copper. The plates are all of the same size, and the copper plate is placed between the zinc plates. The plates are kept apart by fastening their upper ends into parallel slits sawed into a light strip of wood, which strip of wood being longer than the width of the plates rests by its ends on the edge of the battery cup. The two zinc plates are joined together by a copper strip passing over the top of the copper plate. Next it was found that a silver plate might advantageously be substituted for the copper plate, and that the silver plate would greatly be improved by depositing on it the metal platinum. Finally this kind of battery is perfected by thoroughly amalgamating the surface of the zinc plate. The battery as thus described is called Smee's and is almost universally in use among metallurgists. To recapitulate: the best battery has a platinized silver plate sandwiched between two amalgamated zinc plates. As to the size of plates, we suggest that 8×4 inches will be most generally useful.

As to kind and strength of solutions. No solution can be practically used which has a chemical action on the metal or other surface upon which the deposit is to be made. This important fact brings the appropriate solutions within very distinct and very narrow limits. Metallic cyanides may be used in any case. To make the whole story very brief we may say that cyanide solutions are the only solutions actually much used except sulphate of copper, and whenever sulphate of copper attacks the object to be coppered, cyanide of copper must be substituted. Metallic cyanides are generally insoluble in water and are therefore dissolved in a solution of cyanide of potassium. A little more, say 10 per cent of cyanide of potassium, is used than is actually needed to secure the solution of the metallic cyanide. As to strength it is sufficient to say that the solution of sulphate of copper should be saturated, and that a silver solution should contain an ounce of metallic silver to the gallon. and that a gilding solution should contain half an ounce of gold to the gallon.

An expert chemist will not at all be troubled about cyanides of gold, silver or anything else, but if he need them will go straightway and prepare them, but others ask for more of our aid and we give some short cuts to what they may want.

TO PREPARE A GALLON OF GILDING SOLUTION.

Dissolve half an ounce of gold in aqua regia; evaporate to dryness, at first heating as rapidly as you please but towards the end using a water bath. Dissolve this chloride of gold in eight ounces of water and add gradually a strong solution of cyanide of potassium. The first effect of the addition is to make a turbidity or precipitate. Continue the addition till the liquid becomes clear; this is a sign that the cyanide of gold first formed is completely dissolved. Add ten per cent more of the cyanide of potassium and finally sufficient water to make up a gallon.

TO PREPARE A GALLON OF SILVERING SOLUTION.

Dissolve 1½ ounces nitrate of silver in 8 ounces of water. Into this pour, drop by drop, stirring all the time, a strong solution of cyanide of potassium as long as a white precipitate forms. This precipitate is cyanide of silver. Let it rest till the powder goes to the bottom and the liquid is clear, when you decant the liquid, and fill up with water, stirring up the powder with the water. Rest and decant again. And again put in water, rest and decant. The object of all this is the purification of the powder by washing. On the powder pour a strong solution of cyanide of potassium until it is dissolved; add ten per cent more, and finally fill up with water to make a gallon of solution.

Cyanide of copper solution is made by precipitating cyanide of copper by mixing solutions of sulphate of copper and cyanide of potassium, and dissolving the precipitate in cyanide of potassium.

Resumè: Smee's battery, sulphate of copper, cyanide of potassium, copper, silver and gold are the repertoire of the electro-metallurgist, and with these he may copy the form of anything and practically transmute the base metals into gold and silver.

Screw Patent.—The representatives of Thomas W. Harvey, deceased, have filed another memorial asking for extension of his patents for manufacturing wood screws, which was referred to the Committee on Patents. This application failed in the last Congress, and we presume it has no more merit now than then

Editorial Summary.

A CURIOUS FOOD used by natives in certain parts of Mexico, has been investigated by Dr. Phipson, of England. It consists of the eggs, or rather egg shells, of a kind of boat-fly called *corixa mercenaria*, which are abundantly deposited upon the reeds of certain fresh water lakes, and are collected by the inhabitants, dried, and ground into flour. The eggs are smaller than a pin head, and on a microscopical examination it was found that the larvæ had escaped, leaving only the rigid envelope or shell, which is composed almost entirely of chitine with only 5 per cent of mineral matter, and 6·2 per cent of nitrogen. Chitine is maintained to be a glucoside, yielding glucose and lactamide to the action of mineral acids. The abundance of this insect product may be inferred from the statement of d'Aoust that they contribute to the formation of a new oolitic limestone at the bottom of the lakes referred to. Was the manna of the Israelites a deposit of this kind wafted on the wind?

MINE EXPLOSIONS—A NEW REMEDY.—The French journal *Cosmos* suggests a very simple expedient for removing the dangerous gas from mines, which is nothing more or less than that of burning it! As this gas burns quietly in the open air, and requires mixture with air in certain proportions, to become explosive, it seems probable enough that if the mine were at all times brilliantly illuminated in every part with burning lights, the gas, when gradually evolved, would be consumed in detail and not suffered to accumulate until it reached the explosive proportion. But as this expedient would evidently present no remedy, but rather certain disaster, in case of the sudden liberation of a large volume of gas from a concealed reservoir, it is only worth mentioning as an interesting paradox—fighting fire with fire.

PERFECT COMBUSTION OF FUEL is claimed in a new English stove, with which no flue or chimney is used; although vent is provided for a small residuum of gas, if desired, through a half inch pipe. The effective principle consists in making all the gaseous products of combustion pass into a chamber filled with the patent molded peat charcoal, which is said to have the property of absorbing carbonic acid and other gases and burning with a very small supply of air, until entirely consumed. In all stoves, wherever the strength or draft, the form of the grate or the nature of the fuel admits of lighting the fire at the top, a material saving of otherwise lost gases may thus be effected, the mass of fuel being roasted and a large portion of its gases disengaged and burned before it becomes itself incandescent.

AN EMBRYO ENGINEER suggests to an English journal that a monitor might be sunk by a broadsider by rolling off the deck of the latter, at close quarters, a weight of material equal to the tunnage of the former. That is, it would be a good plan for every ship to carry into action an extra deck load for sinking purposes heavier than any other ship could float under. The higher ship would have so much the worst of it that she would capsize her deck load, if not herself, before getting near the monitor. This kind of deposit would be like salt on a bird's tail—very effectual, perhaps, if one could get it there and keep it there.

IMPROVEMENT IN MATCHES.—To avoid the use of phosphorus in matches, the third edition of Kapp's Technology proposes the introduction of nitromannite (8 parts) with 3 of sulphide of antimony, 16 chlorate of potash, 1 bichromate of potash, 10 read lead, 4 powdered glass, and 5 gum. Nitromannite is prepared by treating mannite with nitric acid or a mixture of nitric and sulphuric acid, in the same way as cotton for the manufacture of gun cotton.

COMMUNICATION WITH THE GUARD is guaranteed to the British railway passenger by a compulsory bill which has been introduced in the House of Commons. If this bill becomes a law, it will be interesting to know what particular pyrotechnical device will be adopted for fulfilling the requirement. We observe, however, that a signal operated electrically is now proposed, which seems to be free from difficulty or inconvenience.

THE MACHINERY COURT of the Paris Exposition is 110 feet wide and 4000 feet long; although its annular form allows a perspective of less than one fourth that length. It is 82 feet high, and is lighted by a continuous range of lofty windows commencing 30 feet from the floor. A double central range of iron columns supports the shafting, over which runs a gallery 16½ feet wide, for spectators.

AN ELECTRIC BUOY LIGHT, employing Geissler's tube, is proposed, for the purpose of maintaining a permanent light without the necessity of frequent communication with the shore, enabling buoys to be lighted in positions where they cannot be attended to in the ordinary way. A Giessler's tube lamp has recently been devised by a French inventor for the safety of miners.

SUPERHEATED STEAM.—A company has been organized in this city, composed of several very respectable men, for the purpose of introducing Carvalho's patent for superheating steam. We are assured that the apparatus is very durable, and insures pure dry steam of any required temperature. The Company advertise in another column.

PRUSSIAN RAILWAY BRIDGES are required to be built with chambers in the piers arranged according to military directions, so that they can be effectually blown to pieces below the water level, in case of military necessity.

A LIFE PRESERVER.—The simplest invention we have heard of lately—and yet it may be none the less valuable for that—is that of cutting a bung in a cask, big enough to admit a man's body, weighting the opposite side with suspended ballast to keep it in position, and lining the aperture with a canvas sleeve having a drawing string by which it may be tightened around the waist of the occupant, to exclude water. A supply of provisions and fresh water inside the cask will do no harm to craft or voyager. This life preserver has been tested in heavy breakers with perfect success, it is said; the suspended ballast completely maintaining the proper position of the cask, and acting on the beach as an anchor, so that when once cast ashore, the cask was not carried back to sea with the wave.

FAST OCEAN STEAMERS.—A leading English ship builder has designed a class of steamships for the North German Lloyd's Company, to make the passage between Falmouth and New York in 7½ days, or at 16½ knots an hour. The ships are to be only 330 feet long, by 48 feet beam, and 27 feet hold, but are to be propelled by a pair of monster diagonal compound engines using 6,000 indicated horse-power. The high pressure cylinders are to have a diameter of 80 inches, and the low pressure 160 inches, with 9 feet stroke. Total tonnage, with 1,000 tuns of coal and 1,000 tuns of freight, draft 21¼ feet, 5,900 tuns.

A SMALL ELEPHANT.—The famous gentleman who won an elephant in a raffle would not have been so very unfortunate, if his prize had been of the dimensions of one lately imported from Siam by a naturalist in England. This creature is only three feet high, and very docile, in proof of which it is alleged that on his way from the ship, the day of his arrival in England, he walked into a public house like a veritable Briton, inserted his proboscis in a pitcher of beer that stood on the counter, and drank off the contents without spilling a drop.

PNEUMATIC SPRINGS.—Sterne's patent, in use on the Great Western Railway (Eng.) consists of a "pile" of india-rubber rings, separated by brass plates which are inseparably united to them in the process of vulcanization, forming tight air chambers within the rings. The supposed assistance to the spring from the elasticity of so small a quantity of air as that within the rings, would seem to be too slight to be of any consequence, or to justify the term "pneumatic."

TUBULAR PIERS.—The San Paulo Railway bridge over the river Cubatao, Brazil, rests, in four spans of 75 feet, upon three piers, consisting each of three iron tubes or piles standing in a triangle, screwed into the bottom of the river by screw blades attached to their circumference, and united at convenient intervals in iron frames.

TO BLEACH SPONGE SNOW WHITE.—Soak it in diluted muriatic acid ten or twelve hours, then wash with water and immerse it in a solution of hyposulphite of soda with a small addition of diluted muriatic acid, wash and dry it. Repeated operations it is said, will render the article almost snow white.

OZONE AS A DISINFECTANT.—Get a wide-necked bottle and put in half a pint of water, with a cork floating at the top; on this cork fix a bit of phosphorus; cover the bottle with another bit of cork very loosely. This apparatus may be moved from room to room, remaining till the characteristic smell of ozone is perceived.

IMPORTS AND IMPOSTS.—Walker's comparative tables for 26 years past show that no correspondence exists between the rate of duties and the volume of imports; but that the volume of imports and the volume of *currency* correspond in a remarkable degree. The rate of interest is shown, by similar tables, to have fluctuated under the same influence.

THE ENGLISH WATCH TRADE confesses to a serious decline and discusses the causes. The number of Swiss watches imported into England for sale is now stated at 35,000 a year, while the number manufactured in England is only about 26,000.

ALUMINIUM LEAF.—It is reported that M. Degousse, a gold beater in Paris, prepares aluminium leaf weighing only .01544 grain to the square inch, burning with great brilliancy in the flame of a spirit lamp, and decomposing boiling water.

ANOTHER GUNPOWDER.—Nitrate of potash, 10 parts; picric acid, 10; bichromate of potash, 8·5—intimately mixed—give, according to Dr. Borlinetto, professor of chemistry in the University of Padua, an excellent gunpowder of the best sporting quality.

A NEW STEEL FOR SHOT.—Deuss, a Norwegian steel maker, has excited Prussian military circles with a quality of steel by which heavy armor was penetrated repeatedly with the same shot.

OILS AND BEARINGS.—We observe an announcement from Huger that the higher American oils contain a considerable amount of bisulphide of carbon, which may have something to do with an injurious effect upon bearings and journals.

THE PROPOSED LONDON AQUEDUCT to bring water from the Westmoreland Lakes, as estimated, will be 138 miles long, deliver 83,000,000 gallons a day, and cost over $22,000,000.

PENNSYLVANIA, among other things, will be represented at the Paris Exposition by a lump of anthracite coal weighing six tuns. Montana sends a bar of gold worth about $100,000.

SURGICAL POISONINGS.—M. Malsonneuve, in a paper read in December before the French Academy of Sciences, maintained by reasons and statistics the startling position that at least 85 per cent of persons who die in consequence of surgical operations, die of poison. The poisoning is communicated by the lymph and other living liquids which become exposed in the wound, and after putrefying penetrate the cellular tissue and the orifices of the lymphatic vessels, producing the inflammation which is so prominent a cause of death in surgery, or else enter the circulation, vitiate the blood, and remain in the capillary vessels, giving rise to secondary symptoms of dangerous character, such as erysipelas, anthrax, etc. These consequences are prevented by the various improved means of arresting the putrefying process, destroying its products, or shutting them out of the system, and the mortality in hospitals where these methods have been introduced, has already been greatly diminished.

A MONSTER FILTER.—A singular proposition has been made by Mr. Tilford Macnell, with a view to supplying London with pure water. He proposes to use the Bagshot sands, 22½ square miles in extent, as a filter: bringing 125,000,000 gallons of water daily from the Thames just above Teddington, together with 75,000,000 from the green sand hills south of Guildford; the water to be spread over the whole surface, equivalent to a deposit five eighths of an inch deep in twenty-four hours, and to be withdrawn from below the sands in catchwater canals. Assuming that a water-tight stratum of some kind lies beneath the sands at a convenient depth, the plan might be practicable, and the following questions might become interesting:—How long would it take for the Thames to fertilize the Bagshot sands? And how far would the value of the land when thus incapacitated for filtration, go toward constructing new and better waterworks?

STRAW AND CLOTHES BLEACHING.—Bolley states that the hypo-chlorite of magnesia bleaches much more quickly than that of lime, with the further advantage in the case of straw goods, that it bleaches directly as well as quickly, without first coloring the straw brown as does the hypo-chlorite of lime. Magnesia being a much weaker base than lime, parts with the chlorine much more quickly.—The great bleacher is oxygen, and in the form of ozone, nothing oxidable can withstand it. Ozone is said to be rapidly formed when turpentine is exposed to the air, and the writer who mentions this (in a German periodical) recommends laundresses to add to their rinsing water a little pure rectified oil of turpentine mixed (which can be done only by distillation) with twice as much strong alcohol. No smell will remain in the fabric after drying.

CHINESE-AMERICAN LITERATURE.—It is reported that a Chinese lad who has been for some time engaged in a photographic establishment in San Francisco, has occupied his leisure in translating Webster's Dictionary into Chinese. Probably the effort is rather a curiosity than a literary event. But a fact of real importance is that Wheaton's standard work on International Law is about to be placed in the hands of the Chinese in their own language. Old as that nation is, it is obvious that this book will impart the first perception, at large, of the existence of such a thing as international law; unless we should except the rough and questionable lessons of the opium war. Rev. Mr. Martyn, Presbyterian missionary for twenty years in China, is the translator.

ALLOYS WITH MAGNESIUM.—Mr. Parkinson of the School of Mines, says the *Mechanics' Magazine*, in a paper read before the Chemical Society, showed that all these compounds are exceedingly brittle, and most of them are easily acted upon by air. The most permanent alloy is that with zinc, but even this at present seems susceptible of no practical application. The most interesting compound of magnesium with the metalloids, this gentlemen found by strongly uniting magnesium filings with sand, the resulting compound, silicide of magnesium, when dropped into water or dilute acid gives off spontaneously inflammable siliciuretted hydrogen.

IRON MANUFACTURE OF PRUSSIA.—The cast steel of Prussia was worth little over $300,000 in 1850, rose to a million and a quarter by 1860, and amounts now to nearly $9,000,000 per annum. The manufacture of pig, cast and wrought iron has also been multiplied three or four times in the same period; now amounting to nearly $50,000,000 per annum. Our informant does not specify how far the later expansion is due to conquest.

DR. ELSNER has succeeded in sensibly volatilizing carbon, and fully volatilizing silver, gold, the black oxides of cobalt and copper, green oxide of chromium, red oxide of iron, and oxide of iridium, by the temperature obtained in an enamelling furnace at some porcelain works. Platinum resisted this temperature, but platinum black (platinum separated in powder from a solution of one of its salts) was melted into small buttons.

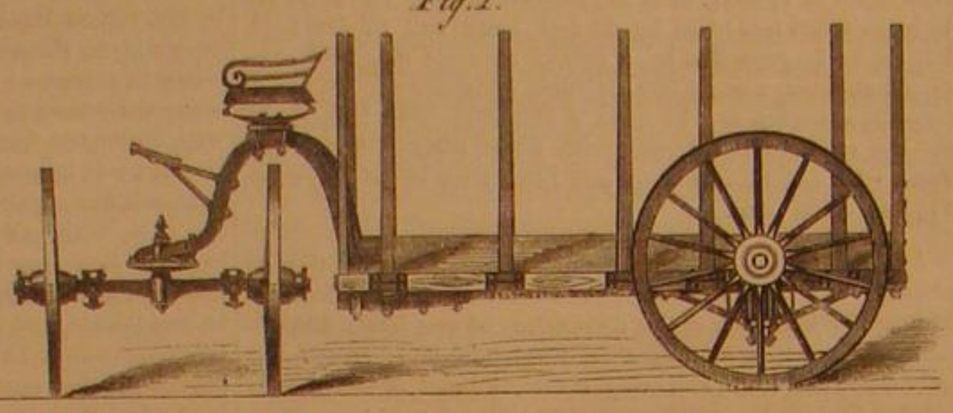
THE BERLIN WARE so much celebrated for its power of withstanding heat, acids and alkalies, is composed, according to Dingler's *Polytechnic Journal*, of 45 parts kaolin, 37½ alumina, and 16½ feldspar. The enamel is composed of 42 parts sand, 33 kaolin, 13 unburnt gypsum, and 12 of the baked body composition above described.

PROFITS OF CHEAP TRAINS.—Legislators and city railroad projectors alike may take a profitable hint from the report of the British Internal Revenue Commission in which they suggest revoking the exemption of cheap trains from duty, as they are found to be among the most remunerative trains running. The fare is less than two cents for one to six miles.

Improved Truck.

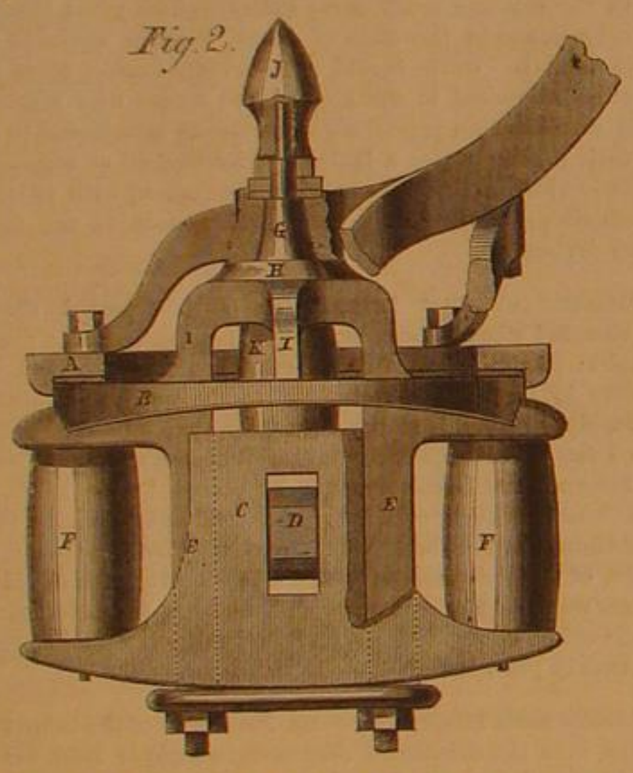
The engravings present views of an improvement in trucks patented through the Scientific American Patent Agency, by Asa E. Hovey of Cambridgeport, Mass., Feb. 26, 1867. It is especially intended for that class of vehicles known as the "California crane-neck trucks." It is intended to give ease in traversing over uneven ground, to prevent sudden shocks and jolts on the axle, and to afford facility in turning short. Fig. 1 is a side view of the truck, and Fig. 2 an enlarged, semi-sectional view of the mechanism connecting the crane necks with the forward axle. There are three of these necks, as seen in Fig. 1, diverging from each other at the back and brought together and welded or bolted at the front. Here they are connected by bolts to an annular plate, A, of malleable cast iron, having a downward projecting flange around its circumference to receive another annular plate, B, of similar material, a brass washer being interposed between. C, is a yoke, also of malleable cast iron, through which the axle, D, passes being secured to it by a horizontal king bolt which allows the axle to traverse or swing in a vertical plane, to facilitate passing over uneven ground without affecting the equilibrium of the truck. The yoke, C, and plate, B, are connected by bolts, E, which have a large washer, or plate, and nuts at their lower ends. Projections on the plate, B, and yoke, C, furnish supports for cylindrical rubber springs, F. G is a wrought iron pin which has a collar, H, and supports, I, connected with the plate, B. The pin may be placed in a mold and the collar, supports, plate, B, and bars or bolts, E, may all be cast upon it and afterward made malleable. The pin, G, passes up through an eye in the front part of the crane necks and thrusts upwardly against washers, nuts, and a cap, J. The rubber spring, K, is between the upper part of the yoke, C, and the lower surface of the flange, H.

Fig. 1.



HOVEY'S IMPROVED TRUCK.

Fig. 2.



By these devices perfect freedom of motion is allowed the axle, both vertically and horizontally; the springs receive and absorb the jolts and jerks caused by rough roads, and the whole is compact, easy working, and simple.

For additional particulars address the patentee.

Converting Electro-Magnetic Engine.

We learn that Mr. Siemens and Professor Wheatstone have simultaneously produced, before the Royal Society, similar machines realizing the conversion of mechanical into electrical force with remarkable perfectness and almost a minimum of loss. Mr. Siemens' converter consists of a bar of soft iron with a very slight initial magnetism, aided by the small mechanical force required to rotate it within an envelope of copper wires laid parallel to its axis. The electricity thus excited by the slight initial magnetism of the iron, excites the magnet in turn, and this reciprocal excitation goes on in unlimited progression. In the miniature experiment shown, the magnetism developed surpassed the strength of two men, and the heat of the electrical current was sufficient to melt iron wire. The power required being so trivial, and the movement so simple and frictionless, it would seem that these striking results might well have approximated closely to an equivalent for all the mechanical power expended. This is a great result in its practical bearings, particularly on the advantageous conversion of mechanical power into light. Our present mode of getting light (to illustrate grossly) is like keeping up a bonfire or heating a furnace merely to read by. We throw away the most of our light-fuel in the form of heat, which, if converted into steam power and that power passed through electro-converting engines and issued in electric light, might be almost adequate to turn the night into day. It ought not to be long indeed, before night will become merely an optional indulgence.

Laws of Development.

Medical investigation has determined among other interesting facts, that (with the exception of the heart and organs of digestion) the embryo consists at first of two lateral and symmetrical halves, which subsequently come together and are agglutinated upon the median line, so as to constitute one body. Each half being a perfect counterpart of the other, the organs and members in general are thus produced in pairs, as the limbs, eyes, etc., or double, as the brain, nose, lip, chin, chest, etc., of which the double structure, and even that of the whole body, is usually marked by a more or less visible indentation exactly down the line of junction. Another curious fact is that the development always proceeds from the periphery inward, and is effected in the main before the agglutination. Thus, the fingers are formed before the hand and the hand before the arm, the ears before the eyes and the eyes before the nose, and so on. Hence if any local mishap arrests the development, where it stops there it will stay, and so a monster is produced, with the fingers, it may be, growing from the shoulder without an arm, or with the nose wanting, having failed to come forward in season before the agglutination, or even with the two eyes united in one, from a premature agglutination or a tardy development. Excessive evolution, on the other hand, produces supernumerary limbs, or when affecting certain portions of the capillaries, those blood vessels which are naturally too small to be seen with the naked eye, become enlarged so as to carry red blood and produce a red or purple mark in the skin. The tendency of independent formations to agglutinate, sometimes produces a junction of separate individuals as well as of the halves of the same individual, as in the case of the Siamese twins.

The First Eight-Hour Law.

The Illinois Legislature has enacted that eight hours shall be a legal day's work, in the absence of any special contract to the contrary, and the act goes into effect immediately. This experiment can hardly be very decisive, as it applies only to contracts by the day and not to farm labor at all. Our impression is that if generally applied and not evaded by over-time arrangements, the eight-hour plan might operate to diffuse wages more equably, and increase the earnings of many who are now scantily employed, at the expense of the shrewder or luckier class who keep their hands full. If applied as above, only to limited classes of skilled labor, the tendency will be to demoralize trades by introducing a still greater influx of half-taught workmen. The English operatives demand to have over-time work forbidden, for otherwise it can be made practically imperative, when it suits the employer. We are thus reduced to choose between forbidding and compelling a man to work more than eight hours or ten, as the case may be: but as the former would be universal and public, and the latter only exceptional and individual tyranny, there seems no difficulty in the choice. Over-time arrangements will therefore certainly be made wherever work is pressing or profitable, unless a relay system should spring up, giving capital a day of sixteen hours, while labor has only half as much, and the gross amount of wages is divided among twice as many hands as before.

Electricity and Fogs.

The electrical character of fogs was observed by investigators in the last century, and three or four years ago Dr. Meissner, in his "Researches on Oxygen," showed that perfectly dried air or oxygen, when subjected to the influence of electricity in closed tubes, produced a mist which did not disappear on being passed through water. Investigations in this direction by Dr. T. L. Phipson, England, led him to the conclusion that with very few exceptions the existence of a fog must depend upon its electrical state. He found that the dense London fogs are electro-positive, while the smoke of the chimneys is electro-negative, and the two thus attract each other. On the other hand, there is a kind of "dry fog" which is invariably electro-negative, that is, in the same condition as the earth and the smoke, from both of which it is therefore repelled. They appear most frequently in May and June, are perfectly dry, often phosphorescent, of a peculiar odor, and the strongest wind or even rain does not disperse them. These fogs, which are not very common, and do not extend to any great hight in the atmosphere, are supposed to be related to unhealthy, certainly very peculiar, conditions of the air. Tests employed in such a fog showed only feeble indications of ozone.

A Steam Gun Carriage was tried on the 15th with a 15-inch gun on a scow in the Hudson river, in presence of Admiral Farragut and other officers. A steam cylinder is fixed beneath the carriage with its piston connected to the latter, so that steam admitted at the rear runs out the gun and then receives the recoil of the discharge; after which the gun is run in by steam admitted at the other end of the cylinder. The steam loading machinery was also employed, and the whole working of the gun was effected by four men with twice the rapidity attained with forty men on the old plan. Applied in such a manner as to be readily dispensed with in case of accident in battle, these arrangements would multiply the efficiency of guns and men.

Particulars of Dr. Livingstone's Death.

The only particular account of the melancholy fate of the great explorer, yet received or indeed likely ever to be obtained, is derived from Dr. Kirk, formerly a member of Dr Livingstone's Zambesi expedition, and communicated by the U. S. Consul at Zanzibar, Edward D. Ropes, in a report to the Department of State, dated Dec. 9, 1866. We quote the material portion of the statement, from which it appears that the tragedy took place about October 25th.

Dr. L. left Zanzibar on the 9th of March, 1866, for exploration of the river Rovuma and the great lake country of Central Africa. His present expedition may be briefly stated to have been an attempt to unite the magnificent discoveries of late years and determine the limits and connections of the three great lakes which reach from 14° south, to 2° north latitude, flowing to the sea by the Zambesi and Nile at the two extremities, but with an intermediate space, as yet unknown Such was the geographical problem. But Dr. L. had in view to affect the present enormous East African slave trade, through pioneering the way which might lead to lawful commerce.

To have consolidated in one the successive discoveries achieved by himself on the Nyassa; Burton, on the Sangan yika; Speke and Grant, on the Victoria, and Baker, on the Albert Nyanza, would have been a fitting triumph for one who was the first to cross the African continent within the tropical zone; but these hopes have been wrecked by his untimely death.

The last heard of Dr. L. was at "N'doude," at the confluence of the Rovuma and Niende. Here he met with kindness, but found the land desolated by the slave traders supplying the market of Zanzibar. We have information that he proceeded further west to "Mataka," a Miao chief, who gave presents of cattle and food. At this point the Indian sepoys remained behind, and have since returned to Zanzibar. From Mataka to Alake was eight days' march. On crossing a wide water in Canves, they followed the border of the lake for several days, and then struck inland. They were suddenly attacked in a bush country, about 9 A. M., by a band of Mavite; Dr. L. killed the most forward of the attacking party, but was surrounded and cut down by one blow of a battle axe, which cut half through his neck. Beyond this we have no details, for those who returned were the first to flee. Almost all who stood near Dr. L. were killed, although they seem to have done considerable with their rifles. This happened about six weeks ago, or about October 25th. The locality it is impossible to determine.

Only one of the survivors saw Dr. L. fall, but they buried his body at 3 P. M., when the Mavite had gone. They took off the baggage and also the upper clothing of the dead body, so that not even a note remains by which to trace the route.

It is hardly probable that any further particulars will ever be obtained in regard to Dr. Livingstone's death, as the Mavite are a wandering people, and it will be quite impossible to acertain the particular tribe by whom Dr. L.'s party were attacked.

English and American.

A writer in the *British Journal* of *Dental Science*, (Dr. W. H. Waite) remarks that "it is notorious that Englishmen at home are not generally disposed to regard with favor anything coming before them with the simple recommendation that it is "American," and equally notorious is it fast becoming that Englishmen who have once crossed the Atlantic are ready to speak in praise of many things simply because they are "American." Naturally suspicious, until they have proved the merits of a case, they are as naturally warm and confiding when the proof has been afforded. Americans, on the contrary, are naturally open-hearted and free until *compelled* to be suspicious. Hence Englishmen who visit America are startled at first by the unbounded hospitality, urbanity and courtesy with which they are received. . . . The amount of attention paid to this department of dentistry [filling teeth] has raised the quality of the work to a point of which few English operators have any idea. The beautiful and delicate instruments commonly used for gold filling are up to the present time not obtainable in this country at all, except through the agents of American manufacturers."

Improvements in Mississippi.

A letter from Mr. A. Herring, C. E. of the Mississippi Central Railroad, Water Valley, Miss., says he desires some information relative to the repairof laminated or worn rails by railroad companies. He says:

"Patching and mending is a necessity with us. On this road, 237 miles long, we have rebuilt eightmiles of trestle work bridging, sixteen locomotives from burned wrecks, depot houses, etc., and reopened the entire road, having a poor credit to begin on, an exhausted treasury, and anenormous bonded and floating debt Our earnings now are $120,000 per month and our operating expenses inside of $60,000 per month; but we must still economize.

"A new T-rail is worth $16.50; if we can repair rails at an average of $4 each the value of the repaired rail will be $12.50. We pay two old rails for one new one and a quarter of another one for freight, thus paying $28.12½ of old rail for $16.50 of new. In purchasing a mile of iron we lose enough for getting one mile and seven tenths if we had the means of repairing. Will some of your readers, railroad men, help us with their experience?"

Molded Peat is to be applied under an English patent to the manufacture of picture frames, moldings, decorations, etc., in the manner of *papier maché* or hard rubber.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Action and Reaction---the Proper Unit of Measure for Force.

MESSRS. EDITORS:—An interesting correspondence under the above caption, appeared on page 137 present volume of the SCIENTIFIC AMERICAN, in which the writer shows a commendable knowledge of facts connected with the points at issue, but as is too often the case, his conclusions appear to be drawn from a doubtful philosophy, rather than from pure philosophical reasoning.

Your intelligent correspondent will not differ with me, when I define force to be "that which, when associated with" matter, "causes it to move." In other words, that which overcomes inertia. He will also acknowlege that gravity and steam are equally absolute forces. Now if in a gun 64 feet long, weighing 16 pounds, carrying a ball of 1 pound a jet of steam sufficient to maintain a constant pressure of 1 pound, be admitted between the breech and the ball, then at the end of 1 second the velocity of the ball will be 32 feet and the quantity of force (steam) applied, will be just equal to the space moved through, 16 feet. At the end of the second, the velocity, space and quantity of force (steam) applied, will be 64 feet. Thus demonstrating that the quantity of force is as the spaces, and as the squares of the velocities. Again, at the end of the first second, the velocity of recoil will be 2 feet, and the space 1 foot, and at the end of the second second, the gun's velocity, space and quantity of force (steam applied), will be 4 feet.

Let 1 represent the amount of work performed by 1 pound moving with a velocity of 1 foot, then, 1 pound (the ball) having a velocity of 64 feet, will perform work equal to $1.\times64^2=4096$ and 16 pounds, (the gun) with a velocity of 4 feet will perform work equal to $16\times4^2=256$. The gun performs just one-sixteenth the work of the ball, with just one-sixteenth the quantity of force (steam). It seems then, that it is not only a rational conclusion, but a demonstrable fact, that the absolute quantity of force in a moving body is exactly equal to its capacity for work, and that the intensities of action and reaction are always equal, but their relative quantities of force, depend wholly on the relative spaces, through which it is applied.

Newton was a remarkable man for the times in which he lived, but erroneous theories, from whatever source, must succumb to the "logic of events." A SUBSCRIBER.

Tenafly, N. J., Feb. 25, 1867.

Printers' "Wants" and "Don't Wants."

MESSRS. EDITORS:—Allow me to call the attention of inventors and builders to a few of the wants and don't wants of the modern disciples of the black art, known as country job printers.

First.—We want a good substantial machine, combining all the good qualities of a lead and brass rule cutter, mitering machine, etc., one that is simple, durable, and when guided by a little common sense and used with ordinary care, capable of doing its work in a smooth, workmanlike manner. There are a number of machines in use for this purpose; but they do not meet the wants of our enterprising job printers of to-day. In fact, there is not a good mitering machine in market, of any kind. Few printers have the skill and patience required to miter brass rule for all the different forms used in a printing office, with no other tools than a pair of old shears and a file. Even if they have the patience they cannot afford the time; for the same work can be done with a good machine in a fraction of the time required by hand, and done much better

Again,—We want a machine to dress wood type, as much of it is uneven in hight, thereby making it almost impossible to do good work, especially on a cylinder press, with the common rubber blanket. Every printer can bear testimony to the vexation and delay of "underlaying," because of the varying hights of the type used in poster work, the variation oftentimes being a full 32d of an inch. This variation is explained by the fact that the type is bought of different manufacturers, no two manufacturers having the same standard of hight, hoping, no doubt, to secure the lion's share of trade by such a suicidal policy. Now, we want a machine with knives or cutters so arranged that we can easily reduce any type which is too high, by cutting off the bottom. Possibly such a machine might be made so as to combine the requisites of a lead and brass rule cutter, miter, etc., all in one, and at a price which would bring it within the reach of all. Certainly there seems to be no great difficulty in the way, and whoever will bring out such a machine may be sure of an ample reward, as every printer in the country feels the need and growing want of one. Inventors, look to this. You can give us such a machine, if you try, and you would have done so long ago, if your modesty had not caused you to shun the abode and acquaintance of that useful, harmless, yet much-abused biped, the printer's devil. But enough for the present of our wants; and now with your permission, Messrs. Editors, let me name some of our don't wants.

In the first place, we dont' want so much poor machinery, engines, presses, etc. In the next place, whenever a press breaks down because of the poor material and workmanship used in its construction, we don't want the builder to fall back upon his dignity and swear that it has been broken through the carelessness or incompetency of the printer. It is a fact, as plain as it is undeniable, that more than one half of all our printing machinery—especially all kinds of job and country newspaper presses are a disgrace to our American mechanics. Why is it? Not that they are imperfect in principle or design, as they come from the inventor's hands, but because of the poor material and worse workmanship used in their construction by the builder, to say nothing of the many presses built so light that they literally "shake themselves to pieces." As an illustration, I will cite an instance in my own experience. Not along ago, the proprietor of the office in which I was employed gave an order for two new presses of the latest and most approved kind. In due time they were shipped by the builder, and arrived, dressed in the gayest attire of bright paint and varnish. The presses were alike in form and pattern. One of them was built in the shop of the patentee, while the other happened to have been built elsewhere. To look at, the presses were alike, but what a difference when set up and pronounced to be in running order! One was actually "thrown together," and was so imperfect in its adjustment that it could not be made to run at all, until the heedless and shameless oversights of the builder had been remdied at an expense of some twenty or thirty dollars; and to day the press stands as a monument of disgrace to the builder, and is actually worthless. But take a peep at press No. 2, bearing in mind that it was built after the same model and form, the same pattern as No. 1, though in another shape and by different workmen. I cannot say too much in praise of this press, for it as perfect as art and iron can make it. Every mechanic and printer looks at it with pride, and well he may, for it has no equal in regard to ease and facility of working, and beauty and rapidity of execution. Manufacturers may shield themselves by saying this is an extreme case. Perhaps it is, but that it is not overdrawn, the two presses, standing side by side, will bear witness.

Much more might be said about poor and cheap machinery, but my letter is already too long, and I trust enough has been said to awaken our inventors and builders to a sense of some of the wants and don't wants of our Yankee job printers.

L. H. P.

Woonsocket, R. I. Feb. 23, 1867.

[As long as human nature is what it is, printers, like other men, must look out for their own "don't wants," by getting their goods of first class manufacturers—not necessarily great concerns, but of proved skill and integrity—regardless of a little difference in first cost, which will very soon be saved in repairs. Second-rate machinery is about the dearest stuff that money will buy; and first-rate machinery *will* cost liberally, and it is not every shop that can make it. We never had or heard of any work from R. Hoe & Co., for instance, that did not give satisfaction in quality *and especially in cost*, when practically contrasted with machinery from professedly cheaper shops. Other equally capable and honorable printers' machinists might be named; but this one is a sufficient illustration of our meaning, and some who have not yet got a hard-earned experience on the subject, may be glad to be assured of *one* way to get along without it.—EDS.

Steel Bridges and Subaqueous Tunneling.

MESSRS. EDITORS:—In the last number of the SCIENTIFIC AMERICAN I noticed a correspondent calling upon engineers to investigate the merits of steel for bridges. Several steel bridges of 100 to 130 feet span already exist in Holland, and at the latest accounts one of 600 feet span was to have been attempted. In the case of a wrought-iron lattice bridge, for one railroad track and single span, we have the proportion between the moving load and the own weight of the complete superstructure, taking our figures from European bridges, built on exceedingly safe principles and with an allowed strain of 8,500 lbs. per square inch, as follows:—

Span in feet.	Proportion of own weight to load.	Span in feet	Proportion of own weight to load.
100	0·6	300	1·44
150	0·8	350	1·64
200	1	400	2
250	1·24		

Or, at 400 feet span it takes two tuns of iron to hold up one tun of load. What we want is a metal stronger than wrought iron, weight for weight, and there is only one such, viz., steel. In building steel bridges the Dutch government allowed a strain of only 8½ tuns (of 2,000 lbs.) per square inch, which is much too small. Double this strain could be taken with perfect safety. But upon the above basis, and taking 4½ tuns as the allowed strain on wrought iaon, with the same construction (a single span and single track lattice) in both cases, wrought iron and steel compare as follows for different spans:

Span in feet.	Weight of iron bridges in tuns.	Weight of steel bridges in tuns.
100	80	30
150	152·5	58·5
200	260	91
250	387·5	132·5
300	540	180
350	717·5	235
400	920	296

As steel will not cost per weight more than twice the cost of wrought iron, the great saving in favor of steel is easily seen, to say nothing of being enabled by its use to build much longer spans than with wrought iron, which includes a saving in number of piers. A bridge crossing the East River in three spans, that is, having two piers in the river, the piers of masonry till above high-water mark, thence cast iron up to the under side of the superstructure, this of steel and made as a *continuous* lattice girder, with double roadway inside and a sidewalk on each outside, would be a comparatively cheap, a practicable and well appearing solution of the problem. A so-called "fish-belly" girder would be a lighter, hence still cheaper superstructure, but these are rather uncouth and ugly in appearance and would be more difficult, that is would cost more to erect in place, than a continuous lattice.

All this would require only following in the footsteps of others, to accomplish. In my mind a tunnel seems better to answer the requirements of the place, and the same need not cost any unknown or fabulous amounts. Speaking merely from my impressions, I do not think it would cost more than the bridge. It is easier to grade 30 or 40 feet *down* than 100 feet or more *up*. The grade of the tunnel should be as high as ever possible: if too deep it would become (like the Thames Tunnel until a railroad was put through it) a mere "curiosity shop." My plan of construction would be this:—Make two rectangular coffer dams, in length equal to a small section of the tunnel, of boiler plate with double walls all around. Commence with one of these at the shore end, by sinking it deep enough into the river bed to be water tight at the bottom. This I would do by the pneumatic method used in sinking the pier foundations for the bridge across the Rhine near Strasbourg, which consists in forcing air into a bottom chamber or chambers, thus forcing the water out (as in a diving bell) and then having men at work in this chamber digging away under the walls, the earth so dug away being lifted out through a vertical pipe coming down the middle of this chamber from above the water level and standing with its end in a sort of well-hole of water in the bottom. The earth is pushed into this well-hole under the bottom edge of the tube. This method insures a uniform, steady, and quiet settlement, with the whole operation perfectly under control, none of which advantages are attainable by the other pneumatic method of *exhausting* the air from the chamber to be sunk and thus forcing it down by atmospheric pressure only. In the method chosen, the compressed air could be maintained in the bottom chambers after the sinking of the cofferdam, and would be very effectual in preventing the water from getting under. Now pump out the water inside the cofferdam. Build the tunnel inside, in an open cut, as a sewer is built in a street: cover everything up again. In the mean while the second cofferdam has been brought around in front, in the line of the tunnel, a water-tight connection made between it and the first one, the water pumped out of it, and the tunnel can proceed into and within its safe precincts. As soon as it is well inside, lift the first one out of the mud (the rise of the tide could be used for this purpose, if it would not rise of itself as soon as the load, required to counteract the upward force of the compressed air underneath, was removed) bring it around in front of number two, and so on across the river. Various modifications and details have of course occurred to me, but these would be premature and uninteresting at present, as the above gives the general outline of the proposed plan. After you have thus reached Brooklyn, the same two cofferdams might suffice to carry you hand over hand over to Jersey City. CIVIL ENGINEER.

Boston, March 12, 1867.

[We do not see the necessity, under the above plan, of keeping the men at work in compressed air, or of using peculiar and awkward methods for raising the earth. If the cofferdam be settled water tight upon the bottom, the working chamber may be emptied through a valve which will exclude water, and free access may be had to it through a well: or, as a simpler method, the water may be forced out at the top of the well itself. We are inclined to think, however, that a still easier way to tighten the cofferdam would be to furnish the lower edge of its sides all around with an unbroken series of vertically sliding plates, tongued and grooved together, or in some other way made to work nearly water tight, and driven down into the mud like spades, each as far as needed, by a moderate force from above. The cofferdam would then be pumped dry with very slight waste of labor.—The problems connected with steel bridges may be studied at the Paris Exposition with some advantage from an elegant structure of the kind—the first in France—which has been put up at one of the approaches of the Champ de Mars. We have no data of its structure, save that its span is 82 feet and width 69 feet, and that it has been tested with a load of 262 tuns, and with loads of 6 tuns upon a single wheel.—EDS.

Gage for Laying out Tank Staves.

MESSRS. EDITORS:—I often see joiners making water tanks and others work, of a conical form, seemingly without rule, other than a half scribe and a half guess rule, which compels them to work the staves to a like width, thus wasting time and material, or else fit each stave for a certain place. The above is my apology for offering for your consideration the following simple and correct method of laying out the work, which might benefit some of your readers.

Make a gage of a thin piece of board (a shingle will do) by striking part of a circle on it of a size desired for the largest end of the tank, also another part of a circle of the size of the small end of the tank, struck from the same center. Draw radial lines across the segment thus marked out, say about one eighth of an inch apart. Cut the shingle to the circular lines and nail a piece of lath to it, the straight edge of it to one of the outside radial lines, and the gage is finished, which will lay out correctly any stave be it wide or narrow.

Suppose a plank will work to a certain width; place the gage upon that end and mark from the edge of the lath to any radial line which fits the width of the plank, marking by the line which reaches the outer circle of the gage. Then slide the gage to the other end of the plank, or the distance corresponding to the hight of the tank, and mark again to the same radial line on the inner cirle. Then line from these two end marks. C. GOODWIN.

Beardstown, Ill.

Consumption of Coal.

MESSRS. EDITORS:—On page 22 of this volume, in a short article on steam I stated that the theoretical minimum amount of consumption of coal in a steam boiler is 4 lbs. per hour, per horse-power of the engine, and that this is never reached on a small scale. This statement is objected to by a correspondent (page 108) who mentions that the consumption of coal in the *Great Eastern* is said to be 4 lbs. per horse-power per hour, locomotives, 2½ lbs., Cornish engines, 2 lbs., and that Bourne even gives 1·74 lbs. for locomotives.

My statement of the 4 lbs was not made without the

knowledge of the last-mentioned estimates. The article being writen for instruction and not for debate about conflicting and erroneous statements, I was silent about them, considering these very low estimates as entirely unreliable, and, in fact, as false statements: the reason will be clear from the following.

The whole question of course depends on the amount of water evaporated from a given quantity of fuel. It is demonstrated that one pound of coal, by the very best method of combustion, will produce 13,500 units of heat, that is, it will heat 13,500 lbs. of water one degree. Starting now with water of about 60° we have to add 150° to reach the boiling point, and adding to this the 1,000° units latent heat required to change the water into steam gives a consumption of heat of 1,150°: this divided among the 13,500 lbs. water gives nearly 12 lbs. water changed into steam by one lb. of coal: thus 3 lbs. of coal will convert 36 lbs. of water into steam. On page 22 I demonstrated that the evaporation of 9 ounces of water per minute produced a certain power which it has been agreed to call a horse-power: this is the same as $9 \times 60 = 540$ ounces or 34 lbs. water per hour, corresponding very nearly with the above amount of water evaporated by 3 lbs. of coal. This is the correct theoretical amount for low pressure steam. For high pressure there is some advantage, as is known, but not to such a degree as to account for the very low estimates spoken of above. In practice it appears that never as much as 12 lbs. of water for every lb. of coal is evaporated: we may verify this by Bourne in his treatise on the steam engine. He states (page 81) that 112 lbs. of coal will evaporate from 11 to 18 cubic feet of water; the last number corresponding with the performance of the very best Cornish boilers: this gives with 1 lb. of coal from 6 to 10 lbs. of water.

Theoretically, the evaporation of 36 lbs. of water (a little more than half a cubic foot) in one hour should thus produce a horse-power: in practice, however, it is found that a cubic foot is required, and this has generally been adopted as the nearest to the results of experience: this brings the theoretical consumption of 3 lbs. of coal to 5 lbs. at least: I adopted 4 lbs. for the minimum reached. Prof. Silliman, who is very correct in collecting his data, states in the last edition of his Physics that in England 10 lbs. of bituminous coal per hour are estimated for every horse power; that in very carefully constructed boilers this effect is reached by 7 or 8 pounds, that in the Cornish boilers with large evaporating and heating surface, the most economical in existence, 5 lbs. are used, and finally that in the United States the anthracite averages 6·25 lbs. per horse-power per hour.

Tredgold, in his practical treatise on Railroads, states, page 82, that 124 lbs. of coal per day in practice, and 82 lbs as the lowest possible theoretical amount of coal per day for every horse-power, is the consumption for the "best locomotive engines likely ever to be invented."

Practical engineers and locomotive builders (for instance at Baldwin's Locomotive Works, in this city) will all agree when conversing with them on this matter, that practically estimating the amount of coal used per horse-power is very difficult, as it is subject to so manifold disturbing influences that the most conflicting results are continually arrived at; therefore, they never trouble themselves with such a calculation, notwithstanding there exists a rivalry on many lines between engineers to economise fuel. The consumption will in the first place depend on the quality of the coal, in which there is more difference than those who do not run engines dream of; then in drawing a railroad train it depends on the state of the weather, temperature, direction of wind, number of stoppages, but above all on the judgment of engineer and fireman, etc. On the Central Pennsylvania road from Philadelphia to Pittsburg, for instance, of two locomotives perfectly alike in all respects, drawing loads also alike, one will use double the amount of coal used by the other, when running over the same distance with the same velocity. Sometimes the same locomotive will improve in this respect and burn less than before, sometimes the opposite takes place. P. H. Vander Weyde.

Philadelphia, Feb. 15, 1867.

An Appreciative Patron.

We wish we had space to publish all the complimentary letters we receive from our patrons; some commendatory of the paper and others of our Patent Agency. But if we should publish half the number we get, we should not have room for anything else, so we forbear inserting only an occasional one. Read the annexed.

Messrs. Munn & Co.—It gives me great pleasure to acknowledge the receipt of my Letters Patent. I particularly admire your ability in framing my specification and claims, which secure to me more than I expected when I applied for a patent. I would say to inventors or those about to apply for patents that if they place their inventions in your hands, they will be successful if there is any novelty in their invention. Omar J. Arnold.

Mt. Ida, Grant county Wis., March 12, 1867.

Kansan Ideas of Comfort.—A subscriber residing in Kansas, after having for years been tormented by the devastations of the gopher, repeatedly losing crops, fruit trees and shrubs, has at last invented a trap which he thinks is a perfect protection, and is happy in the prospect of enjoying peace and comfort in the future. "All I now ask," he says, "is a cabinet organ, a sewing machine, a stereoscope with views, some volumes of the Scientific American, and half a dozen gopher traps."

Mucilage Bottle Cap.—In our notice of this cap, in our last issue, page 212, we omitted to say that the cap is made from spring sheet brass ornamented by beading and is cheaper than any other in the market. We are satisfied from trial that it has no superior among the different kinds which have come under our observation.

[For the Scientific American.]

Application of the Lever Escapement.

By Jules D. Huguenin Vuillemin.

Of all the escapements in use the lever is the one employed as giving the best satisfaction for pocket time-keepers. There are several ways of applying it, not only in the distribution of its degrees but in the adjustment of its different parts. A Swiss firm who have succeeded in giving excellent satisfaction with their watches, adopt the straight line lever escapement with two rollers, the advantages of which may be briefly stated.

By placing on a straight line the lever and the wheel, the teeth of the latter act more equally on the pallets than when put in any other position. This has been demonstrated by several authors, to whom I refer, desiring to be brief in things which have been fully and duly explained by others.

It seems at first immaterial whether or not the center of the balance be a little nearer or a little further from the center of the lever, or in other words, have a long or short fork. As the distance from the pin jewel to the center of the balance is proportionate to the length of the fork, the connection of the levers does not change, consequently the power and resistance remaining between both in the same condition the results are equivalent.

It must be taken into consideration that with a long fork the whole lever becomes heavier, not alone by the addition of weight in the length of the fork but also by the counterpoise with which the backward part of the fork must be charged for keeping its equilibrium. The inertness of the lever and the resistance to the motive power are therefore increased, and friction becomes more extended. For a long fork it is also necessary to employ a large roller. This large roller, by overcharging the center of the balance, makes it necessary to charge also its limbs and to employ a more powerful hairspring and finally a stronger motor or mainspring. As all the resistances of the escapement are increased the causes of wear and tear are also increased proportionately. This consideration shows that it is advantageous to keep the fork as short as possible, without, however, going to extremes.

The difference between the banking generally employed and the banking of the escapement with two roller, one specially for the banking, will now be explained. The roller used generally bears the pin jewel which receives the impulsion from the split of the fork. It is only behind the split of the fork that the banking heel comes, which must be sharp or replaced by a vertical pin to approach as near as possible the center of the roller. As the banking action acts against the edge of the roller, which is somewhat outside of the pin jewel, the heel can not approach the center, and as only a little room can be made, the consequence is that when the watch receives a shock, the heel touches the edge of the roller, which interferes with the vibrations of the balance, and this may also often occur when the watch is hanging.

When the escapement is made with two rollers, the banking roller is behind the pin jewel. The banking pin is longer than the whole split of the ordinary fork, and when in motion describes a larger circle, and consequently approaches much nearer the center of the small roller, and by giving room, which can easily be done, between the small roller and the end of the banking pin, the motion of the watch can never be interfered with, either by receiving a shock or when hanging. This escapement will be found easy to make and to repair when it is by accident out of order.

Various Recipes.

To Clean a Soldering Copper.—Rub it when hot on a brick with rosin and solder.

Arsenical Soap.—This preparation is used to preserve the skins of birds and other small animals. Take of carbonate of potash 12 oz.; white arsenic, white soap, and slacked lime, of each 4 oz.; powdered camphor, ¼ oz. Add sufficient water to form a paste.

Liquid Blacking.—I. Take ivory black 5 oz., molasses 4 oz., sweet oil ¼ oz.; triturate until the oil is perfectly killed, then stir in gradually vinegar and beer bottom of each ½ of a pint and continue the agitation until the mixture is complete.

II. Take ivory black 1 lb., molasses ¾ lb,, sperm oil 2 oz., beer and vinegar each 1 pint; proceed as before.

French Polish for Boots and Shoes.—Logwood chips, half a pound; glue, quarter of a pound; indigo pounded very fine, quarter of an ounce. Boil these ingredients in two pints of vinegar and one of water during ten minutes after ebullition, then strain the liquid. When cold it is fit for use. To apply the French polish, the dirt must be cleaned from the boots or shoes; when these are quite dry, the liquid polish is put on with a bit of sponge.

Solder for Brass Instruments.—An alloy of 78.26 parts of brass, 17.41 of zinc, and 4.33 of silver, with the addition of a little chloride of potassium to the borax, is recommended by Mr. Appelbaum as the best solder for brass tubes which have to undergo much hammering or drawing after joining.

Water-Proof Composition for Leather.—Melt together 1 lb. tallow, ½ ounce neatsfoot oil, 1 oz. of rosin, ½ ounce lampblack and a tablespoon full of boiled linseed oil. Should be rubbed in repeatedly, the boots or other articles to be warmed. It is said to be perfectly water-proof and not injurious to the leather.

The Chicago Tunnel was opened to the waters of the lake on the 7th inst., by four men who walked through it from the shore and ascended through the lake shaft; the ice having rendered it impossible to get at the flood gates by means of a steamer. The men, after opening the gates, were obliged to wait there until a boat could be got within their reach.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Churn Dasher.—Anson A. Avery, Cardiff, N. Y.—This invention relates to an improvement in churn dashers, and consists in forming a dasher with a series of bars fluted and slotted in such manner that the air is caught under and forced through them with the cream so as to thoroughly intermingle in their passage through the bars and thus produce the effect of an atmospheric churn upon the cream, bringing the butter quickly.

Portable Box for Protecting Trees.—Henry A. Graef, Brooklyn, N. Y.—This invention relates to an improved mode of constructing boxes for protecting young trees when planted out where they are exposed to injury from the destruction of the bark by cattle, etc., and consists in forming them of upright wooden slats or metal strips which are attached to wooden or sheet iron hoops or bands.

Hay Loader.—E. C. Green, Plainfield, Ind.—The object of this invention is to load hay or corn fodder upon wagons, either from the shock or the window in the field.

Spring Bed.—David Manuel, Boston, Mass.—This inventions relates to improvements in the construction and arrangement of a spring bed and consists in a new mode of forming the springs and connecting them to the slats and bedstead, which secures an easy and gentle pliability and elastic power in the springs.

Ice Cream Freezer.—H. B. Masser, Sunbury, Pa.—This invention relates to an improvement in ice cream freezers, and consists in arranging a rotary freezing can in combination with a rotary beater in such manner that the can and the beater shall each have a distinct and separate motion independent of the other, or a joint motion when desired; and also an improved mode of packing the side of the beater.

Clothes Tongs.—Benedict Ott, La Crosse, Wis.—The object of this invention is to provide a convenient utensil for the use of women in washing clothes whereby they can lift and handle clothes when hot in a boiler or tub without exposing themselves to being scalded, or when in excessively cold water for rinsing, etc., without contact of the hands to chill them.

Atmospheric Fountain.—John Ross, Greenville, Mich.—This invention consists in improvements in a parlor atmospheric fountain, rendering it more convenient, cleanly and ornamental, by the application of a pump for elevating the water to the upper chamber and a novel arrangement of pipes conveying air and water to the different chambers.

Device for Setting up Barrels, Casks, etc.—C. B. Hutchinson, Auburn, N. Y.—This invention relates to a new and improved device for setting up barrels, casks, etc., whereby the staves previously chamfered and crozed may be set up around their own head, the use of truss and hoops avoided or rendered unnecessary, the barrels or casks all made of an uniform size, and the work performed expeditiously and in a perfect manner.

Gun Wormer.—Henry C. Bascom, La Crosse, Wis.—This invention relates to an improvement in gun wormers or a screw in a ram rod for extricating bullets or a wad from the barrel of a gun and consists in so arranging it in connection with a thimble or case fastened on the end of the ramrod that it may be drawn within the case or portruded therefrom as required, by a screw or slide movement.

Cook Stove.—Seymour Raymond, Middletown, Pa.—This invention relates to an improvement in the tops of cook stoves and consists in making the division plates for the pot holes in such manner that they may be reversed in their position or turned up side down for the purpose of equalizing the action of the heat and preventing them from becoming warped and ruined by the constant action of the fire on one side only to which they are exposed when the plates are not reversible as commonly constructed.

Pad Plates for Harness Saddles.—Palmer Shaw and Edward S. Dawson, Syracuse, N. Y.—This invention has for its object to furnish an improved pad plate for harness saddles, which shall be light, strong and easily and cheaply constructed.

Method of Applying Hoops to Barrels.—Daniel and Edwin Perry, Pawtucket, R. I.—This invention consists in constructing concave bands or hoops, and applying them to barrels, tubs, pails and butter molds by cutting two parallel channels or grooves on the exterior surface of the barrels or tubs at the same distance apart that the hoop is designed to be wide.

Metallic Gage Head and Fastener.—Peter Lawyer, Richmondville, N. Y.—This invention has for its object to furnish an improved gage head simple in construction, easily, quickly, and accurately adjusted, and which when its face has been once made at right angles to the rod will always remain so.

Hernia Truss.—William Pomeroy, New York City.—This invention has for its object to furnish an improved truss so constructed and arranged as to give an upward and inward pressure, which may be shortened or lengthened to perfectly adjust the pad to the hernia; and which will not allow the movements of the body to interfere with the position of the pad over the hernia.

Screw Valve.—John Wilcox, Thompsonville, Conn.—This invention consists in constructing a valve, and in attaching it to its seat and operating it by a screw in such a manner as to adapt it to various purposes, whereby many difficulties which have hitherto been experienced in opening and closing appertures for the admission or discharge of air, gas, steam or liquid is overcome.

Machine for Making Carriage Bolt Blanks.—William Koplin, Newcastle, Pa.—This machine cuts off a suitable length of bar, grasps and points it, upsets it so as to form a square portion between the head and the end longer in diameter than the latter, and lastly swedges a raised head completing the bolt blank which is discharged by a hook which drags it from its bed and drops it to the ground.

Machine for Forming Eave Troughs and Conductor Pipes.—A. Calkins and Wm. Tower, Almont, Mich.—This invention has for its object to furnish an improved machine by means of which the manufacture of eave troughs and conductor pipes may be greatly facilitated.

Axle Box Cover.—Richard McDowell, Lambertville, N. J.—The object of this invention is to provide a cover to axle boxes of railroad cars, which can be easily removed and replaced for cleaning, lubricating and other purposes

Machine for Cultivating and Planting.—Isaac H. Chappell, Decatur, Ill.—This invention has for its object to furnish an improved machine that can be readily adjusted for use either as a cultivator, planter or seeder.

Cotton Bale Tie.—Daniel M. Sechler, Cincinnati, Ohio.—This tie consists of two loops around which the respective ends of the hoop are bent and replicated; the smaller loop is then passed through the larger at a certain point and being slipped back is retained at the narrow portion of the opening in the larger portion.

Churn.—John Megown, New London, Mo.—This invention consists principally in the construction of the churn, and in the combination and arrangement of the operating parts with each other and with the hinged lid so that the said operating parts may be removed from the churn by simply raising and turning back the lid.

Sight for Fire-arms.—Williston Conner, Rensselaerville, N. Y.—The object of this invention is to construct an accurate sight which can be quickly adjusted to any range and which may be removed below the line of range of a fire-arm to which it may be attached so as not to obstruct the use of the intervening sights. With a slight modification the same device may be used for adjusting telescopic sights on fire-arms.

Crystal Sirup.—H. C. Becker, New York City.—This invention relates to a new composition for making crystal sirup, which when added to sugar prevents graining and fermentation of the same, and which is also of great value when used for preserving fruit.

Saw Gummer.—James E. Emerson, Trenton, N. J.—This machine consists of a rotary cutter mounted in a frame which may be attached to the saw blade at will by means of thumb screws used both as clamps and pivots, and an adjustable handle by which the pressure may be always applied in the plane of resistance.

SAW MILL.—O. A. Bassett, Norwich, N. Y.—This invention has for its object to furnish an improved friction feed for circular saws and other machines in which it is necessary to change the direction of the feed while the machine is at work.

BRUSH.—John Brown Alden, Worcester, Mass.—This invention consists in making the body or stock of the brush in two pieces which are pivoted together, whereby the brush can be reversed or changed end for end.

FAUCET.—John Wilcox, Thompsonville, Conn.—This invention consists in constructing a faucet in such a manner that the liability to leak from any part is greatly lessened, the faucet valve being double packed and the packing of all the joints as well as that of the valve being secured in recesses provided for the purpose.

TRAVELING BAG.—Charles F. Blakslee, Brooklyn, N. Y.—This invention consists in perforating the frame in such a manner that the cloth or leather can be fastened directly to it without the use of any other piece or pieces of iron.

BURGLAR ALARM.—C. Waterman, New York City.—This invention relates to a new and improved burglar alarm for doors and windows, and it consists in a new and improved means employed for locking the bell hammer and liberating the same, whereby the alarm, when a door or window to which the invention is applied is partially opened or opened sufficiently far to operate the alarm; cannot be stopped by suddenly closing the door or window.

APPARATUS FOR DRAWING IRON FROM FURNACES.—David N. Williams, Chicago, Ill.—This invention relates to a new and improved apparatus for facilitating the drawing of hot iron from furnaces, and has for its object the arranging or adapting of the several parts in such a manner that the tongs may be adjusted to draw the hot iron from the furnace in any required direction in a right line, thereby greatly facilitating the work, rendering it less laborious, and economizing in time.

COMPENSATING STAY OR BRACE FOR THE SPRINGS OF WHEEL VEHICLES.—Samuel Jackson, Newark, N. J.—The object of this invention is to apply a stay or brace to a vehicle spring, in such a manner that it will work or move to conform to the yielding movement of the spring, and to serve as an efficient brace to the latter at all points or in whatever position the spring may be in.

CORN PLANTER.—Curran Henkle, Washington Courthouse, Ohio.—This invention relates to a new and improved means for distributing or discharging the seed from the seed box or hopper of the machine, and depositing the same in the furrow, whereby the planting or dropping of the seed is placed under the complete control of the operator, and a very simple and efficient device for the purpose specified obtained.

BURGLAR-PROOF SAFE AND VAULT.—E. M. Hendrickson, Brooklyn, N. Y.—This invention relates to an improvement on that class of burglar-proof safes and vaults in which chilled cast-iron walls are employed in order to prevent an entrance being effected by means of drilling.

HOP FRAME.—Jacob B. Van Dewerker, Cobleskill, N. Y.—This invention relates to a new and improved frame for training hops, and has for its object simplicity and economy in construction, and facility in training the vines thereon, and in removing the bearing portion of the vines when in a proper condition to gather or harvest.

PUMP.—Hiram Tyler, Gaines, N. Y.—This invention relates to a new and improved double-acting pump, and it consists in a novel arrangement of valves and water passages, and in an improved construction of the valves, whereby the pump is rendered very efficient in its operation, the parts not liable to get out of repair or become deranged by use, and the pump capable of being used either submerged or above the level of the water to be raised or forced up.

WINDOW FASTENING.—J. D. Smith, Naugatuck, Conn.—This invention relates to an improvement in that class of window fastenings, which are composed of a bolt provided with a spiral spring, the bolt working in metallic thimbles fitted in the side of the sash.

HEAD BLOCK FOR SAW MILLS.—William Carlton, Dunkirk, N. Y.—This invention relates to a new and improved head block for saw mills, and it consists in the means employed for adjusting the knees or standards against which the log to be sawed bears, and by which means the log is set to the saw.

FASTENING FOR CORSETS.—James Bowers, New York City.—This invention relates to a new and improved fastening for that kind of stays or corsets which are composed of two parts, connected by a lacing at the rear part, and by a fastening at the front, which will admit of the front ends of the two parts being readily connected or disconnected.

HEAD BLOCK FOR SAW MILLS.—George Burket and Samuel M. Gaskill, Bluffton, Ohio.—This invention relates to a new and improved head block for saw mills, and it consists in an improved mechanism for setting the log to the saw, and also in an improved reversing mechanism for gigging back the carriage.

SEWING MACHINE.—Walter Bennett, Hunt's Hollow, N. Y.—This invention relates to a new and useful improvement in that class of sewing machines in which a reciprocating shuttle is used, and the invention consists in the means employed for guiding the shuttle carrier or retaining it in proper position while being operated.

DISTILLATION OF BROMINE AND IODINE.—David Alter, Freeport, Pa.—The nature of this invention relates to an improvement in the distillation of bromine and iodine by the use of an alkali to absorb the fumes of bromine and hydro-bromic acid, which would otherwise escape during the production and distillation of the above-named substances.

MILK CAN.—John L. Finch, Warwick, N. Y.—This invention consists principally in the combination of an iron outer case, with a milk can constructed in the ordinary manner, except that the narrow hoops usually put around milk cans are omitted.

HAY RAKE.—John I. Munroe, Burlington, Mass.—This invention consists in applying elastic tips to the rigid teeth of an independent toothed hay rake, to enable them to pass over obstructions without gaping and scattering the hay already collected, and the combination of a divider with the frame of the rake, which, when the teeth are raised to discharge the collected hay, may at the same time drop down into the spread hay, and separate or divide it, so that when the rake teeth descend, and the divider rises, the said teeth may drop down into the space thus cleared, and no hay be left scattered or trailing behind the rake.

HANGING RECIPROCATING SAWS.—Josephine Stewart, Owasso, Mich.—This invention consists in so arranging the different portions of the machine that the saw may be forced back during its upward stroke, to avoid unnecessary friction, and to permit the escape of the saw dust. When it descends, the saw is drawn forward against the timber to be sawn, combined vertical and horizontal motion is thus imparted to the saw.

BENDING MACHINE.—E. D. Gird and W. K. Gird, Cedar Lake, N. Y.—This invention relates to a machine for bending wood, iron, or other material, to any desired shape or form.

WAGON BRAKE.—R. O. Codding and G.W. Pringle, Coddington, Ohio.—This invention relates to a brake which is applied to the front wheels of a wagon in descending a hill, to relieve the team from the pressure of the load.

LOCK.—William J. Hare, New York City.—This invention relates to a lock, the principal working parts of which consist of two spring jaws, which catch into a neck on the stud or nose, secured to the door, lid, or other part, to be locked, and which are forced apart by the action of a key on one or more wedges, which enter below the spring jaws, and compel them to release the stud or nose in such a manner that a simple and secure lock is obtained, which cannot be readily picked or blown open, and which can be applied with advantage to doors of any description, or to trunks or other articles of a similar description.

MACHINE FOR CUTTING SHINGLES AND BARREL HEADS.—S. E. Anthony, Stillwater, N. Y.—This invention relates to an improved machine for cutting shingles and barrel heads, and of that class in which circular saws are employed. The invention consists in the employment or use of an endless bolt carriage, constructed in such a manner that it may work over pulleys, and using in connection therewith one or more circular saws and beds, and an automatic dogging device, all being arranged to operate in the most efficient manner.

BRICK MACHINE.—Philip H. Kells, Adrian, Mich.—This invention relates to a mold wheel which is supported by carrier wheels; the clay is pressed into the molds by the blades of the pug mill, and a contracting throat, and is cut off, forming the upper surface of the brick by the passage of the mold under a cutter board. The brick is raised and discharged from the mold by a follower moved from below by the passage of its carrier wheel upon an inclined plane on the bed track.

KINDLING ARRANGEMENT FOR STOVES.—Harvey L. Byrd, Baltimore Md.—This invention consists in a basket which contains kindling; and hinged under the grate of the stove, so as when elevated, and the contents ignited, to start the fire in the coals chamber of the stove.

COMBINED RULER AND BLOTTING PAD.—Messrs. Walker & Sneeden of Newark, N. J., have patented a simple and convenient blotting paper holder and ruler combined, which will be very desirable for the counting house. The edges of a short and broad rule are grooved, the paper is cut just wide enough to cover the underside and the grooves, and a clamp of bent wire is slid on from each end, resting, and holding the edges of the blotting paper, in the grooves. This ruler may be freely used on the ledger, or on paper where successive or cross rulings are to be made, without the necessity of looking out for the fresh ink.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

64.—TREATING BENZOLE AND OTHER HYDROCARBON LIQUIDS, ETC.—John Johnson, Wilmington, Ill. Jan. 10, 1867.

138.—CONSTRUCTION OF STEAM GENERATOR.—George Gould, Troy, N. Y. Jan. 19, 1867.

182.—FIRE-ARM.—Sylvester H. Roper, Roxbury, Mass. Jan. 24, 1867.

217.—VOLUTE SPRING.—Charles Morrill, New York City. Jan. 26, 1867.

219.—MACHINERY FOR ROVING AND SPINNING WOOL AND OTHER FIBROUS MATERIALS.—Edwin Allen and Henry T. Potter, Norwich, Conn. January 26, 1867.

341.—BENCH VISE.—John S. Hoar, Mass. Feb. 6, 1867.

394.—PROCESS FOR PREPARING RAW HIDE FOR THE MANUFACTURE OF VARIOUS ARTICLES.—William H. Towers, New York City. Feb. 12, 1867.

71.—MAKING PHOTOGRAPHIC TRANSFERS.—Arthur G. Morvan, South Bergen, N. J. Jan. 11, 1867.

93.—LOOM FOR KNITTING.—Augustus C. Crecy and Hugh K. Moore, Malden, Mass. Jan. 14, 1867.

99.—PIPE MOLDING AND CASTING APPARATUS AND BLACKWASHING THE MOLDS.—George Ross, Newport, Ky. Jan. 14, 1867.

121.—TINTING OR COLORING THE SURFACE OF PAPER OR OTHER MATERIALS OR FABRICS.—George Streat, New York City. Jan. 17, 1867.

175.—COTTON-BALE TIE.—John Lee, Blakely, Ga. Jan. 23, 1867.

185.—MACHINERY FOR BLOCKING HATS.—William C. Griswold and Julius Sheldon, New York City. Jan. 24, 1867.

199.—SPINNING AND TWISTING MACHINERY.—George Chatterton, Providence, R. I. Jan. 25, 1867.

260.—MACHINE FOR MANUFACTURING EYELETS.—William R. Landfear, Hartford, Ct. Jan. 30, 1867.

3,403.—PREVENTING ROT IN POTATOES AND GRAPES, ETC.—John F. Bennett, Pittsburgh, Pa. Dec. 28, 1866.

58.—PNEUMATIC APPARATUS FOR THE TREATMENT OF DISEASES IN AN ATTENUATED ATMOSPHERE.—George Hadfield, Cincinnati, Ohio. Jan. 8, 1867.

100.—ROTARY ENGINE.—Truman Merriam and James Cushing, Waterloo, Wis. Jan. 14, 1867.

188.—COMBINED TACK DRIVER AND CARPET STRETCHER.—Thomas Jebb, Buffalo, N. Y. Jan. 24, 1867.

202.—HAMMER.—Joseph A. Veazie, Boston, Mass. Jan. 25, 1867.

212.—TELEGRAPH CONDUCTOR AND CABLE.—John M. Batchelder, Cambridge, Mass. Jan. 26, 1867.

214.—WATER CLOSET.—David Lichtenstadt, New York City. Jan. 25, 1867.

255.—GAS REGULATOR.—Joseph S. Wood, John J. Carberry, John Baker, Jr., and Oscar D. McClellan, all of Philadelphia, Pa. Jan. 30, 1867.

269.—MACHINE FOR CUTTING SCREWS.—Henry Brown, New Haven, Ct. Jan. 31, 1867.

283.—OBTAINING METALS FROM THEIR ORES.—John Wyckoff, Brooklyn, N. Y. Feb. 1, 1867.

311.—BALE TIE.—Charles W. Walley, New Orleans, La. Feb. 4, 1867.

323.—MAKING FOIL OF LEAD COATED WITH TIN.—William W. Huse, New York City, Feb. 5, 1867.

NEW PUBLICATIONS.

THE MECHANICIAN AND CONSTRUCTOR, for Engineers, Comprising Forging, Planing, Lining, Shaping, Slotting, Turning, Screw Cutting, etc., by Cameron Knight. London: E. & F. N. Spon.

This is a serial publication, large quarto, sixteen pages of letter press, and four of fine plates in each number. It is issued monthly, to be completed in about twenty-four numbers, at $1 each. From the two specimen numbers before us we conceive a very favorable idea of its merits and purposes. Unlike many publications ostensibly designed for the instruction of the mechanic, it does not assume that he is already a mathematician, or even a thorough workman, but begins *ab initio*, furnishing valuable information in its first chapters to the workman as well as to the apprentice and beginner. No detail, in the manipulation of the metals used in constructing machinery appears to be regarded as too simple for the author's attention, and while describing and illustrating the proces es, he gives much valuable advice, valuable even to the experienced. The work is really excellent, and will prove valuable to every machinist and practical engineer. It is got up in superior style. For sale by John Wiley & Son, No. 535 Broadway, New York City.

THE AMERICAN CONFLICT. By Horace Greeley. Hartford, Conn.: O. D. Case.

We are indebted to the publisher for the second volume of this elaborate work by Horace Greeley. The first volume, which treated of the political causes which led to the secession of the Southern States followed by armed resistance to the authority of the Federal Government, had a larger sale than any other work of the kind which has yet appeared from the press. The present volume, which contains 782 pages, embraces a complete review of the war from the surrender of Gen. Twiggs, at San Antonio, Texas, to the final capitulation of the trans-Mississippi forces under command of Kirby Smith. In treating of the sanguinary events of the war, the author has employed his acknowledged resources in grouping together the tragic movements of armies and navies with great effect.

GUIDE MAPS AND HAND BOOKS

Of Iowa, Minnesota, and other western States and Territories, are published by Blanchard & Cram, Chicago: presenting their agricultural, commercial and manufacturing resources, physical geography, geology, mineralogy, climate, institutions, and statistics which are very valuable and useful to all who take an interest in the progress of our country.

EXTENSION NOTICES.

Hamilton L. Smith, of Gambier, Ohio, having petitioned for the extension of a patent granted to him the 7th day of June, 1853, for an improvement in paper files, for seven years from the expiration of said patent, which takes place on the 7th day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 20th day of May next.

James Rees and Robert Crichton, executors of Henry Carter, deceased, and James Rees, of Pittsburgh, Penn., having petitioned for the extension of a patent granted to the said Henry Carter and James Rees the 22d day of November, 1853, and antedated June 3d, 1853, for an improvement in nut machines, for seven years from the expiration of said patent, which takes place on the third day of June, 1867, it is ordered that the said petition be heard at the Patent office on Monday the 20th day of May next.

William S. Hyde, of Townsend, Ohio, having petitioned for the extension of a patent granted to him the 21st day of June, 1853, for an improvement in cultivator plows, for seven years from the expiration of said patent, which takes place on the 21st day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 3d day of June next.

Ralph J. Falconer, of Washington, D. C., having petitioned for the extension of a patent granted to him the 7th day of June, 1853, for an improvement in Hose Coupling, for seven years from the expiration of said patent, which takes place on the 7th day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of May next.

Giles F. Filley, of St. Louis, Mo., having petitioned for the extension of a patent granted to him the 14th day of June, 1853, for an improvement in cook ing stoves, for seven years from the expiration of said patent, which takes place on the 14th day of June, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day of May next.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

M. C., of Ga., says that he applied in 1859 a method of discharging bilge water from leaky ships by means of an outward projecting pipe through the bottom of the vessel. It was applied to a steamer plying between Savannah and Florida and proved very efficient while the vessel was in motion. We do not exactly know when this device was first employed, but have the impression that it dated before 1859. See page 185.

R. H. S., of Mass.—Globe valves of composition are of excellent form and material to conduct heat, and if connected with the water space of the boiler by a short pipe will certainly get hot. Even if the heat is no more than that of boiling water—212°—it is too great for the bare hand. Cover the hand wheel with woolen lagging, or attach a wooden cross for handles to the wheel. . . . Equal quantities of tallow and lard, not salted, is better than tallow alone to mix with white lead for covering the polished parts of machinery. The tallow makes the paint too hard to be readily removed. Mix until the paint is of proper consistency to work with the brush.

L. M., of ——.—You will see in our last issue, No. 13, that we have referred to the subject of centrifugal motion as applied to belts. We think you are wrong in attributing centrifugal force only to bodies revolving rapidly. We intend to refer to this matter again.

A. S., of N. B.—Your claim for the largest cylinder engines for New York city up to 1866 is correct. England has built a larger one, but not for marine, but for pumping purposes.

A. S. Y. R., of N. Y.—In speaking of a bow rudder of the *Dunderberg* we used the word "bow" to designate "forward." The rudder is forward of the propeller, over the shaft, and may be called an "equipoise" or "ballanced" rudder.

J. H. H., of Wis.—The cracking of the water-back plate of your range is undoubtedly due to your improved draft, and consequently increased heat. The water evaporates into steam faster than it is supplied allowing the plates to burn. Make your space between the plates larger or use thicker and more strongly braced plates. Your suggestion of making ribs on the plates may be a good one. We cannot be more definite unless we know all the facts.

A. V. V., of N. Y.—We cannot give you the size of flues used in the boilers of ocean steamers unless we enumerate half the ocean steamers in existence. Some use tubes, some cylindrical, oval, and rectangular tubes, varying with the style of boiler.

H. W. S., of Me.—Mix your powdered plumbago with tallow or lard, and apply it as a paste to the parts where the friction is excessive.

G. B. S., of N. Y.—The difference in the amount of water flowing through one 4-inch pipe and four 1-inch pipes, head and pressure being equal, depends upon the areas of the pipes and the relative friction on their inside surfaces. As one only of these data is necessary to show you that they are not analogous, we state the area of the 4-inch pipe to be 12.57 inches while that of the 1-inch pipes is only 3·14 inches.

H. B., of Ill.—Turbine wheels work successfully under a less head than three feet. Water power, except in some very peculiar cases, is cheaper than steam power. . . . We cannot understand how electricity could be generated in a pneumatic tube to interfere with the action of the machinery. . . . No objection we can conceive of exists which may not be overcome, against the use of lag screws to secure rails to sleepers. We do not, however, remember any case where it has been tested.

T. A., of O.—Printing ink is composed of burnt linseed oil, resin and lampblack. Its quality depends greatly on the proper preparation of the oil, and the intimate mixture, by grinding, of the ingredients

M. D. K., of O.—We cannot give you reliable advice on coloring your gilding until we know the nature of the gilding process you employ.

L. J. G., of Md.—A ventilating register in the center of the ceiling is not a new device. The position of the ventilating register, whether at the top or the bottom of the room has been much discussed. There is no very authoritative opinion on either side of the question.

H. C. R., of N. H. wishes to know the amount of carbon in lead pipe compared with that of cast steel. Steel is a chemical compound of iron and carbon, but there is no corresponding compound of lead and carbon. Steel contains from one to one and a half per cent of carbon.

T. H. R., of N. J.—The adjutage for a fountain of water to secure the greatest flow has a length equal to two or three diameters and it has been found advantageous to slightly taper the tube outwards. This statement of the case is probably sufficient for all practical purposes and is all the information on the subject to be found in ordinary works on physics. We do not think the experimental data can be found for a precise answer to your question.

B. C., of N. H.—Will galvanized iron pipe injure well water? B. C. had excellent well water until it was brought into his house through a galvanized iron pipe. Now it is very hard and getting worse. He has another well of soft and excellent water 4 or 5 rods from the first one. We find no sufficient chemical reasons to connect the hardness with the galvanized pipe. The change will probably be found in the water before it enters the pipe and the hardness is due to sulphate of lime.

I. X. L., of N. Y.—"Do you know of any process by which sand can be mixed so as to become as hard as granite?" Yes. Mixed with an equal weight of soda ash and melt into glass.

C. H. C., of Ill., sends us an ingenious device for a perpetual motion based on the assumption that there is some substance which being interposed between a magnet and its armature will intercept or neutralize the magnetic force. When we find such a substance we will entertain the possibility of perpetual motion.

E. P., of Conn.—It is the contents of the egg shell, not the shell itself, which settle the coffee. If you carefully wash the shells from the adhering white of egg they will be useless. If the coffee is not ground too fine it settles well enough spontaneously. The practice of settling coffee with eggs and fish skins is very properly going out of fashion.

L. N. F., of Md.—If you are a tyro in electro-plating you will get useful information in the present number.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Jno. H. Glover, Lawrence, Mass., wishes to communicate with parties who can make pure zinc seamless tubes, 2 feet long, small.

F. A. Clark, Plantsville, Conn., wishes to undertake the sale of a popular and desirable patented invention.

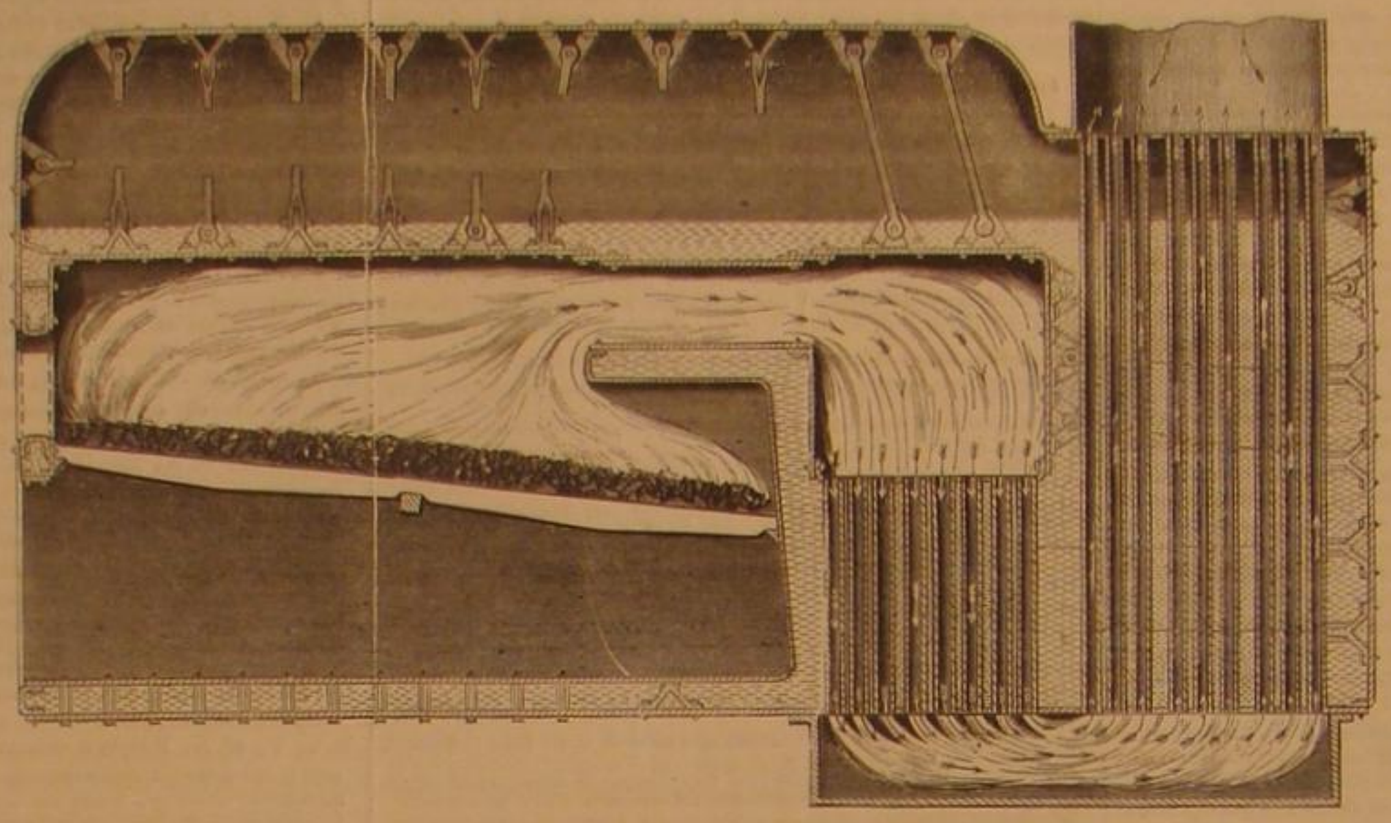
To Die Sinkers and Letter Cutters.—Wanted to contract for a large number of steel dies and letters. Parties prepared to do such work will please address Rollin Defrees, Washington, D. C.

E. N. Hays, Tuskegee, Ala., wishes to communicate with makers of padlocks.

H. Reed, Atlanta Ga., wishes to correspond with Tanners and those contemplating building on his improvements about patented.

Gas Burning and Superheating Boiler.

The combustion of the gases evolved from fuel and the proper distribution of heat in a steam generator is a desideratum to obtain which many attempts have been made. The boiler, a longitudinal section of which is presented in the engraving, is intended to accomplish this result. As will be seen, the grate surface is very much larger in proportion to the water surface than in ordinary boilers. Projecting above the grate and covering a portion of it is a water leg acting as a bridge wall. Against this the flames impinge and partially envelope it; then the flame, smoke, and gases follow the direction of the arrows down through the vertical tubes to the lower combustion chamber into which through suitable apertures, governed by dampers, a proper quantity of atmospheric air is admitted to aid in the combustion of the gases, when the products pass upward through the back tubes to the smoke stack. These tubes may be carried as high above the water level as desired, to superheat the steam. On the top of the boiler a dome of any required form and dimensions may be placed.



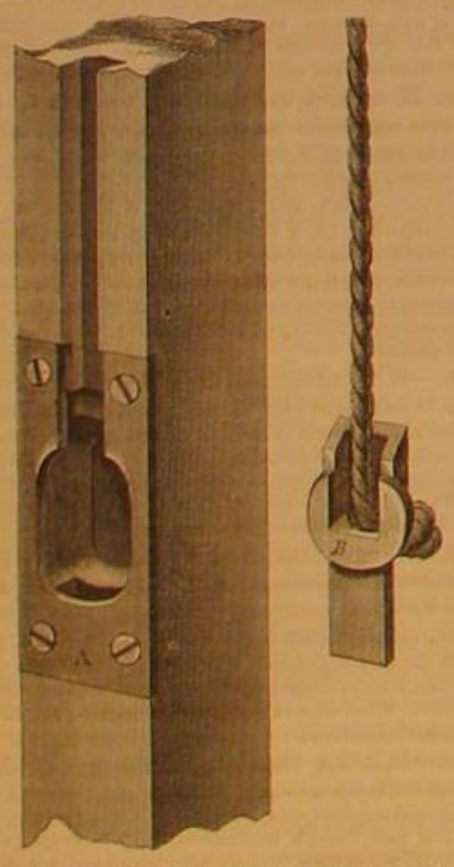
LESLIE'S STEAM BOILER.

To this boiler either the horizontal or vertical system of tubes or flues may be applied, or both may be combined in the same boiler. The addition of a combustion chamber for the purposes of consuming the gases, after they have left the furnace proper, is considered by the inventor superior to the device of burning them in the same chamber with the solid fuel. He claims that a good circulation of the water is insured by the peculiar construction of the boiler, and that the sediment will be deposited at the sides from whence it can be readily removed at the hand-holes. Those boilers of this style now in use, steam easily and rapidly, and the furnace can be adapted to all sorts of fuel, bituminous and antharcite coal, wood, shavings, sawdust, and coal dust. It is claimed that the water level will change very little with irregular feeding and that the boiler never primes.

It was patented July 5, 1865, through the Scientific American Patent Agency, by Hugh Leslie, proprietor of the Franklin Boiler Works, foot of Morgan street, Jersey City, N. J., where the boilers can be seen. He is now building one of fifty horse power. Communications relative to state rights or other particulars should be addressed as above.

SWIFT'S SASH-WEIGHT ATTACHMENT.

On the occasion of our annual house cleanings, those who have the sashes of their windows suspended by cords and



weights have some trouble to remove them, and, after cleaning, to replace them. It is a difficult matter to re-tie the knot so it will not slip but move clear.

We show in the engraving a very simple device for readily detaching the cord and weight from the sash and as easily attaching it. It consists of only two pieces of cast metal—iron will do, as they are always hidden—one, the plate, A, recessed in the sash frame and held by screws, and the other, B, made to slip into the plate, A. For better explanation we represent the two pieces separately. As will be seen the wood of the frame is morticed under the plate sufficiently to receive the cord catch, the tang of which passes under the lower part of the plate, and the piece is held in place by that and the circular boss, B, bearing against the walls of A at the upper part of the oval aperture. The cord passes through the piece, B, and is knotted in the usual manner, passing up through the longitudinal slot to the pulley in the window frame. The cord piece, B, can be readily detached by sliding it downward and pulling it outward.

This device was patented through the Scientific American Office March 5 1867, by Carlos Swift, of Mount Carroll, Ill. who will furnish any additional information.

Unique River Steamboat.

An eminent English marine engineer has given to the public a plan made by him at the request of Mr. H. B. Wilson, of New York, for a North River steamer of peculiar construction, designed to run thirty miles an hour and compete with the express trains of the Hudson River Railroad in point of time while in distancing them in comfort and cheapness. We presume, from the publication, that this plan was not accepted; but as a plan from high English authority, it is a curiosity. The hull was to be pointed at both ends, increasing by nearly straight lines to an extreme width of fifty feet at the center; length 450 feet, and draught 7 feet. Ten 19-feet paddle wheels, whirling at the rate of 72 revolutions a minute (!) were to be worked separately by as many pairs of 4 feet cylinders with 4 feet stroke, and so arranged that no wheel should work in the wake of another. A single immense boiler, 240 feet long, was to run lengthwise, on the bottom of the boat; its under part divided into 70 furnaces 3 feet wide, on each side, and the whole ventilated by ten chimneys. The main cabin would be above all the working parts. The description bears some resemblance to a paragraph in circulation here relative to a proposed Bessemer-steel boat for the North River.

What We Are Coming To.

The progress of railroad irresponsibility and barbarism on our city lines, causes the accounts of East Indian railway management to seem but a slight and natural advance—where there is any difference—upon that we are familiar with. An Indian journal says: "Whether the crowd be great or small, we have never known it considered necessary, so remarkable is the elasticity of the carriages, to afford extra accommodation. Last year, no less than seven or eight corpses, if we remember rightly, were taken from the carriages of this line (Calcutta & Delhi) alone—victims to a barbarous system of over-packing. Men and women are often so crushed in a third-class carriage as to be compelled to remain standing for the entire length of a journey, sometimes 400 or 500 miles, and at the hottest season of the year. Nowhere are the natives treated otherwise than as wild beasts. Tickets for distances under those paid for are constantly issued to the ignorant." Natives are arrested and dragged from the cars by drunken officials under the meanest pretexts, and when forced into higher-class cars for want of standing room in the others, are compelled to pay the extra charge for the accommodation of the company. Capt. Williams, an under secretary to the Government, states that the number of persons found dead in trains is very large.

Oiling the Sea.

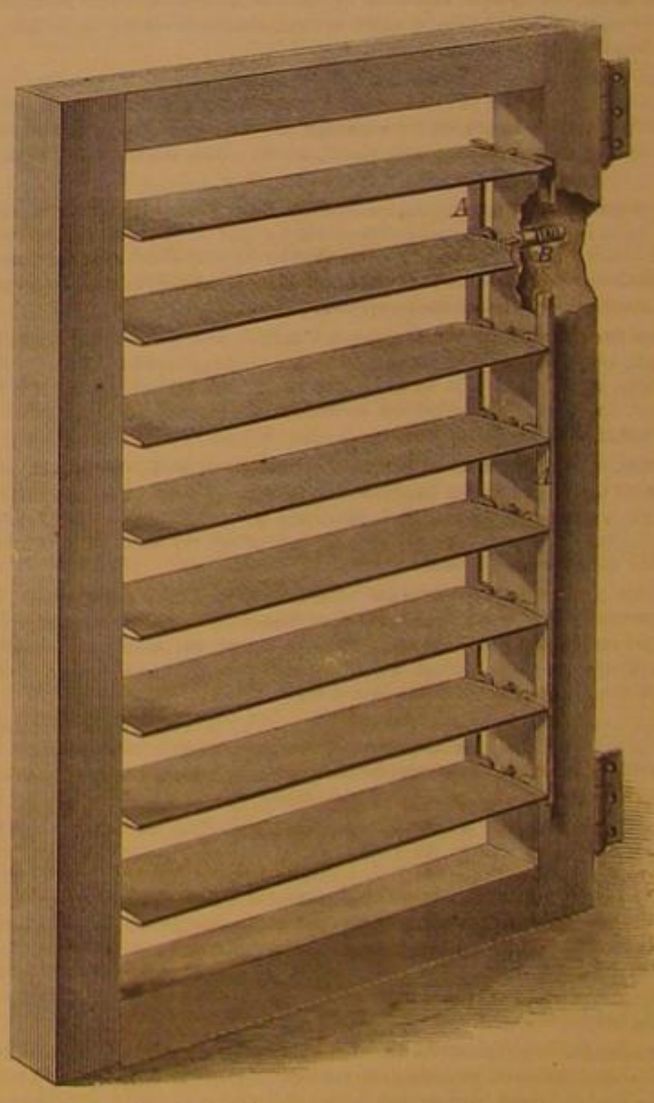
An experienced sea captain writes to the New York *Herald* that he has been at sea for twenty eight years, and master of a vessel for the last ten years, and during that time he saved the vessel under his command twice by "oiling the sea." He writes that "when the master of a ship cannot get out of a storm—that is, when a ship is disabled and he has to take the heft of the gale—if he has oil on board, start two or three gallons over the side of the ship. This will give the ship smooth water to the windward, and then the oil allowed to run drop by drop is all that is required, for as soon as the sea comes in contact with the oil it breaks, and the ship is in smooth water as long as the oil is allowed to run. In 1864, in the heaviest gale of wind I ever saw, I lost all my sails, then the rudder; and I know the vessel could not have ridden the sea for an hour if I had not had oil on board. Five gallons of oil lasted me fifty six hours, and this saved the vessel, cargo and lives on board. Let ships of heavy tunnage have two iron tanks of forty gallons each, one on each side, with faucet so arranged that the oil can be started at any time; small vessels, ten gallon tanks, and all ship's boats tanks of five gallons each, well filled, so that in case the ship founder or burn, the boats will have oil to smooth the sea in case of a gale. With these tanks of oil on board of ships and a good man for master—one who knows the laws of storms and handles his ship so as to get it out of the center of the storm, you will have no more foundering of good ships at sea, with the loss of many lives and millions of money."

HUTTON AND MEE'S IMPROVED BLIND ROD.

In the sultry summer, when with open windows and shut blinds we woo Æolus and deprecate the ardent gaze of Sol, it is pleasant to have the breeze, however faint, reach us, while we are certain the solar heat is shut out. For this we have the Venetian blind, so universally used in this country that it is no longer Venetian but American. Much of our comfort however, depends on the precise angle which the slats present to the horizon. But although our blinds are so arranged that we may move the slats in unison, in the ordinary blind, their permanence in the position desired depends simply on the friction of the pivots or of the guiding or adjusting rod.

By these means the slats may, or may not, retain their position, and constant wear reduces the friction so that the slats either fall of their own weight or are disturbed by a jar or abreath of wind. This contrivance is intended to secure rigidity of the slats in all positions.

It is simply the adaptation of metallic bars, A, placed at the side, instead of the center, and connected to each slat by a small pivot. Placed on both sides of the slats, they insure a more perfect and uniform movement of them. Being on the side they will not interfere with the raising or lowering of the window frame. One or more of the pivots of the slats come in contact with a spiral spring, B, seated in the



frame of the blind, which presses against it, and by its tension holds it in any position.

This device was patented through the Scientific American Patent Agency, January 1st, by Robert Hutton, assignor to himself and William Mee, of the same place, whom address for particulars, No. 1 and 3 South Seventh street, Williamsburgh, N. Y.

American Banking House in Paris.

Many of our citizens visiting Paris, at this season will find their interests and comforts greatly promoted by visiting the American Banking House of Messrs. Jas. W. Tucker & Co. No. 3 and 5 Rue Scribe. This firm have a Banking House; a commission department to purchase goods of every description; a steamer office for which they will act as agents for procuring passages; a reading room supplied with the leading journals of this country, also a post office and registry for the convenience of their customers.

Erratum.—In Mr. Baird's advertisement of "The Practical Draughtsman," the price of that costly work was erroneously printed $1. It should have been $10.

SCIENTIFIC AMERICAN.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

VOL. XVI., No. 14....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, APRIL 6, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

*Improved Screw and Stud Machinery 213
Treatment of Animal Refuse in Europe 214
Electro-Metallurgy—Electrotyping and Electro-plating 214
Editorial Summary 215
*Improved Truck 216
Converting Electro-Magnetic Engine 216
Laws of Development 216
The First Eight-Hour Law 216
Electricity and Fogs 216
Particulars of Dr. Livingstone's Death 216
English and American 216
Improvements in Mississippi 216
Action and Reaction—The Proper Unit of Measure for Force 217
Printers "Wants" and "Don't Wants" 217
Steel Bridges and Subaqueous Tunneling 217
Gage for Laying Out Tank Staves. 217
Consumption of Coal 217
An Appreciative Patron 218
Application of the Lever Escapement 218
Various Recipes 218
Recent American and Foreign Patents 218
Inventions Patented in England by Americans 219
New Publications 219
Extension Notices 219
Answers to Correspondents 219
*Gas Burning and Superheating Boiler 220
*Swift's Sash-weight Attachment.. 220
Unique River Steamboat 220
What We Are Coming To 220
Oiling the Sea 220
*Hutton and Mee's Improved Blind Rod 220
American Banking House in Paris. 220
The Value of Mechanical Skill in the Arts 221
The Teredo, or Ship Worm—Important Trial 221
A Word About Almanacs 221
Gravel and Cement Mining 222
Coppering Iron 222
Patent Claims.....222, 223, 224, 225, 226
*Improved Rail Joint and Base Plate 228

CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK Row, and not at No 39.

THE VALUE OF MECHANICAL SKILL IN THE ARTS.

Those who collect statistics of the world's material progress, and writers on cognate subjects, are fond of exhibiting and rehearsing the triumphs of machines over men—of mechanical contrivances over human skill. So much is attention attracted in this direction that we are apt to forget, in our admiration for the machine and its inventor, the skill of the mechanic whose delicacy and exactness of manipulation alone made it a success. We wonder that the machine can in its action so nearly approach the operations of the hand guided by the judgment, and almost venerate the intellect, which, by patient plodding or almost unexpected discovery, created it. But we do not so often wonder at the skill of hand, the correctness of eye, and the sensitiveness of touch by which the working mechanic elaborated the design of the inventor.

Mechanical skill is never a natural gift; it must be acquired by a long, persistent, and patient practice. There are those who much sooner get control of tools than others. Some can never, even by long practice, become close workmen; but generally the skill necessary to exact workmanship can be acquired, if the workman is not deterred by repeated failures and concentrates all his mental powers on the object sought. And the results are often surprising. The delicacy of touch in handling, forming, and adjusting the diminutive parts of a watch, for example, is almost miraculous. Lately, in reading a description of the Waltham, Mass., Watch Company's Works, we found a statement of the wonderful results of well-adjusted and delicate machinery which was almost incredible. It stated that perfect screws of steel, of such diminutive proportions that a microscope was necessary to see their form, are made by machinery. A pound weight required 300,000 of them, valued at from $3,000 to $3,500. But, we ask, how was the machinery built by which these screws were made? Simply by manual skill. In this same concern a workman had to make by hand the tool by which a tool was made, which latter tool became a portion of an automatic machine, and on this tool-creator he spent wearisome weeks of careful labor.

In fact all the astonishing results of automatic machinery are to be attributed to the hand skill of the workman. Is it any wonder that when we witness the performances of an intricate machine, as the card machine, for instance, we can hardly withhold the tribute of respect we pay to the exercise of human judgment? Human ingenuity, skill, brains, have been employed in its creation. Possibly a portion of that subtle essence called reason is in some way instilled into or imparted to the congeries of mechanical movements we call a machine. Indeed, are we not, as mechanics, in some sense machines? And yet for some purposes do we not create our equals—yes, even our superiors? But this is leading us into the regions of the metaphysical. We leave this to others, as not belonging to our province. We wish, mainly, to call the attention of mechanics to the importance of a practical knowledge of the skillful manipulation of tools, the necessity of patience in acquiring that skill, and the truth that the wonderful results of some of their productions, which may surprise even themselves, are simply and really the results of their own perfection in the use of tools, guided by their mechanical judgment.

It is true that a machine of steel, iron, brass, wood, and leather may produce results impossible to be imitated by hand, if rapidity, economy, and repeated exactness is required. Yet the machine which does this work is actually the product of manual skill as well as of inventive genius. And this manual skill—this education of the hand—is as valuable and necessary now as before machines, as technically considered, became common. In the age of chivalry, when the art of working metals was guarded as a secret, and the "cunning workmen" was the recipient of honors for his handiwork, everything like perfection in workmanship depended upon the judgment and handicraft *of* the workman. He had no machinery to reproduce copies of his work, but each successive result was from his own unaided and personal exertion. Such men are as valuable now as then. There is plenty of work to be done which no machine, however complex and ingenious, can compass; and the good workman is valuable, as is the inventor or the manager.

We witnessed an illustration of this fact, on a somewhat large scale, a few days ago, in a visit to the jewelry establishment of Carter, Howkins & Dodd, in Newark, N. J. The business of this establishment consists entirely in the manufacture of fine solid jewelry, gold, pearls, jet, coral, and enamel being the materials. They do not pretend to set gems, only to make gold jewelry. No article manufactured at this establishment is sham, filled, or of inferior material; and although the products of their work range from the plainest of plain gold rings to the most intricate chain work, hardly any portion of it is made by machinery. The main building is a perfect hive of industry; the workmen or workwomen sitting as closely together as the demands of their respective employments will serve, and from stage to stage producing most elaborately finished specimens of work.

Many people suppose that not only the sham jewelry known as "Attleboro jewelry"—from Attleboro, Mass., where the manufacture of false jewelry once was a principal resource of the town—but that good specimens also were made by machinery; "struck up" by means of dies acting on almost infinitesimally thin sheets, afterward to be "filled" with a baser metal to give them weight and solidity. This, however true it might have been a few years ago, is not now the case. Singularly enough as soon as gold went out of the community as a circulating medium of exchange, the people, satisfied before with imitations of its genuineness, demanded the reality, and now, we are told by Mr. Howkins, of the Newark firm, nothing suits the market but solid and genuine jewelry.

Some of the work, of course, must be done by machinery; as the rolling of the gold ingots into plates and the polishing of the finished work; but most of it is really and only hand work, depending for its exactness and nicety wholly upon the skill of the workman. Take the round jewelry so fashionable—pins, ear drops, studs, etc. They are first a disk of gold, cut from a sheet, to one edge of which is soldered a ring of similar sheet gold, making a flange. It is to be either chased or ornamented with enamel. The chasing is the work of the engraver, who must, by hand, cut every mark upon its surface; or if to be enameled, the pattern to receive the enamel is recessed into the gold by the graver, and then is sent to the filler who places the enamel in the recesses. This work, also is hand work. The enamel comes from Europe in masses resembling opaque glass, black, blue, or white, and is ground into a thin paste with water and laid into the spaces with a camel's hair brush by women. The article is then placed in a muffling furnace and subjected to a great heat which seats it firmly to the gold, the enamel acting, under heat, as a flux.

The settings of pearls, coral, and jet are also formed into shape by hand, and the material is set into these by hand. Even the watch chains we so much admire, the delicate threads of chains for suspending pin drops and handkerchief holders, and the network which forms the delicate bracelets sometimes seen, looking like ribbons of woven gold, are all formed, link, by link, by hand. These facts are hardly credible, yet it is so. Every link in a lady's watch chain or a gentleman's fob chain are separately formed, separately picked up and joined, and separately fused, welded, or soldered. The network of gold referred to as bracelets, so fine and close that light can barely be seen between their interstices, and so flexible as to equal the softest ribbons, are all made by hand, the links, not larger than grains of fine sand, being picked up, one by one, and interlocked with others until the work is completed. A cursory examination of one of these chains would convey the idea that they were woven as are ribbons of silk, and that the wire thread composing them was run through from end to end and across the fabric.

Machinery, however, cannot produce such work as we saw at this establishment. In this case as in many others the brain—intellect—is greater than brute or machine force. The human hand, guided by the human brain, is stronger, more subtile, and delicate than any machine made by man.

It is pleasant and somewhat gratifying to our pride as men to know that we still remain the "crown of all things," that we reign far above all of our creations; and for an exemplification of this grand fact we are indebted to our visit to the establishment of Carter, Howkins, & Dodd. In this connection it is only proper that we publicly tender our thanks to Mr. Wm. Howkins, one of the firm: for his suavity and kindness which enabled us to pass two hours so pleasantly in the inspection of the works, and gave us an opportunity to appreciate gentlemanly courtesy as well as to understand the superiority of men over machines.

THE TEREDO, OR SHIP WORM—IMPORTANT TRIAL.

A marine law case lately brought to trial before the Supreme Court, from the peculiar nature of a large part of the testimony, has attracted considerable public interest, particularly among ship owners and the marine insurance companies. The parties interested are well known shipping merchants of this city, and the action was brought for the recovery of heavy damages alleged to have been sustained by the plaintiffs in consequence of fraud and misrepresentation on the part of the defendant in the sale, in March, 1863, of a ship to the plaintiffs which two years after the purchase proved unseaworthy, her bottom having been badly eaten by worms. The point of interest in the case is the testimony elicited respecting the habits of the sea worm, and under what conditions this pest of the mercantile marine thrives. This evidence was introduced for the decision of the important question whether, provided the ship was as represented, the time elapsing between the sale and date when the vessel was docked for repairs was sufficient for the worm to have accomplished its work, the plaintiffs claiming that it was not, the defendants bringing the testimony of witnesses to show that the destruction could have been completed in a much shorter length of time while in the tropical and stormy seas.

The ship worm (*pholadidæ teredo*) called commonly by the latter and generic name, is an acephalous testaceous mollusk: the best known species, *teredo navalis*, attacks wood immersed in sea water, boring in the direction of the grain and swallowing the resulting dust. The borer of the teredo is admirably fitted by nature for the hard office it has to perform, being coated by a strong armor and provided with a mouth for piercing, like a leech. The rapidity and success of their boring varies with the different kinds of woods: fir and alder they eat with the greatest ease, but make much slower progress in oak, or the more bitter or solid woods.

The tropical waters are infested with these worms, and the warmer the climate the more dangerous and destructive they seem to be. From the tropical seas the teredo has been brought to the temperate waters of Europe and America, and has proved quite destructive, especially in Holland, where the dikes have several times given way, and great devastation has followed, as the result of its borings.

The worm at first is a very minute creature and leaves but a small opening on entering the wood: hence the interior of a plank may be almost entirely eaten away while preserving a fair and unbroken exterior. After entering the wood the worm increases rapidly in size, and though usually confining their operations to a single board, they never leave it until it has become completely honeycombed. Having once taken possession, they can only be removed by keeping the wood from the water for a length of time depending entirely upon the season, as they will immediately perish by frost, will live but a short time in hot dry weather, but are very tenacious of life in a damp state of the atmosphere.

By sailing into fresh water a ship may rid herself of these parasites in time, but the holes by which the worms entered are so minute that the salt water will be retained in the cells and fresh water will enter so slowly that the creatures will live and continue eating for some time after the vessel has left their natural element. Prevention, in this case, is certainly far better than cure, and if a new ship is properly sheathed, little danger need be apprehended from this source, as the copper acts not only as a preventive but also poisons the wood; the only possibility of exposure to their attacks being when, by careening, any portion of the vessel should fall below the water line, then on a long tack in the tropical seas, it is asserted, the teredo has been known to fasten itself to the vessel's side, and begin its destructive feast.

A WORD ABOUT ALMANACS.

With us of modern day, the almanac is valued as presenting in a convenient form the yearly calendar, a useful compilation of facts, or an annual of statistical knowledge of general import, and we can hardly realize the power exerted for ages by these productions of the old philomaths. To trace out the history of this class of popular literature would be an interesting but hopeless task, the origin and derivation of the name alike being lost in obscurity; the etymology of the word indicating an Arabic derivation and the very existence of the almanac being undoubtedly due to Mohammed on astrology. The offspring of ignorance and superstition, in its subsequent growth strangely combining truth and falsehood, assuming successively a religious, a merely astrological or a political character, its mischievous tendency at times so important as to be interdicted by royal decree, no other class of books reflects so well the tastes of the people for whose demand they were created.

Manuscript almanacs dating back to the fourteenth century are found in the old public libraries of Europe, carefully preserved marvels of fine workmanship and elaborate decoration, and it is not a little singular that the first page of each of the volumes now extant is invariably embellished with a portraiture of the human form, different portions of the body being divided off between the twelve celestial signs of the zodiac precisely as in the almanac of to day. The removal of this traditional cartoon has been attempted by the almanac wights at various times, but the result has always been pecuniary loss to the fastidious philomath, for the book wanting the "anatomy" was considered a dumb oracle and public opinion obstinately refused placing the least reliance upon its unsanctioned predictions.

Of late years it has become quite common for enterprising advertisers, particularly the venders of patent medicines, to make a medium of these periodicals, for gaining the public mind. But originality in this respect can not be pretended, for during the fifteenth and sixteenth centuries the physicians took the entire charge of these useful publications, and with a shrewd eye to business turned the power conferred upon them to a practical end, by nominating certain days for aperient and diuretic indulgence, together with others set aside for pharmaceutical abstinence; it is needless to add, that the former class held a striking predominance over the latter in annual comparison.

History preserves some memorable instances as showing what implicit reliance was placed upon the predictions of the crafty philomaths, even though repeatedly their wise announcements, owing to the unaccommodating nature of cir-

cumstances, failed to prove true. In the year 1523, the almanacs foretold a series of incessant and destructive rains. As a consequence preparations for the anticipated deluge were made on an extended scale; but to the consternation of the augurers the season was one of unusual drouth: the cunning astrologers revised, with commendable zeal, their intricate calculations conveniently discovering that a vagrant cypher had mysteriously crept in, thereby anticipating the date by a thousand years. The political revolutions in England placed the almanac wights of that day in an unenviable position, human knowledge and sagacity could not foresee what turn affairs might take. Looked to for advice both by rulers and subjects, the philomaths could only meet the emergency by making their announcements of such a general character that the reigning power in either case could take no offense, and at the same time their reputation in this desperate game, be sustained.

The earliest literary productions on this continent were psalm books and almanacs and it was in this country that the latter first assumed anything approaching to a rational character. The publication of Poor Richard's almanac marks a new era from which dates a much needed reform. The reign of astrology succumbed in the march of progress, and gradually the display of pretentious prophecies which hitherto had rendered these works popular, gave way for information of more practical and genuine value.

While speaking thus disparagingly of astrology it is well to bear in mind just to what an extent we of to day are indebted to it. The supposed influence of the stars upon the destinies of man—analogous to the power exerted by the sun on the earth's vegetation and the seasons—led the astrological devotees to continued and careful observations on the motions of the heavenly bodies, and thus prepared the way for the perfected system of astronomy, a science worthy of the study of the philosopher.

The right of compiling almanacs, a hereditary monopoly enjoyed by certain privileged families for generations, has long since become common property, as witness the numberless publications, suited to every diversity of taste which supply the periodically returning demands made by the public at the opening of each new year.

GRAVEL AND CEMENT MINING.

We are indebted to Mr. H. L. Hopkins, a mill builder and inventor in California, for interesting information, illustrated with rich specimens, of both the original wealth and full half as wealthy waste, of the comparatively new class of workings known as "gravel" and "cement" claims. Their extent is yet unknown, but our informant believes, contrary to the general opinion, that it will prove to be general in all parts of the state.

These deposits are believed to be the beds of ancient rivers, lying now hundreds of feet below the surface of the ground. They are worked by tunnels and drifts at the bottom of the bed, simply washing out the lowest settlings of gold, and leaving the vast and valuable mass above, the bed rock which is very rich in gold, the abundant sulphurets, rich in gold which no satisfactory process can rescue as yet, numerous fragments of rich quartz, and a great deal of the less soluble cement or conglomerate, as "tailings," from which fully as much gold can yet be extracted as had been taken out by the first crude process. Yet in this imperfect manner $2,000,000 in gold have been taken out of a single claim, and over $800,000 from another, not a tithe of which has been worked. Eight distinct river beds, each 40 or 50 feet wide, have been crossed nearly at right angles in working the latter claim, and the dirt lying close on the bed rock of these river channels is always amazingly rich. Drifts following these obsolete water courses to right and left, must be excessively profitable.

The washing is done about once in two months, or as often as the boarded pits used for the purpose are filled with the gravel and cement, and the latter sufficiently disintegrated by the action of the elements. In the first place, it is so solid as to require blasting. To illustrate the waste of the usual method, it is related that an Irishman employed by a certain company received as a gift a pile of "tailings" to keep him busy during a slack season. By careful re-washing, he obtained $26,000 in gold, and still another washing yielded him $15,000, after which he sold the Fortunatus' earth for $5,000 to a party who obtained $12,000 more from it. We have not heard whether it is producing still or no. Mills are now beginning to multiply in connection with the gravel or cement claims, and it is confidently believed that their product can be doubled by this means.

Coppering Iron.

A new process for this purpose is patented by a Mr. Bernabé, giving, as represented by those who have examined it, an inseparable cohesion of the metals, and what is more novel if true, at an expense little greater than the cost by weight of the copper deposited. The foreign reports state that the perfect adhesion of copper to iron is a new achievement in electro metallurgy. This is an error. We are not certain how it may be in Europe, but in this country, where electro-metallurgy has been practised in some of its applications to a greater extent than in any other, the electro-plating of iron with copper is done as perfectly as that of any other metal. The expense of the chemicals required, with that of cleansing the iron of oxides, has hitherto rendered coppered iron more expensive than copper, in thin plates; and if this expensiveness has been overcome, as represented, the invention will be of immense value. Iron ships, for example, would be relieved of one of their two great disadvantages—that of fouling—as compared with wood: for we presume there would be no difficulty in hardening the porous copper deposited in this way, by rolling the plates.



ISSUED FROM THE U. S. PATENT OFFICE,

FOR THE WEEK ENDING MARCH 19, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the Scientific American, New York.

62,917.—Stop Motion for Feeding Mechanism of Carding Engines.—W. L. Ainsworth, and A. D. Wright, Lowell, Mass.

We claim the peculiar stop motion or mechanism for effecting the disengagement of the bevel gears, S' and X, and we also claim the combination of such a stop motion or its equivalent, and the laying and feeding mechanism as described.

And we also claim the combination of the alarm apparatus or its equivalent, with the stop motion and the laying and feeding mechanism applied to or making part of a carding engine as described, the whole being substantially as and for operation in manner and for the object or purposes as hereinbefore explained.

62,918.—Staple for Artificial Teeth.—J. Lambert Asay, Philadelphia, Pa.

I claim the use of staples, a, with their bent portions projecting from the teeth as a means of securing the latter to a vulcanizable gum plate or to vulcanizable gum attached to a metal plate as and for the purpose herein set forth.

62,919.—Concentrating Sulphuric Acid.—D. Ashworth, and R. B. Eaton, Woburn, Mass. Antedated March 12, 1867.

First, We claim condensing or rectifying oil of vitriol by passing the same, through a series of glass retorts, in combination with a heating apparatus, substantially as described.

Second, We claim the combination of a series of glass retorts, G, with the pan, E, and furnace, A, substantially as and for the purpose specified.

62,920.—Steam Engine.—Henry Bailey, New York City.

First, I claim the combination with the cylinder and its piston, of the steam or water tight box or chambered cylinder head, pitman and revolving crank all arranged for operation within said head in open communication with the cylinder, substantially as specified.

Second, The chambered cylinder head, H, constructed with its internal form corresponding to the course described by the pitman in its action, substantially as shown and described.

62,921.—Carding Engine.—S. R. and G. W. Ballard, Coldwater, Mich.

First, We claim the rotating tubes, a a a, having removable tips or points, b, when the same are constructed and operated as described for the purpose specified.

Second, We claim the arrangement of driving pulley, d, single belt, E, friction-roller belt-tightener, r, and a series of rotating tubes, a a a, in combination with worm gear, s t, heart cam, Q, finger, o, lever and slide L l, for moving the guide frame, K, as described for the purposes specified.

62,922.—Manufacture of Friction Matches.—William Baustian, Davenport, Iowa. Antedated March, 11, 1867.

I claim the composition wherein the matches are dipped as hereinbefore described.

62,923.—Machine for Making Nuts.—Albert B. Bean, New Haven, Conn.

I claim the crowner, T, in combination with the punch, L, and die, A, and hinged holder, U, substantially as and for the purpose set forth.

62,924.—Steam Engine Slide Valve.—William Birch, Cincinnati, Ohio.

First, I claim in the rectangular or square frame, the arrangement of the straight and angular packing strips to be expanded by steam in the manner described.

Second, The valve in the packing frame to admit oil to the steam or valve chest and also admit air to prevent a vacuum in the cylinder and steam pipe.

62,925.—Ink-Well Cover.—John A. Blake (assignor to Blake & Brothers), New Haven, Conn.

I claim the combination of the cover, C, and the shank, D, when hinged together by a hook formed upon the one, and a corresponding bar on the other, substantially in the manner herein set forth.

62,926.—Exploding Torpedoes in Oil Wells.—R. Boeklen, Brooklyn, N. Y.

I claim the application of two or more torpedoes in an oil well, the same being connected together and exploded simultaneously by one continuous electric current, substantially as and for the purposes herein described.

62,927.—Cover for Kilns of Sugar Refineries.—William R. Bradford, Charlestown, Mass.

I claim the construction or formation of a kiln cover by casting the metal upon a fire brick or bricks, or other similar material, and so as to secure the metal and brick together, substantially as set forth.

62,928.—Railroad Picks.—John E. Brastow and E. K. Ingoldsby, Van Buren Center, N. Y.

We claim attaching the pick to its handle by forming a head of the strap, C, constructed and applied substantially as and for the purposes herein set forth.

62,929.—Water Wheel.—S. J. Bridge and A. M. Craig, Portage City, Wis.

We claim a water wheel having the spiral buckets, b, and the tangential guides, a, combined and arranged substantially as shown and described.

62,930.—Wool Press.—George M. Briggs, Boston, N. Y.

I claim the separate twine receptacles, 1, 2, 3, 4, 5, 6, and corresponding grooves, a a a and b b b, when combined and arranged with the stationary bed, A A, fixed compressing box, D D, and the follower, E, substantially in the manner and for the purposes described.

62,931.—Axle Box.—George Brill, Philadelphia, Pa.

I claim, First, The sliding door, F, and pin, H, with its collar, h, the whole being constructed and adapted to an axle box, substantially as and for the purpose herein set forth.

Second, The ribs, y y, and lip, x, arranged on the box for the retention of the door as set forth.

Third, The packing strip, G, adapted to the door and box as described for the purposes specified.

62,932.—Extension Ladder.—Charles R. Bryant, Frankfort, N. Y., assignor to Calvin Eaton, Webster, N. Y.

I claim in combination with the extension ladder, A and B, the rope, D, and retracting rope, C, arranged and operating substantially in the manner shown and described and for the purposes set forth.

62,933.—Hydrants.—Joseph H. Buckley, New Haven, Conn.

I claim the combination of the valve, C, having its seat formed and packed in the manner described, with the chamber, B, provided with waste passage or passages, I, and with the cone, f, on the valve rod, when the said passage or passages, I, are united or arranged so as to form a central support for the valve rod, substantially as herein set forth.

62,934.—Car Spring.—G. W. Buss, Boston, Mass.

I claim as a new article of manufacture, a spring for railway and other carriages, made up of the following combined devices, namely: an open metal box, a lever hung upon a fulcrum, in one end of the box and having its free end projecting out from the opposite end of the box for connection with the truck, and a spring interposed between the lever and the roof of the box, the box serving as a bearing for the fulcrum pin, as a means of connection between and support of the spring and lever, and as a means of applying the spring, lever and fulcrum to the body of the carriage, the whole being arranged to operate substantially as set forth.

62,935.—Kindling Arrangement for Stoves.—Harvey L. Byrd, Baltimore, Md.

I claim a kindling basket beneath stove grate or furnace grate, substantially as described.

62,936.—Composition for Roofing, Covering Wood, etc.—John Caflisch, Union Mills, Pa.

First, I claim the combination of lime with coal tar, in the manner substantially as and for the purpose herein shown.

Second, The composition of coal tar, sand, quicksand or clay, and lime, substantially as and for the purpose herein described.

62,937.—Apparatus for Regulating Draft in Steamboat and other Chimneys.—J. B. Campbell, M. D., Cincinnati, Ohio.

First, I claim the enlarged end of the smoke pipe, B, provided with the wings, E E, and with the curbs, D D, constructed and used in the manner above described.

Second, The wings, E E, hinged and adapted to the purpose described.

62,938.—Awl Handle.—Nathan S. Clement, New Britain, Conn.

I claim, as a new article of manufacture, the awl handle herein described, having a tapering head, B', or a movable stem operated by a nut, c, lock-d in the cover, C, by being headed or enlarged to match the recesses provided in said covor, as herein set forth.

62,939.—Envelope Machine.—John H. Cooper (assignor to E. J. Spangler, W. E. Lockwood and E. D. Lockwood), Philadelphia, Pa.

I claim, First, Knives attached to one cross head or plate E, and so arranged as to cut or sever the strip of paper at several points simultaneously, substantially in the manner described during one movement of the said cross head.

Second, The combination of the said cross head, its drivers, the blade, 3, and folding rollers, T and T', so that the paper may be cut and folded during one movement of the cross head.

Third, The stationary arm, H, projecting through an opening in the cross head, E, and carrying rollers, I, in combination with the rollers, J.

Fourth, The combination of the intermittently-revolving drawing rollers, I and J, with the continuously-revolving feed rollers, P and Q, the whole being arranged to act on the paper, as set forth.

Fifth, The system of rods, x x' and x'', arranged for maintaining the paper in contact with the table and imparting proper tension to the paper.

Sixth, The guiding plates, v and v', connected together by the system of levers, herein described, or the equivalents, to the same and arranged for the proper guidance of the paper in a central course, substantially as described.

62,940.—Car-brake Shoe.—Edmund L. Countiss, Philadelphia, Pa.

I claim the combination of the shoe with the catches, c c, and the square-headed lug, d, attached together with the receiver, b, shaped as shown with its slotted hole, l, socket, g, with its flanges and the double inclined groove, constructed and arranged in the manner described.

62,941.—Soldering Iron.—C. O. Crosby (assignor to himself and H. Kellogg), New Haven, Conn.

I claim the body, A, and point, B, when constructed and united by the enlargement of the point within the body, substantially as herein described.

62,942.—Screen Plate for Paper Machinery.—Francis Curtis, Auburndale, Mass., assigns one half of right to Russell & Son, Lawrence, Mass.

I claim a screen plate for paper machinery, constructed of the material known as hard rubber.

62,943.—Flour Bolt.—William Derwent, Jr., Rockford, Ill.

I claim the short conveyor interposed between the upper and lower bolts, substantially as and for the purpose set forth.

62,944.—Suspended.

62,945.—Method of Holding Edged Tools on Grindstones—Patrick V. Dunn, Calamus, Wis.

I claim, First, The combination and arrangement of the frame, C C C, the clamp, D, and the scythe device, E, substantially as described for the purposes specified.

Second, The combination of the weight, I, lever, J, and wheel, K, as described for the purposes specified.

62,946.—Hopple for Horses.—Robert N. Eagle, Washington, D. C.

I claim a hopple in which the leg bands are connected by loops which slip upon each other or upon a device interposed between them or by a single loop connected more directly to another leg band as in Figs. 5 and 6, substantially as described.

62,947.—Blind and Shutter Fastener.—Charles H. Eddy (assignor to himself and Theodore J. Dickerson), Auburn, N. Y.

I claim the shutter or blind fastening composed of lever, G, provided with hooks, E F, attached to the sill, H, in combination with notches, C D, on the blind to be operated substantially as and for the purpose set forth.

62,948.—Saw-gumming Machine.—James E. Emerson, Trenton, N. J.

I claim, First, The thumb screws, D D, arranged and operating as pivots, substantially as and for the purpose specified.

Second, The combination of the thumb screws, D D, and adjustable handle, I, for exerting the pressure directly in line with the cutting part, substantially as described and represented.

62,949.—Milk Can.—James H. Farley, Lowell, Mass.

I claim the ring, A, constructed as described in combination with the bottom part of a milk can, substantially as described and for the purpose herein set forth.

62,950.—Apparatus for the Manufacture of Vinegar,—Joseph Firmenich, Buffalo, N. Y.

I claim the combination with the vessel, C, of the concave condensing surface, N, perforated diaphragm, l, and porous stratum, j, with the pipe, K, provided with perforated head, l, constructed substantially in the manner and for the purpose set forth.

I also claim, in combination therewith, the tempering vessel, E, constructed as described, with the pipe, d, and vapor generator, A, arranged and operating substantially as described.

I also claim the cooling vessel, P, constructed as described, in combination with the water space, H, arranged and operating as described.

62,951.—Peat Machine.—John T. Foster, Jersey City, N. J.

I claim, First, The stirrer or agitator formed of vanes, b b and d d, connected with a revolving shaft, B, and of a convolute shape or character inclining as they revolve to press the material downwards for operation in combination with a reversely moving cylinder, D, substantially as specified.

Second, The combination with a revolving stirrer or agitator, of reversely operating concentric cylinders formed with oblique slots in or through their peripheries for operation in connection with an intermediate stationary slotted cylinder, substantially as specified.

Third, The combination with the obliquely slotted revolving outer cylinders, F G, and forming tube, I, of the director, J, substantially as shown and described.

Fourth, In combination with the forming tube, I, the yielding gage, L, operated by the material in its delivery as described.

Fifth, The combination with the forming tube, I, and yielding gage, L, of the knife, M, moved forward to effect the cut by the action of the gage through mechanism connecting it with the mill, substantially as herein set forth.

Sixth, The side guide, K, in combination with the knife, M, and gage, L, for operation together, essentially as specified.

62,952.—Machine for Making Pasteboard Boxes.—John T. Foster, Jersey City, N. J.

First, I claim the combination with the reciprocating feeding bar, D, of a former so constructed as that, in the one motion of the bar, the blank is creased and bent over the same, and its one edge or end made to overlap the other, substantially as specified.

Second, The combination, with the reciprocating feeding bar, D, and former operating as described, of setting discs or wheels arranged to act on the bent edges of the box or case, as it is delivered from the former, essentially as herein set forth.

62,953.—Steam Generator.—John Hafer, Bedford, Pa.

First, I claim the combination of the cones and flanges, with a steam boiler farranged and operating substantially as and for the purpose set forth.

Second, The combination of the cones and flanges, with a steam boiler, and with the tubes, K, arranged and operating substantially in the manner and for the purpose set forth.

62,954.—Castor for Furniture.—E. Hambujer, Detroit, Mich.

I claim the equatorial balls, e, moving round the entire circumference of the grooved chamber, d, in combination with the top ball, f, operating relatively with the roller ball, E, substantially as described, for the purpose specified.

62,955.—Garden Syringe.—A. F. Hammond, Houston, Ohio.

First, I claim the arrangement of the cylinder, c, spring piston, d, operated by rack and pinion, substantially as described and represented.

Second, In combination with the subject matter of the first claim, I claim the movable nozzle, operating as described.

62,956.—Preparing and Preserving Wood.—Thomas Hanvey, Lancaster, N. Y.

I claim the process of preparing wood for preservation, substantially as herein described.

62,957.—Doubletree.—Jacob B. Hough, Lebanon (assignor to himself and Samuel Braden), Ohio.

First, The combination of the doubletree, D, with the fulcrum block, E, and guides, a a, constructed, arranged, and operating in the manner and for the purpose described.

Second, I claim the stay block, F, in combination with the compensating doubletree and its fulcrum block, arranged to operate conjointly with the guide rods, a a, substantially as and for the purpose set forth.

62,958.—Self-Adjusting Guide Roll for Paper Mills.—Robert L. Howe, Westbrook, Me.

I claim the swinging base, A, set upon the stationary base, B, as described,

and having the two rollers, a b, all constructed, arranged, and operating as set forth, and for the purposes specified.

62,959.—CARTE DE VISITE EXHIBITOR.—P. Gengembre Hubert, New York City.

First, I claim the herein described "revolvicon" in which cartes de visite are stored, as in fig. 2, and in which they are exhibited as in fig. 1, by dropping in sight one after the other, by their own gravital force, arranged and operating as specified.

Secondly, The combination of the piece, H, pin, F, and wheel, G, with the carte de visite, J J, etc.

Thirdly, The combination and arrangement of the leg, R, with the leg, P', of the bottom, B, to obtain the two positions of the instrument, as specified.

Fourthly, The self-adjusting reflector, E, arranged and operating as set forth.

62,960.—APPARATUS FOR COOKING AND PRESERVING FRUITS.—William Janney, Martinsville, Ohio.

First, I claim the fruit pan, D, in combination with vessel, C, as above described, and for the purpose set forth.

Second, The steam chest, B, pipe, F, and vessel, C, in combination with fruit pan, D, for the purposes above specified.

62,961.—COAL BURNING STOVE.—John H. Keyser, New York City.

First, I claim a stove which is composed of two apartments, B E, one arranged below the other, with a removable open-grated fire pot, which is provided with a grate, G, said pot being suspended free from the sides of the lower cylinder, B, and sustained by a cast iron flanged ring, C, which is secured permanently to cylinder, B, and which forms the base for and means of attachment of the cast iron section, D, of the cylinder, E, substantially as described.

Second, In combination with grated or open fire pot, F, suspended within a cylinder, B, by means of a cap ring, C, I claim the grate, G, when it is sustained independently of the fire pot, and by the cylinder, B, substantially as described.

Third, The combination and relative arrangement of the air inlet passages, e, with a suspended fire pot, F, and with the two detachable cast iron section C D, substantially as described, and for the purpose of cooling and preventing said sections from warping.

Fourth, An open grated fire pot, F, which is suspended within the cylinder, B, and combined with the removable sections, D E, outlet, g, descending flue, h, and damper, s, the latter being located opposite the outlet, g, substantially as described.

62,962.—RADIATING ATTACHMENT FOR HOT AIR FURNACE.—John H. Keyser, New York City.

In the construction of radiators to be applied to hot air furnaces, I claim the arrangement of a central ascending flue, c, passing through one or more radiating drums, and leading into the center of an upper drum, in combination with de cending flues arranged around said flue, c, and communicating with the lowermost drum and an exit pipe, g, so that without the use of a damper the products of combustion rising from the fire chamber of the furnace shall be equally diffused throughout the said drums and pipes, substantially as described.

62,963.—MACHINE FOR MAKING CARRIAGE BOLTS.—William Koplin, Newcastle, Pa.

I claim the combination, with the dies, a a', b b', of the discs, c H, operated as described, to form the square on the bolt.

The die, c, in combination with the swedge, I, on the lever, F, operated as described.

62,964.—METAL CLASP FOR BARREL HOOP.—David M. Lawrence, Washington, D. C.

I claim the buckle or plate, A, with its slotted or loop opening to receive the iron hoop, and with shoulders, c c, at each end, together with the tongue or flange, substantially as set forth in the foregoing specification, and for the purposes therein indicated.

62,965.—COTTON PRESS.—Eugene McDonnell, Baltimore, Md.

I claim a cotton bale compresser provided with the following parts: fulcrum beams, C C, power levers, I I, toggle arms, L L, lifting rods, M M, rising follower, E, adjustable upper bed, G, and the whole driven by means of a pulley chain, N, and capstan, P, or its equivalent, to which the power of horses may be applied, all arranged and operating substantially as and for the purpose herein specified.

I also claim the combination of the fulcrum beams, c c, arranged between the follower, E, and power levers, I I, through means of the toggle arms, L L, and lifting arms, M M, substantially as herein set forth.

I also claim the adjustment of the bed, G, by means of the blocks or timbers, H, and the means described, or the equivalent thereof, for raising and lowering the bed, substantially as described.

I also claim the alternate arrangement or interweaving of the fulcrum beams, C C, and toggle arm, L L, as specified.

62,966.—GRINDING MILL.—Christopher Moegling, Milwaukie, Wis.

First, I claim the adjustable wings, E, in number more or less, when used upon the periphery of the rotating stem of a grain or flowing mill for the purposes specified.

Second, The pipe, g, the cover, h, the elbow, k, and the educting pipe, I, when provided with the cap, J, all combined and arranged substantially as set forth, and so operate in connection with the wings, E, for the purposes specified.

62,967.—ATTACHING DOOR KNOBS TO THEIR SHANK.—Wallace T. Munger (assignor to Thomas Kennedy), Branford, Conn.

First, I claim the combination of the cylinder, A, and plug, C, and tube, I constructed and arranged so as to receive and discharge the requisite quantity of filling substances, substantially as herein set forth.

Second, In combination with the above I claim the adjusting spindle, F, arranged to gage the quantity of filling substances, substantially as herein set forth.

62,968.—ADJUSTABLE ESCUTCHEON FOR NIGHT LATCHES.—Wallace T. Munger (assignor to Branford Lock Works), Brandford, Conn.

I claim the escutcheon, E, in combination with a lock or latch when made adjustable thereon, substantially in the manner herein set forth.

62,969.—STEAM-ENGINE SLIDE VALVE.—John Nesbitt, Northfield, Vt., assignor to himself and Levi B. Tyng, Lowell, Mass.

First, I claim the arrangement of the valve, d, with reference to the packing, g g, in its ends substantially as herein described.

Second, I claim the chamber, l l, over the valve, d, constructed in the manner and for the purpose substantially as herein set forth.

Third, I claim the combination and arrangement of the valve, d, shield, h, chamber, l l, and exhaust port, K, for the purpose substantially as described.

Fourth, I claim the projections, f f, on the ends of the valve, d, constructed in the manner and for the purpose substantially as herein described and set forth.

62,970.—HORSE HAY-FORK.—J. H. Parker, J. T. Hall, and Isaac Pierce, Trenton, N. Y.

First, I claim two spiral tines one having a right hand, the other a left hand twist, and so arranged and held with relation to each other when in the hay that it will be bound and held from sliding or slipping off the tines until they are allowed to revolve at the will and pleasure of the operator.

Second, The combination and arrangement of the yoke, B, cross head, A, tines, c, ratchet wheels, e, and pawl, f, constructed, arranged, and operating in the manner herein described and for the purpose set forth.

62,971.—CULTIVATOR.—Levi Repp, Tiffin, Ohio.

First, I claim the construction of the central beam, A, of a three beam cultivator with a jointed extension, A', having a shovel applied to it, and also a spring, g, for keeping it down and staying it laterally, substantially as described.

Second, Pivoting the front ends of the three beams, A B B, to U-shaped clevis plates, a a, substantially as described.

Third, The construction of the shovels, m m, with narrow and wide wings, and so that they can be reversed at pleasure, substantially as described.

Fourth, In combination with the forward pivot connections of the three beams, A B B, I claim the lateral extension braces, C C, and still standards, E, connected to beam, A, in front of the joint, d, by a bolt, e, substantially as described.

62,972.—DOOR FOR GRAIN RAILROAD-CARS.—G. B. Rich, Lafayette, Ind.

First, I claim the application of the sliding joint plates, p, to the grain doors of railroad cars, substantially in the manner and for the purposes herein shown and described.

Second, Connecting the said joint plates by means of the pivoted levers, b and d, substantially as and for the purposes set forth.

Third, Suspending the grain door of railroad cars by jointed rods, n, or chains, or any equivalent device, whereby they may be fastened up out of the way when not required for use.

62,973.—BED BOTTOM.—J. Rickard and J. Cook, Philadelphia, Pa.

We claim the strips, b and b', having dove-tailed ends adapted to dove tailed sockets, d, in combination with the springs, c c, and slats, a, substantially as described.

62,974.—SAFE.—Benjamin Sherwood and D. Fitzgerold, New York City. Antedated March 12, 1867.

First, We claim the spherical fire and burglar proof casket, constructed substantially as specified.

Second, Arranging the said casket within a safe or other receptacle, as set forth, which is otherwise filled by a book case or its equivalent, as described.

Third, Constructing the safe with the opening of access on the side thereof, in combination with a book case inserted therein, and arranged so as to be readily withdrawn therefrom horizontally, all substantially as described.

Fourth, Combining with the safe and the book case, as above, the platform, F, or equivalent support for the book case when withdrawn from the safe as aforesaid.

62,975.—FARM GATE.—A. D. Smith, Grafton, Ohio.

I claim the gate, A, constructed as described, in combination with the posts, B C, the post, B, being so arranged in relation to the gate that it forms the support fulcrum, and slide combined upon which the gate rests, slides, and turns when being opened as closed as described.

62,976.—CARRIAGE FOR CHILDREN.—Charles Spring, Dorchester, Mass., and Andrew Spring, Weston, Mass.

We claim, in combination with the body, stationary axle and two main wheels of a child's carriage, a leader wheel, n, whose axis is supported in journals, arranged out of line with the shaft, l, substantially as shown and described.

We also claim the means or mechanism for relative adjustment of the shaft, l, and axle, m, and for changing the position of the axle, substantially as described.

Also the arrangement of the pole so as to be capable of a vertical swinging movement, when this movement is fixed and determined, substantially as set forth.

Also combining with the carriage body the crib box, o, substantially as described.

62,977.—LATHE FOR CHASING AND BACKING DOWN TAPS.—W. X. Stevens, Worcester, Mass., assignor to J. M. and D. B. King, Waterford, N. Y.

First, I claim operating the guide bar, F, which regulates the taper of the tap, so as to channel it longitudinally by mechanism constructed substantially as described.

Second, The arrangement of the mandrel, B, of the pattern, S, acting in combination with and indirectly through the lever, G, rock shaft, f, cams, e, and guide bar, F, on the tool stock, E, for throwing back the tool, essentially as herein set forth.

Third, The combination of the pattern, S, on the mandrel, the lever, G, with its rock shaft and lifters, and the bar, F, raised by the latter and acting on the lifting end of the tool stock, substantially as and for the purpose or purposes specified.

62,978.—CAR COUPLING.—Ithamar W. Stuart, Jun., Charlottesville, Ind.

First, I claim the bumper head, C, when formed with an upwardly projecting part or hook grooved upon its inner side, substantially as herein shown and described, and for the purposes set forth.

Second, The combination of the bar, D, arms, d1 and d2, balance guard, E, chain, G, and link, F, with each other and with the bumper, C, draft bar, B, and end of the car, A, substantially as herein shown and described and for the purposes set forth.

62,979.—EGG DETECTOR.—A. F. Summers and C. Nye, Peoria, Ill.

We claim the chamber, A, provided with eye hole, D, the adjustable screw, B, provided with receptacle for the eggs, reflector, C, and ledge, E, when all shall be constructed, combined, arranged, and operated as and for the purpose set forth and described.

62,980.—HORSE-SHOE NAIL MACHINE.—Ephraim Thomas, Middleboro, Mass.

I claim the bed knife as made with the channels, S, for receiving and guiding the head projection of the nail plate during its entrance into the machine.

I also claim the combination of the point shear, O, and its fellow shear, M, with the dies for separating the blank from the nail plate and heading it as described.

62,981.—BUTT MACHINE.—Thomas Tracy, New Britain, Conn.

I claim the spring button, f, and tongued bar, c, or their equivalents, in combination with suitable mechanism for operating said bar, substantially in the manner and for the purpose as described.

62,982.—INSTRUMENT FOR SUPPORTING FRACTURES.—Samuel B. Tucker, St. Louis, Mo.

I claim the invention of the plates, E E, and the springs, F F F F and G G, making, when put together, the instrument for the support of fractures of the scapulæ, clavicles, and vertabræ of the cervix and spine.

62,983.—MACHINE FOR CONCENTRATING ORES.—Thomas Varney, San Francisco, Cal.

First, I claim the use of the disk, A, divided into compartments.

Second, The trough, B, all constructed in the manner and for the purposes set forth.

62,984.—CAR COUPLING.—W. Y. Warner, Wilmington, Del.

First, I claim the pin, D, arranged to operate within the opening, c c, and recess, a, of the block, A, and to slide in a cross bar, F, which can turn in projections on the said block, all substantially as set forth for the purpose specified.

Second, The shoulder, m, arranged as a support for the pin, D, substantially as specified.

62,985.—HARVESTER CUTTER-BAR.—Thomas Welch, Churchville, N. Y.

First, I claim the skeleton or shell head, H, constructed as described, in combination with the knife bar of harvesters, substantially as and for the purposes set forth.

Second, The arrangement of the skeleton or shell head, H, with the boxes, B and B', pitman, P, and set screw, s, substantially as and for the purposes set forth.

62,986.—SEWING MACHINE.—Henry F. Willson, Fort Wayne, Ind., assignor to W. G. Wilson, Cleveland, Ohio.

First, I claim a needle bar receiving an independent vibration from a crank in combination with an oscillating lever, and with vibrating needle bar holder, in such a manner as to produce a compensating vibration, substantially as described.

Second, The set screw, J, in combination with the eccentric, E', and oscillating lever, H, for the purpose of affecting the length of the stitch by regulating the throw of the needle to the left, said lever being jointed to the vibrating fulcrum of the needle bar, as described.

Third, I claim the stationary shuttle, constructed and supported substantially as described, in combination with the needle bar and oscillating bar, for the purpose described and set forth.

62,987.—BRUSH.—John Brown Alden (assignor to himself and Edwin C. Cleveland), Worcester, Mass.

I claim the arrangement and combination of the parts of the brush marked A B and C, whereby the parts, A B, may be reversed or turned end for end, substantially as described for the purposes herein set forth.

62,988.—DISTILLATION OF BROMINE AND IODINE.—David Alter (assignor to Charles W. Bodey), Freeport, Pa.

I claim the use of an alkali to absorb the fumes of bromine and hydrobromic acid while in process of distillation, substantially as herein shown and described.

62,989.—GRAPE AND OTHER ARBORS.—James O. Attick (assignor to himself and George W. Holgen), Dayton, Ohio.

I claim the metallic casting, A, constructed substantially as described, and used for the purposes herein set forth.

62,990.—SHINGLE MACHINE.—Sherman E. Anthony, Stillwater, N. Y.

First, I claim the disconnected bolt carriages, B, with projections, e, operating with the toothed wheels, d, substantially as described for the purpose specified.

Second, The operating of the sliding dogs through the medium of the T-headed screws, H, flanged spring plate, G, pin, k, arm, f, and lip, g, substantially as described for the purpose specified.

Third, The fixed or stationary dogs, Z, in connection with the sliding bars, M, and the plates, N, on the framing, having beveled or diagonal ends, substantially as shown and described.

Fourth, The fixed plate, i, in combination with the slotted dogs, F, substantially as and for the purpose specified.

62,991.—CHEESE VAT.—Grinmon Austin, Denmark, N. Y.

I claim the within-described device for cooling milk, so constructed that the water which passes around the milk receiver to cool the same, will act upon a wheel or equivalent device, operating the parts which causes continuous agitation to the milk, substantially as specified.

62,992.—CHURN DASHER.—Anson A. Avery, Cardiff, N. Y.

I claim the slotted and fluted fingers, a a and e e, in combination with the cross head, B, and the cross beams, D D, arranged and operating substantially as herein described.

62,993.—INJECTOR FOR STEAM GENERATORS.—Andrew Barclay, Kilmarnock, North Britain.

First, I claim the combination with the steam and water nozzles of an injector of a fixed casing containing any non-conducting substance interposed between the said nozzles, as herein shown and specified.

Second, The arrangement of an adjustable air-tight packing between the steam and water inlets, as hereinbefore described.

Third, The arrangement and construction of apparatus for injecting or ejecting fluids and liquids, in which a double set of nozzles is employed in combination with an injecting or water nozzle, so as to form annular jets of steam and water, as hereinbefore described.

Fourth, The arrangement and construction of apparatus for injecting or ejecting fluids of different temperatures, whether in immediate contact or not with the steam nozzle, as hereinbefore described.

Fifth, The combination of the exterior main portions of the instrument with the pillars or studs or equivalent devices for connecting the same under the arrangement herein specified, so that the stuffing boxes, joints, and packing are rendered accessible, and capable of being readily adjusted, as set forth.

Sixth, The application of a set of variable nozzles and throats to apparatus of the kind hereinbefore described, in the manner specified.

62,994.—GUN WORM.—Henry C. Bascom, La Crosse, Wis.

I claim the gun wormer consisting of the thimble, c, worm screw, m, and revolving nut, b, arranged in such a manner that the said screw shall be extended or retracted, substantially as described.

62,995.—SAW MILL.—O. A. Bassett and Erasmus Smith, Norwich, N. Y.

First, We claim the combination of the friction wheels, C E F, and wheels, G I, or equivalent, and the friction wheels, K S, with each other and with the saw shaft, B, and feed shaft, R, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the toothed sliding bar, V, gear wheels, W Y, and shaft, X, with each other and with the friction carriage, D, substantially as herein shown and described, and for the purpose set forth.

62,996.—AUTOMATIC BOILER FEEDER.—Hiram Beadle, Washington, D. C.

First, I claim the arrangement of the pipe, B, condenser, D, valve, C, pipes, I and N, with reference to the chamber, A, and float, E, substantially as herein set forth.

Second, The combination of the supply pipe, B, valve, C, and chamber, A, with the float, E, rod, F, and valves, K and K', substantially as and for the purpose set forth.

Third, The combination of the rod, F, yoke, G, rods, I, and valves, K and K', substantially as and for the purpose set forth.

62,997.—STARCH SIRUP.—H. C. Becker, New York City.

I claim a composition which is made of the ingredients and substantially in the manner set forth and described.

62,998.—BURGLAR ALARM.—Henry Behn, New York City.

First, I claim the arms, G and G', rods, J and J', and lever, C, operating the bell hammer through a lug, adjusted, combined, and arranged, substantially as specified.

Second, I claim the arrangement of the pendulum, H, in combination with the stop lever, N, operated by a projection, w, fast to the lever, C, in the manner and for the purpose as set forth.

62,999.—SHUTTLE CARRIER FOR SEWING MACHINES.—Walter Bennett, Hunt's Hollow, N. Y.

I claim the guide rod, C, applied to the bed or cloth plate, A, by means of the screws, D D, and springs, e e, or their equivalents, substantially as and for the purpose specified.

I further claim constructing the shuttle carrier, B, with a part or portion, b, to serve as a bearing surface against the cloth plate, A, when used in combination with the adjustable guide rod, C, arranged and applied substantially as set forth.

63,000.—ROCKING CHAIR.—Hermann Berg, Springfield, Mass.

First, I claim constructing the side frames of a rocking chair of elastic strips, b b' c c', substantially as and for the purpose set forth.

Second, The combination of removable cross bars, a a1 a2, with the elastic side pieces, B C, of a rocking chair, substantially as and for the purpose described.

Third, The flexible back, E, in combination with the seat, D, top cross bar, a', and side pieces, B C, constructed and operating substantially as and for the purpose set forth.

Fourth, The yielding tops, e, in combination with the runners of a rocking chair, constructed and operating substantially as and for the purpose described.

63,001.—GRAIN DRILL.—Lyman Bickford, Macedon, N. Y.

I claim, First, The construction of the distributing wheel whereby it is adapted to the discharge or delivery of grain upon its opposite vertical sides or faces, for the purpose specified.

Second, The distributing wheel, provided with the enlarged hub or center, and with curved or angular sides or faces, substantially as described.

Third, The starting ribs, formed upon the curved or angular sides or faces of the vertical distributing wheel, substantially as and for the purpose described.

Fourth, The casings upon the opposite sides of and in combination with a double distributing wheel adapted to the delivery of grain upon its opposite vertical sides, substantially as described.

Fifth, Providing the lugs or ears, through which the casings of the distributing wheel are fastened to each other, with the interlocking faces, substantially as described.

Sixth, The casings of the distributing wheel provided with the external flanges and with the side delivery or discharge opening, substantially as described.

Seventh, The employment of the casings, provided with the external flanges and side delivery openings, in combination with the vertical starting ribs or teeth on the side of the distributing wheel, substantially as described.

Eighth, The employment of a slide, in combination with the double distributing wheel for closing the seed run upon one side or face thereof, and simultaneously opening that upon the opposite side or face, substantially as described.

Ninth, The adjustable block, or its equivalent, at the end of the grain box, in combination with the slide, substantially as and for the purpose described.

63,002.—CARPET BAG.—Chas. F. Blakslee, Brooklyn, N. Y.

I claim a traveling-bag frame provided with sunken perforations, a, having a connecting channel, c, for the purpose described as herein specified.

63,003.—WASHING MACHINE.—Asa Blood, Sr., Janesville, Wis.

I claim the pendent or swinging presses, C C, placed in suds boxes, A A, which are connected together substantially as shown; and operated through the medium of the arms, h, rods, j, and lever frames, D D', one or both, substantially as shown and described.

I also claim the connecting of the two suds boxes, A A, in such a manner as to allow a space, B, between them for the rods, j, to work in, substantially as set forth.

I also claim the combination of the hinges, m, handles, F, uprights, E, and lever frames, D D', as and for the purposes specified.

I further claim the combination of the two suds boxes, A A, lever frames, D D', presses, C C, rods, j, arms, h, and springs, G, with the lids or covers, b, fluted or otherwise, and all arranged to operate in the manner substantially as and for the purpose set forth.

63,004.—GAS HEATER AND PETROLEUM STOVE.—Alonzo T. Boon, Galesburg, Ill. Antedated March 1, 1867.

First, I claim the bundle of short, fine wire, F, in combination with the horizontal tube, C, substantially in the manner and for the purposes as herein set forth.

Second, The solid heater, E, as constructed and provided with a cone, g, in combination with the horizontal tube, C, substantially in the manner and for the purposes as herein set forth.

Third, The ogee cylinder, B, in combination with the funnel-shaped bottom, a, of the stove, substantially in the manner and for the purpose as herein set forth.

63,005.—CORSET FASTENING.—James Bowers, New York, N. Y.

I claim a fastening for stays or corsets composed of eyelets C, inserted in one of the parts A, just behind its hem b, and plates d, formed or provided with hooks e, and attached by loops c, to the front edge of the other part A, substantially as herein shown and described.

63,006.—REED MUSICAL INSTRUMENT.—John C. Briggs, Ansonia, Conn.

I claim the separation of the wind chest of a melodeon by a flexible diaphragm D, substantially as described for the purpose specified.

63,007.—WATER ELEVATOR.—Ransome Brown, West Edmeston, N. Y.

I claim the arrangement of the windlass B, stop e, pivoted to the bar d, bucket C, with its valve and curved hook a, all constructed and operating as set forth.

63,008.—GATE.—T. I. Burhyte, Fond du Lac, Wis.

First, I claim a gate constructed with the high posts R, provided with the counterbalancing weights, said gate being pivoted to turn in a vertical plane substantially as described.

Second, The spring catches f, connected to the vertical rod b, and arranged to operate in connection with the gate as set forth.

63,009.—HEAD BLOCK FOR SAW MILL.—George Burket and Samuel M. Gaskill, Bluffton, Ohio.

We claim the bar G, provided with the adjustable bevelled plates H H', secured by clamps I I, substantially as shown, and connected or arranged with the rack F, and also provided with the pendent bars J J', the above parts being used in connection with the stop K for operating the rack F, substantially as described.

63,010.—LANTERN.—William Burns, Chicago, Ill.

First, I claim the construction and arrangement of a lantern having its cap, globe and oil cup separately connected and detachable by screws so that no part of the weight of the lantern is supported by the screws of the globe substantially as shown and specified.

Second, Attaching and supporting the globe of a lantern at the base, by means of the screw band d, permanently attached to the bottom of the globe substantially as specified.

Third, The upper rod of a guard detachable from the dome when made of a spun screw-band substantially as and for the purposes specified.

63,011.—HORSE HAY RAKE.—Manlove Butler, Vernon, Ind.

First, I claim the piece A, when constructed with the hooks f f, and bag g, and attached to the lever c, and arranged to operate in combination therewith substantially in the manner and for the purpose set forth.

Second, The hinge attachment d, which permits the lever to be laid along side of the head of the rake, all arranged and operating as set forth and described.

63,012.—MACHINE FOR FORMING EAVES TROUGH.—Allen Calkins and Wm. Tower, Almont, Mich.

First, We claim the combination of the bars B and C, with each other and with the frame A, of the machine substantially as described and for the purpose set forth.

Second, The combination of the bars, D E F, with each other and with the frame, A, of the machine, substantially as described and for the purpose set forth.

Third, The combination of the die G, sliding block H, nippers I, rope J, shaft L, gear wheels M, N, and crank O with each other, and with the frame A, of the machine substantially as described and for the purpose set forth.

Fourth, The combination of the die P, guide T, bar U, nippers I, rope J, shaft L, gear wheels M, N, and crank O, with each other and with the frame A, of the machine, substantially as described and for the purpose set forth.

63,013.—BEER COOLER.—David Cammerer, Cincinnatti, Ohio.

I claim the arrangement of the tubes, A B C D etc., decreasing in size from the bottom upward, the separate troughs, N N', and projecting flange g substantially as and for the purposes set forth.

63,014.—STEAM GENERATOR.—Luther W. Campbell, Aurora, Ill.

First, I claim the receiver for water or other liquid, constructed and arranged, operating inside of a superheating steam generator which is exposed directly to the fire, substantially as and for the purpose explained.

Second, A receiver E, constructed so as to form two or more parts combining an inner lining and an outer jacket, the lining having no top and the outer jacket no bottom, with a space between them of suitable capacity to form a steam passage substantially as described.

Third, The combination of the receiver E, the cone or cap F', and the feed water pipe K, with a superheater, substantially as described.

Fourth, The receiver E, with the blow-off pipe G, in combination with the superheater D, substantially as described.

Fifth, The receiver E, in combination with the cup E, and the blow-off pipe I, substantially as described.

Sixth, In combination with the superheating steam generator constructed to operate substantially as described I claim the feed water regulator operating substantially as explained.

63,015.—HEAD BLOCK FOR SAW MILL.—William Carlton, Dunkirk, N. Y.

I claim the gear which operates the knee of a Head Block consisting of the bevel wheels D E, worm F, rack L, sleeve B, and lever G, arranged and operating substantially as described for the purpose specified.

63,016.—Post Augers.—Henry W. Caswell, Yarmouth, Maine.

I claim combining with a post-auger an air tube substantially as and for the purposes specified.

63,017.—Hand Stamp.—N. L. Chamberlain, West Roxbury, Mass.

I claim the manner herein shown and described of attaching the ink-ribbon to its shafts.

63,018.—Seed Drill.—James Chambers, Greensburg, Ind.

First, I claim the arms E E, made in the form described and connected to the frame A, in the manner and for the purposes herein specified.

Second, The arrangement of the frame A, with the diving wheel C, hoppers D D and D' arms E E, pipes h h, and seed pipes k' k, substantially in the manner and for the purposes herein set forth.

Third, The adjustable journal boxes, a a, when used as and for the purposes specified.

Fourth, The rock-shaft d, provided with the uprights e f e, and operating in three perforated wheels s', by means of their rods g g g, in the manner and for the purposes set forth.

Fifth, The arrangement of the rack bars H H, with the cog-wheels w and cog-shaft w', metallic band F, handle G, with spring n, for expanding or contracting the arms E E, with their attachments in the manner as and for the purpose specified.

Sixth, The hoppers D D, when used with their open tubes h h, and seed pipes k k, substantially as set forth.

63,019.—Combined Planter and Cultivator.—Isaac H. Chappell, Lawrence, Kansas.

First, I claim so arranging the crank lever, M, that when the plows are raised they will be thrown apart so that in turning the plows will not break down the corn.

Second, The standard, I, in combination with the bars, F F, for the purpose of elevating and lowering the plows without changing their angle.

Third, Attaching the bars, F F, to the standards, e e, for the purpose of elevating or lowering the ends of the bars, F F, so as to change the line of draft above or below the center of the axle, substantially as shown and described.

63,020.—Wagon Brake.—R. O. Codding and G. W. Pringle, Coddingville, Ohio.

First, We claim the pivoted lever, H, and rod or bar, M, operating the brake bar or shaft, I, and ratchet wheels, n n, substantially as herein shown and described and for the purposes set forth.

Second, We claim the ratchet wheels, n n, operating substantially as shown and described, in combination with the brake bar or shaft, I, as and for the purposes set forth.

Third, we also claim the spring, L, and neck yoke, G, in combination with pole or tongue, E, substantially as shown and described.

63,021.—Washer for Socket Bolts in Steam Boilers.—Joseph G. Collins, Boston, Mass.

I claim a washer constructed or formed substantially as herein shown and described, for the purpose set forth.

63,022.—Back Sight for Fire-arms.—Wm. Conner, Rensselaerville, N. Y.

I claim a spring sight, A A', guided in a metal plate, B, and constructed and operating substantially as and for the purpose herein shown and described.

63,023.—Churn.—James J. Davelin, Philadelphia, Pa. Antedated March 5, 1867.

I claim the combination of dasher, N M and P O, constructed and held together by fastenings, A W C and D, with churn, B, the whole combined and acting in the manner and for the purpose above described and shown.

63,024.—Saw.—Chas. Disston, Philadelphia, Pa.

I claim the securing of detachable teeth in saw plates by means of the tapering arm, b', of a saw tooth, and the ring or washer, D, when both are constructed and adapted to openings in a saw blade, substantially in the manner and for the purpose described.

63,025.—Buck-saw Frame.—Henry Disston, Philadelphia, Pa.

I claim the guard, F, inclosing a portion of the rack, e, and connected to the bar, D, of the saw frame, all substantially as described, for the purpose specified.

63,026.—Process of Separating Metals.—Wm. Elmer, New York City.

I claim the process of treating metallic ores or other materials containing metals by the following three operations, performed successively upon them, viz: 1st, The oxidation of the oxidizable substances by treating the material while hot with a gaseous substance that supplies oxygen to them. 2d, The reduction of the oxides by treating the oidxized ores while hot with a gaseous substance that is incapable of oxydizing them. 3d, The process of separating the metals from each other by treating their mixtures at progressively increased temperature with a gaseous substance that has a higher affinity for oxygen than the metals have, so that the metals are fuzed in a non-oxydizing atmosphere in the order of their fusing temperatures, the process being conducted substantially as hereinbefore set forth. These three operations being performed in the order and substantially as hereinbefore set forth.

I also claim the process of treating metallic ores or other materials containing metals, by the following two operations performed successively upon them, viz: 1st, The reduction of the metallic oxides by treating the material while hot with a gaseous substance that has a higher affinity for oxygen than the metals to be reduced have. 2d, The fusion of the metals by treating the reduced ores while hot with a gaseous substance that is incapable of oxidizing them, these two operations being performed in order and substantially as hereinbefore set forth.

63,027.—Burning Fluid.—H. H. Etter, Washington, D. C.

I claim the ingredients, when mixed in the proportions as herein specified, for the purpose of producing a safe and brilliant light.

63,028.—Needle Wrappers.—David Evans, Studley, Eng.

I claim fastening and folding up of the needles in wrappers or papers that have flaps and folds as herein shown, so that the needles are easy of access from the outside without liability to drop or fall from the wrapper or to corrosion from contact with the fingers, as herein described and represented.

63,029.—Milk Can.—John L. Finch, Warwick, N. Y.

First, I claim the combination of the sheet iron outer case, B, with the body of the milk can, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the removable hoop, C, with the projecting lower end of the sheet-iron outer case, B, substantially as herein shown and described and for the purpose set forth.

63,030.—Washing Machine.—H. S. Forney, Baltimore, Md.

I claim in combination with a flanged metallic collar, f, in the lid, E, the bevel pinion or gear, I, made, arranged, and operating therewith and with the drive gear and the agitator or stirrer, substantially in the manner and for the purpose described.

63,031.—Apparatus for the Manufacture of Vinegar.—Andre Foubert, New York City.

I claim the manufacture of vinegar from the vapors of wine condensed and acidified in substantially the manner specified.

63,032.—Galvanic Battery for Remedial Uses.—Herman Fritz, Cleveland, Ohio.

First, I claim air and water-tight case, A, connecting bridge, G, rods, R, in combination with zincs, E, and covers, B, as arranged and for the purpose set forth.

Second, The insulating washer, I, connecting screw, F and M, and insulating washer, K, as arranged in combination with the arm, L, and foot plates, N and insulator, N', for the purpose and in the manner specified.

Third, The screw, M, insulating washer, I, as arranged in combination with the screw, F, zinc, E, and bridge, G, for the purpose and in the manner described.

63,033.—Sewing Machine Attachment for Marking Tucks.—H. W. Fuller, New York City.

I claim, First, The employment of the nipping fingers to form ridges or creases in fabrics for the purposes specified, when arranged with respect to and operating upon the fabric substantially in the manner described.

Second, The combination with the marking device described of the plate, F, for the purpose specified.

Third, The use of the screw, 4, or its equivalent, to adjust the fingers to the fabric, as specified, and to determine the amount to be seized.

Fourth, In combination with the marking device possessing the functions and mode of operation described the spring, B, arm, C, and auxiliary arm, D, or its equivalent, as specified.

Fifth, In combination, the said marking device, the bed plate, E, or equivalent, and a feeding device, for the purposes specified.

Sixth, In combination, the marking device, bed plate, feeding device, and a stitch-forming mechanism, substantially as and for the purpose specified.

Seventh, So constructing and combining the arm, C, and spring, B, as to be adjustable for various widths of tucks or plaits, in combination with the marking device.

Eighth, The supplemental spring, B', and its screw, B², or their equivalent, for the purpose specified.

Ninth, In combination with the aforesaid marking device, a suitable gage, F.

63,034.—Bending Machine.—E. D. and W. K. Gird, Cedar Lake, N. Y.

First, We claim the disk, C, and the jaws, a a, in combination with the cross head bar, b, substantially as described.

Second, The belt shifter, n, in combination with the slots, c c, in the fly wheel, and the disk, C, substantially as and for the purpose herein set forth.

63,035.—Portable Tree Box.—H. A. Graef, Brooklyn, N. Y.

I claim, First, A portable tree box formed of slats or strips, a a, fastened to bands or hoops, b b, and secured to the tree by lashings, d d, constructed and arranged substantially as and for the purposes herein described.

Second, The hooks or bands, b b, fastening by buttons or slots or their equivalents, in combination with sectional hoops or bands, b' b', for enlarging the size of the box, substantially as herein set forth.

63,036.—Manufacture of Bleaching Powder.—Thomas Gray, Union Road, Eng.

I claim the application, as before stated, for the purposes of bleaching fabrics or fibers or other materials without destroying or injuring them, substantially, as described.

63,037.—Hay Elevators.—E. C. Green, Plainfield, Ind.

I claim, First, The hoisting apparatus herein described, in combination with the wagon bed, A, arranged and operating substantially as and for the purposes herein specified.

Second, The hollow center post, B, inclosing the hollow center standard, D, with its cross arm, E, and pullies, d d, in combination with the slide roller, F, with its pulley, s, and spring, l, connected with the horse rake, G, and operated by the rope, e, constructed, arranged, and operating together substantially as and for the purposes herein described.

Third, The crank, n, in combination with the slide roller, F; and the spring, p, constructed and arranged substantially as and for the purposes set forth.

63,038.—Seed Planter.—J. Deloss Green, Antrim, Ohio.

I claim, First, Providing the spokes, H H, with adjustable supplementary spokes or bars, F, which carry seed boxes and slides, as and for the purpose herein set forth.

Second, The arrangement of the overlapping and adjustable bars, C c', with the cams, G G, and seed slides, e e, substantially as and for the purpose specified.

Third, The automatic covers, K, upon the ends of the supplementary spokes, F, for the purpose of discharging the grain, substantially as specified.

63,039.—Connecting Rods for Machinery.—Thomas Hall, Bergen, N. J.

I claim the combination of the rod, A, the sliding piece, B, with wedge-shaped bearing, and screw, C, when the same are arranged and operate substantially as described.

63,040.—Buckle.—E. Hambujer, Detroit, Mich.

I claim a buckle constructed of a single piece of wire, the ends of which constitute the tongues, being coiled upon each other in the rear and bowed thence toward their points, substantially as described.

63,041.—Trunk Lock.—Wm. J. Hare, New York City.

I claim the spring jaws, C, in combination with a stud, D, one or more wedges, E, and a key, K, constructed and operating substantially as and for the purpose described.

63,042.—Horse Hay-Fork.—O. J. Hardgrove, Canton, Ohio. Antedated March 10, 1867.

I claim the case, A, shaft, B, thimble, d, with prongs, a a and a', and spring, b, when constructed, arranged, and operating in the manner as and for the purposes specified.

63,043.—Mode of Reducing Vegetable Fibrous Substances.—James R. Haskell, New York City.

I claim the combined process of treating vegetable fibrous substances consecutively and by relation of each process to the preceding and following process in the form and manner and for the purposes, substantially as hereinbefore described.

63,044.—Mode of Treating and Separating Vegetable Fiber.—James R. Haskell, New York City.

First, I claim the mode of producing a vacuum or partial vacuum by first steaming the vegetable fibrous material under pressure and expelling the air, and then condensing the steam with a shower of cold lye which causes a rapid absorption of the lye in every part of the plant in the manner and for the purposes substantially as hereinbefore described.

Second, I claim the mode of treating vegetable fibrous substances in the form and manner and for the purposes, substantially as hereinbefore described.

63,045.—Steam Engine Oil Cups.—Moses Hawkins, Birmingham, Conn.

I claim an oil cup, A, provided with a stand pipe, D, extending up to near the cup, E, and a water cock, f, the whole constructed and operating as described.

63,046.—Construction of Safes.—E. M. Hendrickson, Brooklyn, N. Y.

I claim using for such purpose and in the manner described, wires or rods, bent or coiled spirally, as herein shown and described.

63,047.—Corn Planter.—Curran W. Henkle, Washington, C. H. Ohio.

First, I claim the curved arm, J, operated through the medium of the loader arm, L, and lever, F, in combination with the hopper, H, provided with the tube, h, and the spout, I, all arranged to operate in the manner substantially as and for the purpose set forth.

Second, The valve, D, in the opening, a, in the plow, C, when arranged to operate in connection with the curved arm, J, substantially in the manner and for the purpose specified.

63,048.—Railroad Crossing.—Edward Hiserodt, Washington, Ill.

I claim the peculiar form and arrangement of the crossing chair, with the lips outside of the rail holding it to its position, with the ommission of the lips on the inner side of the rail and the application of the cleats, h, as and for the purpose described.

63,049.—Car Coupling.—Humphrey Holden (assignor to A. S. Barber), Hartford, Conn.

I claim the combination of the draw head, A, with the block, E, springs, G and F, and the link, B, and pin, C, said parts being arranged for use, substantially as set forth.

63,050.—Cultivator.—Henry Howe (assignor to himself and E. R. Ford), Oneonta, N. Y.

First, I claim the pendants, D, and the manner of securing them to the plow beams, and frames, substantially as and for the purpose shown and described.

Second, The bars, E, in combination with the plow beams, E, and pendants, D, substantially as and for the purpose herein shown and described.

Third, The combination with the tongue, F, and drivers seat, G, of the plow beams, E, swivel braces, c, and doubletree, H, substantially as and for the purpose herein shown and described.

Fourth, The slotted tongue, F, made substantially as and for the purpose herein shown and described.

Fifth, The levers, I, and chains, h, for the purpose of raising the plows out of the ground and retaining them in that position, substantially as herein shown and described.

Sixth, The upright side frames, B, as arranged and connected with the horizontal cross bar, C and C' substantially as and for the purpose herein shown and described.

63,051.—Refining Petroleum, etc.—Fleury Huot, Perth, Amboy, N. J. assignor to himself and John Rogers, of N. Y. city. Antedated Sept. 19, 1866.

I claim, First, Separating the bone black and impurities from the oil by filtering the same through a centrifugal filter as specified.

Second, The centrifugal filter formed of two thicknesses of cloth with sheets of filtering paper between them as and for the purposes set forth.

63,052.—Machine for Setting Staves in Barrels.—C. B. Hutchinson, Auburn, N. Y.

I claim, First, The setting up of barrels, casks, etc., by suspending the chine hoop by means of a clamp or its equivalent in such relation with the head which is placed on a suitable frame or support, that the ends of the staves may be inserted between the head and chine hoop, substantially as shown and described.

Second, The adjustable table, D, constructed with a concave upper surface and of a diameter smaller than that of the barrel for the purpose described, substantially as specified.

Third, The combination of the clamp frame or support and gage when arranged substantially as and for the purpose set forth.

63,053.—Compensating Braces for the Springs of Vehicles.—Samuel Jackson, Newark, N. J.

I claim the application to the springs of wheel vehicles, of a stay or brace arranged as shown and described or in an equivalent way to compensate for the yielding movement of the spring.

63,054.—Burning Fluid.—W. W. Jacobs, Hagerstown, Md.

I claim a fluid composed of the ingredients hereinabove named, mixed together in and about the proportions described, and for the purpose specified.

63,055.—Treadle Cam for Looms.—Barton H. Jenks, Bridesburgh, Pa.

I claim constructing the grooved hub of a treadle cam, C, of two parts, substantially in the manner and for the purpose described.

63,056.—Seed Drill Teeth.—Samuel Keeler, Lancaster, Pa.

I claim the arrangement and combination of the curved arm, J, with the spiral spring, M, operating as herein described and for the purposes set forth.

63,057.—Brick Machine.—Philip H. Kells, Adrian, Mich.

First, I claim the combination of the annular mold bed, B, and the central support, C, substantially as described and represented.

Second, The arrangement of the throat piece, d, above the molds operating to pack in the clay and remove the superfluity, substantially as described.

Third, The arrangement upon the mold wheel of the two pug mills on opposite portions, substantially as described.

63,058.—Water Wheel.—T. J. Kindleberger, Eaton, Ohio.

First, I claim the wheel having its plates and their buckets constructed, operated and arranged as herein described.

Second, The combination and arrangement of the plate, C, arm, D, worm wheel, E, and bevel gear with the hand wheel, F, for operating the gates as set forth.

Third, The combination of the rod, a, box, b, and spiral spring, m, with the set screw, o, arranged to operate as and for the purpose set forth.

Fourth, I claim constructing the crown plate, B, with the recesses or notches in its periphery, as shown and described, the outer points of said plate being arranged to protrude even with the periphery of the annular rim, A, as and for the purpose herein set forth.

Fifth, I claim constructing the gate, H, with the outwardly projecting arm, r, for the purpose of attaching the spring box, b, thereto, as shown and described.

63,059.—Plow.—Charles Kinkel (assignor to Alexander Wehle), New York City.

First, I claim the general construction of the plow, consisting of the plow frame, C, in connection with the axle, D, the plow beam, B, screw tree, F, and shaft, H, substantially as described.

Second, The plow frame, C, in combination with the screw tree, F, and universal joint, G, substantially as set forth.

Third, The universal joint, G, applied to the plow beam B and screw tree, F, substantially as described.

Fourth, The movable axle, D, in combination with the plow frame, C, substantially as described.

Fifth, The application of my improvement to plows of the usual construction by means of the cast iron shoe, R, substantially as described.

63,060.—Book Keepers Ruler.—A. O. Latham, Wheeling, W. Va.

I claim the combination of the secondary ruler, B, with the main ruler, A, the former swiveling upon a pin at or near the center of the latter, substantially as and for the purpose specified.

63,061.—Low-water Indicator.—W. H. Laubach (assignor to himself and W. S. Cooper), Philadelphia, Pa.

First, I claim the weighted lever, E, controlled by a float or weight g, and having a projection adapted to a catch or hook on the end of the lever, D, in combination with the pawl, K, arm, c, weighted arm, c', and whistle, H, the whole being arranged and operating substantially as and for the purpose herein set forth.

Second, The weight or float, g, and its projection, y, arranged to operate in the interior of the glass tube, B, as and for the purpose herein described.

63,062.—Carpenters Gage.—Peter Lawyer, Richmondville, N. Y.

I claim the combination of the cam lever, E, lever spring, D, plate, C, flanged and slotted metallic eye, B, substantially as described for the purpose specified.

63,063.—Safety Guard for Door Locks.—Rufus K. Lee, New York City,

I claim the movable guard plate or pin entering the latch or bolt outside the case, in the manner and for the purposes set forth.

63,064.—Harness.—Jacob B. Lindeman, Manor Trop. Pa.

I claim the combination and application of the breeching, A, and stay strap, B, when affixed to the shafts of a vehicle, in the manner and for the purpose specified.

63,065.—Wardrobe Bedstead.—S. C. Maine, Boston, Mass.

I claim as an improved bedstead and bed, the balance spring, a, or its equivalent, attached to shaft, b, by chains, or their equivalent, in combination with frames or cases as shown in Fig. 1 and 2, and operated substantially as set forth.

63,066.—Bed Bottom.—David Manuel (assignor to himself and Willard Manuel), Boston, Mass.

I claim the arrangement of the compound wire springs having spiral ends, a a, attached to the frame of the beadstead, A, and held by the cords, b b, and having also long curved sides, c c, connected with the slats, B, by the hooks, d, formed, combined and operating substantially as and for the purposes herein described.

63,067.—Gate.—John W. Martin, Washington, D. C.

First, I claim the combination of the tubular portion, E, with a step, F, and pintle, J, said parts, E and F, being constructed with spirally included abutting surfaces and applied to a gate post, substantially in the manner and for the purposes described.

Second, In combination with the spirally inclined tubular portion, E, and the step, F, formed of cast or hardened metal, I claim the wrought metal pin, J, substantially as and for the purposes described.

63,068.—Ice-cream Freezer.—H. B. Masser, Sunbury, Pa.

First, I claim the device of a catch, k, or its equivalent, for locking and unlocking the beater shaft, h, in combination with the gear wheel, b, by means of which separate or alternate motions may be given to the beater and the freezing can, A, or both together, arranged and operating substantially as and for the purposes herein described.

Second, The india-rubbed packing, m m, fitted on the edge of the beater wing, g, arranged and operating substantially as and for the purpose specified.

63,069.—Railway Joint.—A. S. McClure, Duncannon, Pa.

I claim the construction of the ward rail, B, when fitted into the flanges of the main rails, A, and fastened and supported by the guard plate, C, as herein described and for the purposes set forth.

63,070.—Car-axle Box Cover.—Richard McDowell, Lambertville, N. J.

I claim, First, An axle box having a projecting ring in front provided with tapering flanges, b, receiving the cap, B, with corresponding flanges, c, having an operating weighted handle, d, in the manner described for the purpose specified.

Second, The weighted handle, d, arranged on the cover, B, for the purpose of holding the same in position, substantially as herein shown and described.

63,071.—Piston Packing.—James P. McLean, Brooklyn, N. Y.

I claim combining the cork, C, rubber, R, with or without the mineral coating and securing the same by means of metallic strips, all substantially as described and for the purpose set forth and shown in the drawing.

63,072.—Piston-rod Packing.—James P. McLean, Brooklyn, N. Y.

I claim packing the piston rod or shafting, R, of a steam engine with the steam by means of the sectional, N N', pad C C, and steam ports, U U, constructed and operated substantially as described and shown in the accompanying drawings.

63,073.—Packing for Manholes of Steam Generators.—James P. McLean, Brooklyn, N. Y.

I claim the cork diaphragms (or rings) or sections thereof, coated with a non-combustible substance, for the purpose substantially as described and shown in the accompanying drawings.

63,074.—Churn.—John Megown, New London, Mo.

First, I claim the combination and arrangement of the pullies, F G, and band, L, or their equivalent, shafts, H J, cranks, I K, standard, E, and hinged lid, D, with each other and with the dasher handles, P, churn, B, and frame, C, substantially as described and for the purpose set forth.

Second, The combination of the box or cap, M, bolts, N, and nut, O, with the shaft, J, and standard, E, substantially as described and for the purpose set forth.

63,075.—Apparatus for Compressing Air.—J. B J. Mignon and S. H. Rouart, Paris, France.

We claim, First, the herein-described apparatus for obtaining the compression or exhaustion of air, the same consisting of one or more reservoirs into and from which the compressing and exhausting agent is conducted so as to compress or exhaust the air within the same by means of supply and exhaust pipes and regulating valves, arranged and operating substantially as shown and set forth.

Second, The combination with two or more reservoirs, arranged as described, of the air and water supply and exhaust pipes and their operating valves, connected with the said reservoirs, in such manner as to effect the continuous compression or exhaustion of air, substantially as specified.

Third, The combination with one or more air-compressing reservoirs, as described, of a hollow pillar or other tubular receptacle for the dispatches, or other objects to be transmitted through the tubing, under the arrangement and for operation as herein set forth.

63,076.—Bung for Casks, Barrels, etc.—John Miller, Buffalo, N. Y.

I cloim, First, The metallic box, A, expanding inwardly to receive the plug, B, when employed as a lining for bung holes, and constructed substantially as described.

Second, The plug, B, when provided with the head, h, and enlarged end, g, and combined with the packing ring, F, and box, A, substantially as set forth.

Third, The handle and driver, K, constructed and operating with the other parts, as described.

63,077.—Curved Corrugated Steel Plates.—Richard Montgomery, New York City.

I claim as an article of manufacture curved corrugated steel for the construction of steam chimneys, furnace and flues for steam boilers and for other purposes, substantially as described.

63,078.—Railroad-track Lifter.—John Morton, Winchester, Ind.

I claim, First, A combination of levers, E and G, fulcra, D1 and D2, and hooks, F, constructed and arranged to operate substantially in the manner and for the purpose set forth.

Second, The combination of the crossed levers, E, and slotted adjustable hooks, F, substantially in the manner and for the purpose set forth.

63,079.—Hay Rake.—John I. Munroe, Burlington, Mass.

I claim the combination of the divider J K L M N, chain R, or equivalent lever P, teeth E, and frame of the rake with each other substantially as herein shown and described and for the purpose set forth.

63,080.—Saw Mill.—Isaac H. Newton, Oakfield, Mich.

First, I claim the hook M, suspended from the bent or loaded lever L, in combination with the operating mechanism for turning the log upon the carriage, substantially as herein set forth.

Second, The tilting blocks D, furnished with inclined or cam shaped ends d, and combined in relation with the sliding blocks E, and frame J, substantially as herein set forth for the purpose specified.

Third, The rock shaft H, and cams G, in combination with the sliding blocks E, and tilting blocks D, and frame J, substantially as herein set forth for the purpose specified.

Fourth, The arrangement of the bent lever L, hook M, and cord N, with reference to each other and with the wheel P, and rock-shaft H, substantially as herein set forth for the purpose specified.

63,081.—Boat Detaching Tackle.—Milton V. Nobles, Elmira, N. Y.

I claim, First, in combination with a boat detaching apparatus, a bail, bar or brace connected to the sides of the boat, so as to prevent the boat from tipping, when unevenly loaded, substantially as described.

I also claim hinging the bails by which the boat is steadied, at the sides, so that when let go or disconnected they will drop and lie upon the decks and thus not incommode or endanger the passengers or crew as described.

63,082.—Boat Detaching Tackle.—Milton V. Nobles, Elmira, N. Y.

I claim the combination of the detaching apparatus with the brace, and with the central suspension of the boat as and for the purpose herein described and represented.

63,083.—CLOTHES TONGS.—Benedict Ott, La Crosse, Wis.

I claim the legs A, and handle B, with blades formed at right angles to them pivoted together at a, and provided with the spring b, which holds the legs A, open, constructed and arranged as herein set forth.

63,084.—DYEING AND PRINTING TEXTILE FABRICS AND COMPOUNDS THEREFOR.—Alfred Paraf, Mulhouse, France.

First, I claim as a new article of manufacture the arsenite of glycerine hereinabove described.

Second, The combination in the operation of dyeing or printing on textile fabrics or yarns, of the arsenite of glycerine, coal tar color, and acetate of alumina, magnesia, or other metallic oxide, substantially as and for the purpose hereinabove set forth.

63,085.—SPINNING JACKS.—F. R. Pearson, Germantown, Pa.

First, I claim actuating the belt shifter bar "f," in one direction by means of the twist gearing and in the other direction by the spiral spring the whole combined and arranged substantially as described and for the purpose set forth.

Second, I claim the combination and arrangement of the catch "e," loop "p," and faller "n," constructed as described and operated from the front of the carriage substantially as described and for the purpose set forth.

Third, I claim the combination of the rod "r," lug "O," catch "e," stand "h," and nut "t," when constructed as described for the purpose set forth.

63,086.—ADJUSTABLE HANDLE FOR FRUIT BOXES.—Cary Peebels, Santa Clara, Cal.

I claim a handle A, constructed with the arms b b, and the prongs c c, similar to that herein described substantially as and for the purpose set forth.

63,087.—COMPOSITION FOR COATING WOOD, CLOTH, METALS, AND FOR FORMING VARIOUS ARTICLES.—Antonio Pelletier, Parkersburg, West Va.

First, I claim the compound consisting of vegetable fibre, soapstone, silicate of soda or its equivalent red lead and litharge substantially as described and for the purpose set forth.

Second, The compound consisting of vegetable fibre, soapstone, silicate of soda or its equivalent red lead and litharge when coated on wood, cloth, leather, brick, stone, iron or other fibrous forms or solid substances and treated with a solution of muriatic acid consisting of one part of the acid to three parts of water, substantially as described and for the purposes set forth.

Third, I claim as a new article of manufacture the composition substantially as herein described and for the uses and purposes set forth.

63,088.—HOOPING CASKS.—Dan. Perry and Edwin Perry, Pawtucket, R. I.

We claim the concave hoop B, fitted permanently in channels or grooves on the outer face of the barrel, tub, pail, or other article made of wood and hooped substantially as described for the purpose specified.

63,089.—WOOD TURNING LATHES.—John Phillips, Jr., Chicago, Ill.

First, I claim the cylindrical bearing or holder B, or its equivalent in combination with the cutters E, arranged and operating substantially as specified.

Second, I claim the arrangement of the cutter G, with the cylindrical bearing B, or its equivalent operating as and for the purposes set forth.

63,090.—PRESS STRAINER.—John E. Phillips, Philadelphia, Pa.

I claim the perforated cylinder d, and band cover, e, in combination with the disks strainers and a screw plunger and base plate a, operated substantially as described for the purposes specified.

63,091.—TRUSS.—William Pomeroy, New York, N. Y.

I claim the construction, combination and arrangement of the pad spring F, with the pad E, and main spring B, of the truss, substantially as herein described and for the purpose set forth.

63,092.—SLEEVE SUPPORTER.—Thomas Powell, Milroy, Ind.

I claim the elastic band B, provided at one end with the ring C, through which it passes after encircling the arm above the elbow and having at its lower end the hook D, adapted to catch in the slit of sleeve as herein described and represented.

63,093.—STOVE COVER FOR COOKING STOVES.—Seymour Raymond (assignor to himself and J. Campbell), Middletown, Pa.

I claim the reversible pot-hole division plates in the upper plate of a cook stove constructed and operating substantially as and for the purpose herein described.

63,094.—STALL FOR ROASTING ORES CONTAINING SULPHUR, ETC.—John T. Reese, Baltimore, Md.

I claim an Ore Stall with a roof a, by arch or otherwise, a closed front by doors b b, the arrangement of draft parts d d, the arrangement of fume ports e e, and f, the connection of stack s, and culvert h, with culvert i, and main culvert and stack, this process of confined roasting a long and crooked main culvert, and the process of securing sediment by the bends, the rough walls or the obstructions in the culverts.

63,095.—BEDSTEAD FASTENING.—Adam H. Rennie, Binghamton, N. Y.

I claim the mode of constructing, arranging, and combining oblique dowelled pin joints with the eccentric clasp, D, substantially in the manner herein described and represented.

63,096.—TEMPERING STEEL AFTER IT HAS BEEN WELDED TO IRON FOR CUTTING TOOLS.—Asa R. Reynolds, Auburn, N. Y.

I claim tempering steel that is welded on iron, such as shear blades, plane irons, chisels, axes, or hatchets, and other cutting tools, by means of a reactionary blow produced by a drop die, or hammer, substantially as herein described and represented.

63,097.—WELDING STEEL TO MALLEABLE IRON AND TEMPERING THE STEEL BY ONE OPERATION.—Asa R. Reynolds, Auburn, N. Y.

I claim welding steel to malleable or wrought iron, and tempering the steel by one and the same process or operation, viz: by submitting the two metals, in a properly heated condition, to the action of a drop die, and the reaction thereof, with the under or anvil die, and the metal held between them, substantially as described.

63,098.—FIREPLACE.—Israel I. Richardson, Delaware, Ohio.

I claim the arrangement of the open grate, A, chambers, E, recessed in the jamb, and with perforated front doors and reverberating flues, D D, as described and represented.

63,099.—FOUNTAIN.—John Ross, Greenville, Mich.

I claim the combination and arrangement of the receiver, D, chambers, A and B, jet pipe, b, pipe c, air pipe, d, pipe, e, pump, E, pipe, f, stop cocks, g h and i, substantially as described for the purpose specified.

63,100.—FENCE.—John H. Rowley, Fabius, N. Y.

I claim the arrangement of the panels, A A, with the braces, E E, adjustably hinged to the said panels and the sliding bar, D, the several parts being constructed and used substantially in the manner and for the purpose herein specified.

63,101.—TOWEL RACK.—C. W. Royse, Peterborough, N. H.

I claim the frame, C, hung in projecting pieces, E, of a block or plate, F, in combination with the arm, G, having set or thumb screw, H, substantially as and for the purpose described.

63,102.—POCKET IMPLEMENT.—John A. Russ, Springfield, Mass.

I claim, as a new article of manufacture, the instrument herein described, consisting of the various tools mentioned, combined and arranged substantially as herein set forth.

63,103.—FENCE GATE.—M. L. Salyards, Troy Grove, Ill.

First, I claim the peculiar arrangement of the ropes, D D, in combination with the gates, B B, substantially as and for the purpose described in the foregoing specification.

Second, The peculiar arrangement of the ropes, H H and I I, in combination with the gates, B B, substantially as and for the purpose described.

Third, The posts, G G, and weights, M M M M, in combination with the gates, B B, substantially as and for the purpose described.

Fourth, The rollers, C C C C, in combination with the gates, B B, substantially as and for the purpose described in the foregoing specification.

63,104.—MATCH BOX.—Louis Schoerken, Koln, Prussia.

I claim connecting the hinged part, D, of the cover, C of an inner sliding box with the back, a, of an outer case, by means of an elastic band or strap, substantially as and for the purposes described.

63,105.—COTTON BALE TIE.—Daniel M. Sechler, Cincinnati, Ohio.

I claim the arrangement of the buckle, A, constructed with notched slot, 4, 5, and the loop, B, adapted and proportioned to engage with the buckle, substantially as described and represented.

I claim the loop, B, for attachment to one end of the hoop and adapted to lock within a buckle or equivalent device on the other end of the hoop.

63,106.—NAIL HAMMER.—George Selsor, Philadelphia, Pa.

I claim the combination, substantially as described, of the claws, c, with the plane of a hammer, for the purpose specified.

Second, The groove, x, in the pane beneath the claws, for the purpose described.

63,107.—CLOTHES SPRINKLER.—Ira W. Shaler, Brooklyn, N. Y.

I claim as a new article of manufacture the dampener described, when constructed substantially as set forth.

63,108.—PAD PLATES FOR HARNESS.—P. Shaw and E. S. Dawson, Syracuse, N. Y.

We claim as an article of manufacture the pad plate herein described, the same consisting of the struck up plate of steel, A, strengthening plate of malleable iron, B, combined and provided with the loop, G, substantially as and for the purpose specified.

63,109.—HAT-BLOCKING MACHINE.—Julius Sheldon (assignor to himself and W. C. Griswold), New York City.

First, I claim the bars, f, provided with notches, g', for the purpose of adjusting said bars to all depths of hats, substantially as described.

Second, I claim the slides, l, provided at one end with pins, g, which act as the fulcra of bars, f, and having their inner ends so arranged with the cone, n, as to be adjustable substantially as described.

Third, The ring, k, provided with a surrounding elastic cushion to adapt it to the two functions of breaking the band and giving the pressure to the clamps, substantially as described.

Fourth, I claim the ring, p, disconnected from but arranged to operate the clamps, l, substantially as and for the purpose specified.

63,110.—STOVE-COVER LIFTER.—Amos Shepard, Plantsville, Conn.

First, I claim a cast metal stove-cover lifter with the perforated hollow and notched socket or ferrule, substantially as described.

Second, I claim casting the herein described perforated hollow socket or ferrule in the manner and by means substantially as described, for the reception of wood handles.

63,111.—CORN HARVESTER.—James Shobe, Principio, Md.

I claim the combination of the revolving cutters, I I, receiving guides, f h, gathering belts, m g, standards, k b, and cross arms, K K, for holding the gavels, the forked hook catch, M, and foot lever, R, for liberating, as herein specified.

63,112.—CORN SHELLER.—Isaac B. Siddle, Caswell County, N. C.

I claim the improved corn sheller herein described, composed of the plate, A, with teeth, b, or their equivalent, the whole arranged to operate substantially as described.

63,113.—WINDOW FASTENING.—J. D. Smith, Naugatuck, Conn.

I claim the combination of the slide bolt, C, with the thimbles, D D', provided with screw threads on their exterior surfaces, substantially as and for the purpose herein set forth.

63,114.—SAW MILL.—Josephine Stewart, Owossee, Mich., administratrix of the estate of R. L. Stewart, deceased.

I claim the pitman, E, pivoted at its center to the pivoted arms, G, at its outer end, to the arm, d, and at its inner end to the pitman, D, constructed and operating substantially as described, for the purpose specified.

63,115.—APPARATUS FOR DISTILLING PETROLEUM.—A. H. Tait and J. W. Avis, New York City.

First, We claim the arrangement of partitions, a, in the still, A, said partitions being provided with apertures, c, at or near their bottoms, and with apertures, d, at or near their tops, substantially as and for the purpose described.

Second, Placing the apertures, c, at or near the bottoms of the partitions, a, in a zigzag position, substantially as and for the purpose set forth.

Third, The arrangement of valves, e e', in the top parts of the partitions, a, substantially as and for the purpose described.

Fourth, The arrangement of two or more condensers, C C', in combination with the compartments, b b1 b2 b5, of the still, A, and with valves, e e', regulating the communication between said compartments substantially as and for the purpose set forth.

Fifth, The equalizing pipe, n, in combination with the compartments, b b5, of the still, A, substantially as and for the purpose described.

Sixth, The gates, l l1 l2, in combination with the compartments, b3 b4 b5, of the still, A, substantially as and for the purpose set forth.

Seventh, The combination of coking or tar retorts, E E', with a still, A, divided into a number of compartments, b b1 b2, b5, substantially as and for the purpose described.

63,116.—PROCESS AND APPARATUS FOR THE FERMENTATION OF SACCHARINE LIQUIDS.—A. H. Tait & Joseph W. Avis, New York City.

First, We claim effecting the fermentation of saccharine solutions or liquids in vacuo.

Second, The arrangement of the force pump or fan blower, in combination with a suitable refrigerator and with the fermenting tun for the purpose of cooling the wort as set forth.

Third, The arrangement of a steam pipe in combination with the tun, A, refrigerator or condenser, C, and receiver, D, substantially as and for the purposes described.

63,117.—BRAIDING ATTACHMENT FOR SEWING MACHINE.—Joseph Thomas, New York City.

I claim the arrangement of the plate, m, forming part of the braiding plate, A, and capable of opening and shutting to facilitate the passing in of the braid, and provided with a groove, s, on its underside to guide the braid, the whole being constructed in the manner and for the purpose set forth.

Second, I claim the arrangement and use of the frame, D, with rollers, B and B', or their equivalent at the ends, and the manner of stretching the material upon the same, for the purpose substantially as described and set forth.

63,118.—PUMP VALVE.—H. Tyler, Gaines, N. Y.

I claim the valve, N, attached to the end of the sliding rod, L, by means of the nut, d, so as to furnish the said valve to play on the rod as herein described, piece, M, and guides, b b, when all are constructed and arranged as herein set forth.

63,119.—HOP FRAME.—Jacob B. Van Dewerker, Cobleskill N. Y.

I claim a hop frame composed of the vertical stakes or poles, A, and inclined bars, B, the latter being connected to the former and arranged relatively therewith, substantially as shown and described.

63,120.—WINDOW-SASH SUPPORTER.—Richard Vose, New York City.

I claim a thumb piece and crank united to form one piece when supported by a simple divided plate, C, upon a window sash and combined with a spring catch upon the end or side of said sash by means of a connecting cord or wire all substantially in the manner and for the purpose herein set forth.

I claim also the combination of a pin, r, with a spring catch, e, as herein described when said pin is made to project in or through a slot cut in the sash, all substantially as and for the purpose herein set forth.

63,121.—BOOTJACK.—James Walker, Cincinnati, Ohio.

I claim a self-adjusting bootjack composed of the two jaws, D D', with the curve linear slots, E E', sliding between two plates, A, and B, so as to be closed by the action of withdrawing the foot from the boot, substantially as set forth.

63,122.—ATTACHING THILLS TO WAGONS.—Theodore Wallis, A. B. Mattoon and Chauncey E. Tutler, Auburn, N. Y.

We claim the shackle, A, when provided with a receptacle as described in combination with slide, C, as constructed and both being employed, in the manner and for the purpose set forth.

63,123.—INSTRUMENT FOR DRAWING ELLIPSES.—Aaron Warr, Lockport, N. Y.

I claim the combination with a pair of dividers of the pen and pencil carrier, f, jointed to a sleeve, e, or equivalent, which enables the device to slide up and down and turn upon the inclined bar or leg, B, of the dividers, arranged and operating substantially as set forth.

I also claim, in combination therewith, the double brace, C, consisting of the legs, h h, collar, i, and set screw, n, substantially as and for the purpose specified.

63,124.—BURGLAR ALARM.—C. Waterman, New York City.

First, The rod, G, connected by a pivot or any suitable joint, to the arm, F, and the door, A, and arranged in relation with the hammer rod, B, of an ordinary bell alarm, to operate in the manner substantially as and for the purpose set forth.

Second, The hook or fastening, C, in combination with the hammer rod, B, and the other rod, G, substantially as and for the purpose specified.

63,125.—APPARATUS FOR DRAWING IRON FROM THE FIRE.—David N. Williams, Chicago, Ill.

I claim the sliding drum, G, in combination with the traveller, C, chain, E, and tongs, F, all arranged to operate substantially in the manner as and for the purpose set forth.

63,126.—VALVE.—John Wilcox, Thompsonville, Conn.

I claim a valve, constructed, arranged and operating substantially as herein shown and described.

I claim the stop arrangement, a b, substantially as herein set forth in combination with a screw valve.

63,127.—FAUCET.—John Wilcox, Thompsonville, Conn.

I claim the faucet consisting of the shell, A, stem, C, socket, D, thimble, a, valve joint, B, and packing recesses, p, constructed as herein set forth for the purpose specified.

63,128.—VENEER CUTTER.—John B. Wilson, New York City.

I claim cutting a crimped or corrugated veneer, substantially as described for the purpose set forth.

63,129.—STEAM-ENGINE SLIDE VALVE.—Parker Wineman, Chicago, Ill.

First, I claim the application of a laterally expansible packing to a ring which is applied within a cup, B, upon the back of a slide valve, said ring being held against the valve chest back by the pressure of a spring alone while the packing is expanded by the pressure of steam, substantially as described.

Second, The detachable ring, a, grooved on its circumference and fitted with expansible packing in combination with the cup, B, for the purpose of packing a slide valve, substantially as herein set forth.

Third, The combination of the flanged ring, a, and its spring, b, with the expansible packing and its spring, h, applied within a cup, B, and operating substantially as described.

63,130.—VAPOR GENERATOR AND BURNER FOR HEATING PURPOSES.—Henry R. Foote, Oil City, Pa., assignor to himself Stillman C. Allen, and J. H. Winsor.

First, I claim a retort or vessel, a.

Second, A tank or means of supporting the retort, with the hydro-carbon oil or liquid.

Third, An apparatus for decomposing steam and introducing its gaseous constituents into the retort.

Fourth, An air pump, or means of forcing air into the retort.

Fifth, Means of discharging from the retort and burning the mixture of air, hydro-carbon vapor, and the gaseous constituents resulting from the decomposition of steam as set forth.

I also claim the combination of such combination, and the reservoir, b, applied thereto, and for use, substantially as described.

I also claim the employment of the vapors of a light and volatile hydro-carbon as set forth with the heavier oil, the air and gaseous constituents of steam introduced into the retort substantially as described, such light and volatile hydro-carbon, being placed in the air reservoir, b, so as to be vaporized therein by the air forced into and through it or by any other proper means, the vapors of such hydro-carbon, being carred by the air from the reservoir into the retort.

I also claim the admixture of gas of a hydro-carbon fluid, air and the gaseous constituents of steam and their combustion by the means, in the manner and for the purposes set forth.

I also claim the deflector or radiator, g, constructed as described and arranged in relation to pipes f, and elbow, f', as and for the purposes set forth.

I also claim the combination of the heating coil of pipes, p', or its equivalent, with the tank, c, the retort, a, a steam decomposing apparatus, and an air forcing apparatus, the whole being to operate substantially as set forth.

I also claim the arrangement of the oil tank, c, surrounded with the water jacket, t, with the retort, a, a steam decomposing apparatus and an air forcing apparatus, substantially as specified.

I also claim the combination of the drain pipe, k, with the retort, a, the tank, c, a steam decomposing apparatus, and an air forcing apparatus when combined for use as specified.

REISSUES.

2,509.—LAMP.—Wilmon W. Blackmar, Boston, Mass., assignee by mesne assignments of D. H. Chamberlain. Patented May 8, 1855.

First, I claim the combination of a perforated wick tube or chamber, B, with the body, C, of a lamp filled with a porous or absorbing material for the purposes set forth.

Secondly, An oil can constructed in the manner and for the purposes set forth.

2,510.—BILLIARD TABLE CUSHION.—Hugh W. Collender, New York City. Patented December 8, 1857. Reissued August 23, 1859.

I claim billiard table cushions composed of vulcanized india-rubber or allied gum, with a layer rendered less compressible than the body or back by the incorporation of fibrous or equivalent substances, the said layer and back or body having been united in the green or plastic state, and together vulcanized as and for the purpose specified.

2,511.—CUSHION FOR BILLIARD TABLE.—Hugh W. Collender, New York City. Patented January 12, 1858.

I claim uniting the parts employed in forming combination billiard cushion by placing the harder or more dense and less elastic substances in a mold, and allowing the melted rubber to flow against, around, or into the harder or more dense and less elastic substances, or causing the plastic rubber by pressure to unite with the same, and then vulcanizing the india-rubber, substantially as and for the purpose set forth.

2,512.—CUSHION FOR BILLIARD TABLE.—Hugh W. Collender & Michael Phelan, New York City, assignees of Hugh W. Collender. Patented September 25, 1860.

We claim making cushions for billiard tables of two thicknesses of what is known as the soft compound of vulcanized India-rubber, or allied gum, with an interposed thickness of what is known as the hard compound of vulcanized india-rubber, or allied gum, or, as the equivalent thereof, with an interposed thickness of the soft compound of vulcanized india-rubber, or allied gum, rendered hard by the admixture of fibrous or equivalent substances, substantially as and for the purpose specified.

2,513.—AUGER.—Ransom Cook, Saratoga Springs, N. Y. Patented June 17, 1851. Extended 7 years.

First, I claim constructing boring implements, with their lips or cutting edges, as shown and described, that is, such lips commencing at the screw or point, and extending therefrom nearly at right angles until about half way from the center to the outer point, and then curving upwards and forward said curve being continued until the outer portion of the lip is nearly semicircular, or until it turns within the periphery of the tool.

Second, I claim a boring implement having its lips so formed as their cutting edges shall form a spiral line from the point where they begin to curve, to their outer extremity, whether the curved edge shall incline forward or backward, substantially as shown and described.

Third, I claim a boring implement, having its lips or cutting edges curved both in the horizontal and vertical planes, substantially as herein shown and described.

2,514.—FETTER AND HOPPLE.—Robert N. Eagle, Washington, D. C. Patented April 7, 1863.

First, I claim the devices substantially as described, for connecting the legs of an animal by a coupling whose mode of junction with the leg bands relieves the said leg bands of motion upon the leg, wholly or in part.

Second, I claim a bar or strap, B, or its equivalent, as a means of connecting the coupling, C, with the portion, A, embracing the leg substantially as described and represented.

2,515.—MACHINE FOR WASHING PAPER STOCK.—Horace W. Peaslee, Malden Bridge, N. Y. Patented January 23, 1855. Antedated September 20, 1854. Reissued January 8, 1856.

I claim a rotating perious cylinder, provided with projecting teeth on the inside, and mounted, substantially as herein described, so as to be sustained and rotated without a shaft and arms, that the inside and ends may be unobstructed for the passage of the stock, substantially as and for the purpose described.

And I also claim, in combination with a previous rotating cylinder, armed with teeth on the inside, substantially as described, the means substantially as described for the introduction of water through the meshes of the cylinder to the stock inside, as and for the purpose described.

2,516.—STEAM GAGE.—Emmett Quinn, Washington, D. C. Patented March 13, 1866.

First, I claim the construction of a compound syphon steam gage, so that the movements of the fluids in each tube are therein confined and prevented from entering and mingling with those in the others during transportation, substantially as herein set forth.

Second, The combination with the gage of an index tube, of a less caliber than the other tubes, in said gage, substantially as herein described.

2,517.—MACHINE FOR PLANTING.—John G. Clark, Middletown, Ohio. Patented October 2, 1866.

First, I claim the toothed cylinder, B, in combination with a toothed reciprocating slide or slides, constructed arranged and operating substantially as described.

Second, The arrangement of the agitator in the hopper, C, above the toothed cylinder, operated by mechanism substantially as described.

Third, The combination of actuating gearing with the perforated slide, b, arranged to operate at the bottom of the hopper, conjointly with the cylinder B, to regulate the discharge of the seeds, substantially as specified.

Fourth, The stationary teeth, arranged tangentially in relation to the cylinder and ribs, e e, in combination with the positively operating devices for separating the seeds, substantially as described.

2,518.—MACHINE FOR SCOURING LEATHER.—P. Jewell & Sons, Hartford, Conn., assignees of Peter E. Hummel. Patented June 16, 1857.

First, We claim in the leather scouring machine a reciprocating tool stock, operated by a connecting arm, C, crank, D, or their equivalents, to actuate the tools, arranged therein successively upon the surface of the leather presented to their action.

Second, We also claim, in a leather scouring machine, a movable bed or table upon which the leather is placed, and held by atmospherical pressure for presenting said leather to the action of reciprocating tools.

Third, We also claim, in a leather scouring machine, suspending the mechanism upon which the tool stock reciprocates, to trusses, or timbers, directly over the movable bed or table, so as to produce firmness, and unobstructed access to the bed or table from all sides thereof.

Fourth, We also claim, in a leather-scouring machine, an automatic reciprocating tool stock, in combination with a horizontal movable bed or table for presenting the leather to the action of said tool stock.

Fifth, We claim, in a leather-scouring machine, a slitted lever, D, or its equivalent, in combination with the connecting rod, C, and reciprocating tool stock, to allow the back and forward movement of the said tool stock to be extended or contracted more or less, as desired.

Sixth, We also claim, in a reciprocating head of a leather-scouring machine, so arranging the tools therein as to be adjusted, vibrate, counterpoise, and graduate their action, for the purpose described, as may be desirable.

Seventh, We claim the bearings, e, arranged in the tool stock to impart yielding property to the vibrating tool stock, for the purpose described.

2,519.—APPARATUS FOR TANNING.—B. H. McNulty, Philadelphia, Pa., William Kern, Mansfield, Ohio, and Sterling Bonsall, Philadelphia, Pa., their assignee. Patented May 23, 1865.

First, We claim hanging the hides in a vat, and agitating the tanning liquor by means of a rotating dasher or agitator, substantially as and for the purpose described.

Second, Hanging the hides in a close water-tight vat, and agitating the tanning liquor by means of a rotary or otherwise moving dasher while the liquor is under pressure within said closed vat, substantially as described.

Third, We claim the combination of the water-tight vat, A, the dasher, E, and a force pump or other equivalent means of producing pressure within the vat, substantially as described.

Fourth, We also claim the dasher, E, located in the lower part of the vat in combination with the bars, B, or other equivalent means for hanging the hides in the vat, so that the tanning liquor when agitated by the dasher will freely permeate between the hides, substantially as described.

2,520.—KNIFE.—Ira Merritt, Abington, Mass., assignee by mesne assignments of himself. Patented June 7, 1859.

I claim the knife handle herein described, provided with means for clamping the blade, and for allowing the cutting edge or point to be adjusted with respect to the handle, substantially as set forth.

I also claim adjustable blades so made as to be fixed and held in different positions in the handle, substantially as set forth.

2,521.—MACHINE FOR CAPPING TACKS.—John C. Rhodes, South Abington, Mass. Patented July 10, 1866.

I claim, First, The rotating frame, A, having movable plungers, D, provided with spiral or other suitable springs, and stationary dies, C, in combination with one or more stationary cams, G, when all arranged together so as to operate substantially as and for the purpose described.

Second, The combination with the dies, C, of the clearers or discharges, g, stud, i, and spring, h, substantially as and for the purpose specified.

2,522.—Harvester.—Adam R. Reese, Phillipsburg, N. J., assignee of Samuel Comfort, Jun., Morrisville, Pa. Patented April 1, 1856.

First, I claim, in combination with a harvesting machine, a platform to support the falling grain, made of slats, supported at one end only.

Second, A platform composed of slats supported at one end only, arranged to drop the gavel when a sufficient amount has accumulated thereon to form a sheaf.

Third, In combination with a harvesting machine, a platform which is automatically operated to discharge the grain at one side, and out of the way of the machine on the next round.

Fourth, In combination with a harvesting machine, a platform to receive the cut grain, so arranged as to swing around and drop the gavel at one side out of the way of the team and machine on the next round.

Fifth, In combination with the slatted platform, a device for receiving the cut and falling grain, while the gavel is being discharged.

Sixth, In combination with a slatted platform, a device automatically operated for supporting the falling grain while the gavel is being discharged.

Seventh, In combination with a platform made of slats, supported at one end only, a device for receiving and supporting the cut and falling grain while the gavel is being discharged.

Eighth, In combination with a slatted platform, a device which is supported at one end only for the purpose of forming a support for the cut and falling grain while the gavel is being discharged upon the ground.

2,523.—Process of Obtaining the Extractive Matter of Tan Bark and other Materials by Displacement.—W. H. Burridge, Cleveland, Ohio, joint patentee with J. Brainard, and assignee of Brainard's entire interest. Patented April 8, 1862.

First, I claim the process herein described for making extracts and for filtering purposes, which consists in dividing the material from which the extract is made, or which forms the filter into a series of horizontal layers or divisions, either with or without a perforated diaphragm, and which by suitable mechanical means fresh material may be introduced into the bottom of the column and the exhausted material discharged at the top.

Second, The introduction of water or liquid to be filtered at the top of the column, while the fresh material or filter is introduced at the bottom and discharged at the top, substantially as specified.

Third, Obtaining the extractive property of bark by the process herein described.

DESIGNS.

2,596.—Spoon Handle.—G. A. Eno, Philadelphia, Pa.

2,597.—Water Cooler.—John L. Hadden, Phila., Pa.

2,598.—Coffee and Tea-pot Tops.—George Jones, Saugerties, N. Y.

2,599.—Set of Signal Flags.—Henry J. Rogers, Baltimore, Md.

2,600.—Ax Handle.—Imlay B. Viets, New Britain, Conn.

2,601.—Pitcher.—Andrew and Wilfred Dunworth, Dobbs' Ferry, N. Y.

2,602 to 2,605.—Burial Case.—Charles Zeuner (assignor to Crane, Breed & Co.), Cincinnati, Ohio. Four Cases.

EXTENSIONS.

Seed Planter.—Geo. W. Brown, Galesburg, Ill.—Letters Patent, No. 9893. Dated Aug. 2, 1853, antedated Feb 2, 1853. Reissue, No. 526. Dated Feb. 16, 1858. Again Reissued, No. 1036, Sept. 11, 1860.

I claim a seed planting machine constructed principally of frame work, the front part of which is supported on not less that two runners or shoes, with upward inclining edges, and the rear part supported on not less than two wheels, the latter being arranged to follow the former, substantially as and for the purpose set forth.

Seed Planter.—Geo. W. Brown, Galesburg, Ill.—Letters Patent, No. 9893. Dated Aug. 2, 1853, antedated Feb. 2, 1853. Reissue, No. 526. Dated Feb. 16, 1858. Again Reissued, No. 1037. Dated Sept. 11, 1860.

I claim in combination with a shoe or runner, for seed planting machines, with an upward inclining edge, and its point sufficiently high or raised so that it will climb up and over, or cut or break through intervening obstacles, without materially forcing the earth laterally at its front part, and widening towards its rear end, so as to open out a gash or furrow in which the seed to be planted may be deposited, and long enough to furnish a support to the frame work, substantially as described.

Seed Planter.—Geo. W. Brown, Galesburg, Ill.—Letters Patent, No. 9893. Dated Aug. 2, 1853, antedated Feb. 2, 1853. Reissue, No. 526. Dated Feb. 16, 1858. Again Reissued, No. 1038. Dated Sept. 11, 1860.

I claim in combination with a seed planting machine constructed principally of frame work, with not less than two runners and not less than two wheels a hinged joint between the point of the tongue, and the rear part of the machine, so that one part of the frame work may be raised, lowered, adjusted, or supported on the other part, substantially as described.

Seed Planters.—Geo. W. Brown, Galesburg, Ill. Letters Patent No. 9,893; dated Aug. 2, 1853; antedated Feb. 2, 1853. Reissue No. 526; dated Feb. 16, 1858. Again reissued No. 1,039; dated Sept. 11, 1860.

I claim a seed-planting machine wherein the seed-dropping mechanism is operated by hand, or by an attendant, in contradistinction from "mechanical dropping," the mounting of said attendant upon the machine in such position that he may readily see the previously made marks upon the ground and operate the dropping mechanism to conform thereto, substantially as herein set forth.

I also claim, in combination with a seed-planting machine composed substantially of frame work and upon which the person who works the seed slides or valves sits or stands, a lever or its equivalent, by which a driver or second attendant may raise or lower that part of the frame work which carries the attendant and the seeding devices, and thus ease the machine in passing over intervening obstacles or in turning around, substantially as described.

Sewing Machine.—James E. A. Gibbs, Steel's Tavern, Va. Letters Patent No. 1,206. Dated Feb. 21, 1860.

I claim the peculiar form and figure herein described and set forth as the design for a casting of a sewing machine.

Knitting Machine.—Moses Marshall, W. Aldrich, and L. B. Tyng, assignees of M. Marshall, Lowell, Mass. Letters Patent No. 9,621; dated March 15, 1853. Reissue No. 1,801; dated Oct. 25, 1864.

I claim, First, Forming the stitches alternately on each side of the needle rests by two sets of needles placed at an angle to each other, and operating one needle at a time, substantially as described.

Second, The two plates, or rests, e and f, or their equivalents, so arranged as to support the two sets of needles, and allow the fabric knit to pass between them, substantially as described.

Third, Connecting the cam boxes, I i, which actuate the opposite sets of needles by means of the arms, l l, or its equivalent, so as to give the proper alternate and relative movements to said sets of needles, substantially as described.

Fourth, Connecting the feeder which carries the thread with the arm which connects the cam boxes, substantially as and for the purpose set forth.

Fifth, Two sets of single and independent needles, crossing at an angle to each other, and those of each set moving in direct or parallel lines, and the two sets operating alternately on each side of said angle, substantially as and for the purpose described.

Note.—Fifty-one Patents in the above list were secured through the Agency of the Scientific American.—[Eds.

WROUGHT-IRON TAPS AND DIES.—Having recently obtained a patent in Case-Hardened Wrought-Iron Taps, the Subscriber would like to sell a portion of the patent, or engage some party to enter into the manufacture of them. State, County, and Shop Rights for sale. A circular, giving further information, may be had by addressing

FRANKLIN S GREGG, Patentee,
14 1] Cincinnati, Ohio.

Office of the Saunders Cotton Mills,
Saundersville, Mass., Feb. 7, 1867.

F. S. Gregg, Esq., Dear Sir:—Inclosed please find $2.40 for the tap which I have just received. As the head machinist of this corporation I must say, that with all my experience I never saw any Wrought-Iron Tap that come up to this. I have made it a study myself for years, trying different methods of hardening iron, and have always been sure that there must be something better than the old method of case-hardening. You are the lucky one to discover it—it is no humbug, it is a great thing. I put it to a severe test: I ran it through, from end to end in our common cold pressed nuts, then I put it through a piece of ⅝ unannealed cast steel to a full thread, without injuring it in the least. I can cheerfully recommend it as a most reliable discovery, and anything that I can do for you I will do most cheerfully. I shall probably give you an order for more by-and-bye. Yours respectfully,

WM. S. PLACE,
Machinist at Saunde s' Cotton Mills.

[The Tap tested by Mr. Place was 1 in. at large end, and ⅝ at small end, 8 threads to the inch, and 5½ in. long, clear of head.]

F. S. Gregg, Esq., Sir:—Your Taps are received. They are unquestionably a good thing.

WM. L. AVERY, Baltimore, Md.

F. S. Gregg, Sir:—Your Taps and Dies were first rate.

J. L. HAVEN & CO., Cincinnati, Ohio.

A PAIR OF SPECTACLES.—The City of Elmira, N. Y., relies for protection against fires upon Fire Engines and high rates of insurance! A fire broke out there recently which raged unchecked until it had laid waste a large portion of the city and entailed a loss of hundreds of thousands of dollars. The city of Auburn, N. Y., relies upon Holly's Stationary Water Works for supply of water and protection against fires. On the 9th of February, 1867, a fire broke out in an Oil Refinery in that City, and with water thrown by this machinery, through three miles of pipes and hose, the flames were soon drowned out and the bulk of property in the Refinery saved.

Through this "Pair of Spectacles" is plainly to be seen the superior wisdom of Auburn, which it would be well for other cities and villages to imitate. Full information of Holly's new and perfect system of supplying towns with water and shielding them from the calamities of fire may be obtained by addressing the Holly Manufacturing Company, Lockport, N. Y., or by personally inspecting the works constructed by said Company for the cities of Lockport and Auburn.

T. T. FLAGLER, President.
J. K. McDONALD, Treasurer.

FOR SALE.—A large, first-class

BRICK MANUFACTURING ESTABLISHMENT, WITH TWO DWELLING HOUSES,

Located on three and one half acres of ground within twenty rods of the Erie Canal, and N. Y. Central, Syracuse, Binghamton, and Oswego Railroads, and adjoining a Horse Railroad. The buildings and improvements are of the most substantial kind, there being a machine shop, 2 stories high 60 by 110 ft., foundery, 50x66, blacksmith's shop, 30x60, tumbling, chipping, paint, pattern and tempering rooms, and office. Also, boiler and engine, McKenzie cupola and blower, line shafting and pulley. All of which cost about about $75,000, and would now cost much more, but will be sold for much less than cost.

Also, for sale a variety of machinery, consisting in part of 1 H. B. Smith's tenoning, boring, and morticing machines, 1 first-class Daniels' planer, 29 feet bed, 1 shaping machine. Also, tools for working iron—2 shaping or

CUTLERY MACHINERY Made at the Thomas Iron Works, Worcester, Mass. 14 6*

MALLEABLE IRON CASTINGS of every description made to order. Address
14 26*] OLNHAUSEN & CRAWFORD, Pittsburgh, Pa.

FOR SALE.—The most complete set of Machinery in the United States for the manufacture of Wood, Pocket, and Dressing Combs. There are no goods of this kind in the market, and there is great call for them.

The parties owning the machinery being engaged in other business is the reason for selling the machinery. Enquire at 92 Church street, N. Y., or at the Carpetbag Factory, Middletown, Orange County, N. Y.

Also, Button-mold Machinery, unequaled by any others; there is great call for these goods, also.

14 4*] MATTHEWS BROTHERS.

FURNACE FOR SALE.—The Subscriber offers for sale a valuable Furnace Property, called Bath Furnace, situated in Rockbridge County, Virginia, containing about 2000 acres. There is a fine and permanent water power, abundance of the best ores, good wood, and manganese. The buildings are of no value, but its ores, etc., and its convenience of transportation—being within two miles of Goshen, on the Virginia Central Railroad—renders it a truly desirable and valuable investment. A map and description of the property can be seen at the office of R. W. Templeman & Co., Baltimore, or by addressing me at Buffalo Forge, Rockbridge County, Va. [14 4] D. C. E. BRADY.

PETROLEUM, Professor Dussauce is ready to furnish plans of oil factories, drawings of apparatus, with complete processes to manufacture, refine, deodorize, and discolorize petroleum. Also processes to prepare lubricating oils and greases. By particular processes, benzine, aniline and colors of coal tar have been obtained from petroleum; he can indicate their preparation. Every kind of information desired on the subject will be noticed and immediately answered. Address

Prof. H. DUSSAUCE, Chemist,
1*] New Lebanon, N. Y.

PART XV. BURGH'S MODERN MARINE ENGINEERING, containing two colored plates of Humphrey's and Watt's Engines, and forty woodcut illustrations of the details of Condensers and Engines. To be completed in 17 parts, at $1 50 each.

D. VAN NOSTRAND,
14 192 Broadway, New York.
, Catalogues of scientific works sent on application.

HIGHLY IMPORTANT TO DISTILLERS.—A new patent Apparatus for Distilling Spirits, possessing superior advantages over any still heretofore in use, yielding high wine 40 to 60 above proof the first distillat on; is very compact, rapid in operation, and requires little or no water for condensing. For particulars apply to Abram Knight's Sons, 7 Peconics Slip, N. Y., or at the Manufactory, 44 Greenpoint Avenue, Greenpoint, L. I. 1*

MANUFACTURERS OF and DEALERS in general and special Machinery, Tools, Steam-pipe and Fittings, Belting, and Hose, are invited to send circulars, cuts, etc., with lowest prices to wholesale agents, to P. O. Drawer 62, Springfield, Mass. 14

A MACHINE SHOP IN A VERY DESIRABLE and central location in the city of Chicago, doing a good business, with a steady growing demand for its manufacture, is offered for sale; capital required from $20,000 to $30,000. For further particulars and reasons selling, address Post Office Box 1,129, Chicago, Ill. 14tf.

ANY PARTY HAVING A PATENT possessing real intrinsic worth, and willing to receive a small interest in the same in consideration of a sufficient amount of money being raised to conduct successfully the business arising from the introduction of the Patent. Nothing noticed unless it will bear the most searching examination, and in which money can be seen. Address, with full particulars, stating where an interview can be had, to "Capitalist," Box 773 N. Y. P. O. 1*

POWER AND FOOT LATHES ARE manufactured and sold by C. F. ROST, 320 Delancey street. 1*

THE LABOR-SAVING MACHINE THAT has no equal. Ripping, cross cut, and scroll saw combined. Self-feeding. One man can do the work of 5. Agents wanted. Send for descriptive circular and prices. 1* Wm. H. HOAG, 222 Pearl street, P.O. box 4,245.

TWELVE OF GOFF'S BAG FASTENERS sent by mail, postage paid, for 50 cents. See cut in "Scientific American," February 23, 1867. 1 J. M. GOFF, Ionia Ill.

STEAM ENGINES.—COOK, RYMES & Co.'s celebrated first-class stationary, portable and hoisting engines constantly on hand, at their warerooms, 107 Liberty street, New York. 14-8

THE CARVALHO STEAM SUPER-HEATER MANUFACTURING COMPANY.

Capital Stock.....$60,000

Board of Directors.
S. M. BECKLEY, ADDISON SMITH,
H. D. BULKLEY, S. HASTINGS GRANT,
HENRY W. BULKLEY.

Carvalho's Steam Super-Heater, awarded a silver medal at the Fair of the American Institute, 1865, is simple, durable and effective. Guaranteed to prevent "priming," furnish PURE STEAM of any required temperature, saving 20 per cent in fuel, time, etc. In daily operation at South Brooklyn Iron Works, South Brooklyn, near Hamilton Ferry; Jones & Smith, corner of 42d street and 10th avenue; Weston, Covel & Co., corner of 7th avenue and 29th street, and elsewhere. For circulars, terms, etc., address

HENRY W. BULKLEY,
15 2*] General Agent, 70 Broadway, N. Y.

THE PRACTICAL METAL-WORKER'S ASSISTANT.—BYRNE.

Comprising Metallurgic Chemistry; the Arts of Working all Metals and Alloys; Forging of Iron and Steel; Hardening and Tempering; Melting and Mixing; Casting and Founding; Works in Sheet Metal; the Process dependent on the Ductility of the Metals; Soldering; and the most Improved Processes and Tools employed by Metal-Workers. With the Application of the Art of Electro-Metallurgy to Manufacturing Processes; collected from Original Sources, and from the Works of Holtzapffel, Bergeron, Leupold, Plumier, Napier, and others. By Oliver Byrne. A New, Revised, and Improved Edition, with additions by John Scoffern, M. B., William Clay, William Fairbairn, F. R. S., and James Napier. With Five Hundred and Ninety-two Engravings, illustrating every Branch of the Subject. In one volume, 8vo, 652 pages.....$7.00

CONTENTS

Chapter I. On Metallurgic Chemistry:—The useful metals and metallic ores defined. History of metallurgy. Refining processes. New refining processes. Advantages of cast-iron. Crystallizing tendency of wrought-iron in large masses. Classification of metals. Alloys. Affinity of metals. Theory of alloys. Metallic oxides. Reduction of metallic oxides. Carburetted hydrogen. Sulphides. Chlorides. Calcination and roasting. Carburets and carbons. Metallic salts.

Chap. II. Special Metallurgic Operations:—Volatile combinations. Metallic distillation processes. Fluxes and fluxing. Furnaces. The combustive function. Products of combustion. Natural and artificial blasts. Blast machines. Catalan trompe. Chain blast. The Cagniardelle.

Chap. III. Recently-patented Refining Processes:—Plant's process. Martien's process. Clay's process. Bessemer's process. Bessemer's converting vessel. Application of the tuyeres. Pouring out the fluid metal. Preparing the vessel. Process of conversion explained. Bessemer's squeezers. Bessemer's hammer and guage. Analysis of Bessemer's iron. Analysis of ordinary puddle-iron. Reflections on Bessemer's process.

Chap. IV. Refining and Working of Iron:—Iron-furnaces in the United States. Dickerson's method of making wrought-iron directly from the ore. Manufacture of malleable iron. Puddling. Winslow's machine for compressing puddlers' balls. Rollers or rolls of the iron works. Angle or T iron. Varieties of iron.

Chap. V. Manufacture of Steel:—Cementation. Blistered steel. Sheer steel. Cast-steel. Characteristics and qualities of steel. Works on iron and steel.

Chap. VI. Forging Iron and Steel:—Management of fires. The blast. Furnaces, forges and hearths. Hand-forging. Anchors. Tongs and general tools. Oliver or small bit-hammer. Management of fires—the degrees of heat. Ordinary practice of forging. Drawing down, jumping, building up or welding. Set-hammers, flatters, top-fullers. Twisting the work. Practice of hammering. Anvils. Methods in forging. Making bolts and nuts. Mortices. Levers, arms, brackets and frames.

Chap. VII. On Wrought-iron in Large Masses:—Forge tools. Limits of welding power. Auxiliary tools. Forge-hammers. Nasmyth's steam-hammer. Effects of Nasmyth's hammer. Materials for forging. Tendency of over-refined iron to deteriorate. Cast and wrought-iron for ordnance. Tensile strength of the monster-gun. Material used in forging. Varieties of treatment required. Modes of working large forgings. Different modes of forging large iron masses. Forging the monster-gun. Crystallization explained. Crystalline tendency of iron. Causes of fissures and their remedy. Danger of forgings in cooling. Report of the Franklin Institute on the "Princeton's" gun. Effects of hammer hardening. Importance of metallurgy to engineers.

Chap. VIII. General examples of welding—Shutting together, shutting up, welding heavy works, the butt joint, to form a T-joint, eo lical sockets, wrought iron hinges, musket barrels, Damascus twist, stub twist and wire twist; wrought-iron tubes, chains, chain cables, tires of wrought-iron wheels for locomotives, hatchets, spades; concluding remarks on forging, and the applications of heading tools, swage tools, punches, etc.; heading tools; swage tools; trip and tilt hammers, manufactured at the Lowell machine shop.

Chap. IX. Hardening and tempering—General view of the subject, hammer hardening, the quantity of carbon in cast iron, steel and glass polarized, practice of hardening and tempering steel; common examples of hardening and tempering steel; razors, penknives, hatchets, adzes, cold chisels, saws and springs; less common examples of hardening and precautionary measures; Jacob Perkins's discovery; Oldham's process.

Chap. X. Hardening cast and wrought iron—Chilled iron castings, malleable iron castings, case-hardening wrought and cast iron.

Chap. XI. On the application of iron to shipbuilding—Earliest use of iron in canal boat and shipbuilding; variation of the compass in iron vessels rectified; construction of iron vessels for ocean traffic; half cross section of a frigate, ribs, keels, decks, form of the deck beams, riveting of the plates; single and double-riveted lap joints; wood and iron as materials for shipbuilding; resistance to tension and compression in iron ships; practical tests of iron ships, durability, economy, effects of shot on iron ships.

Chap. XII. The metals and alloys most commonly used—Description of the physical character and uses of the metals and alloys commonly employed in the mechanical and useful arts; antimony, bismuth, copper, alloys of copper and zinc only; remarks on the alloys of copper and zinc; alloys of copper and tin only; remarks on the alloys of copper and tin only; alloys of copper and lead only; remarks on the alloys of copper and lead only; alloys of copper, zinc, tin, and lead; remarks on alloys of copper, zinc, tin, and lead; gold alloys, nickel, palladium, platinum, rhodium, silver, silver alloys, tin, zinc, Babbitt's anti-attrition metal, Fenton's anti-friction metal; alloy of the standard measure used by government; tutenage, expansion metal, tables of the cohesive forces of solid bodies; tabular view of some of the properties of metals, weights of wrought iron, steel, copper and brass wire and plates.

Chap. XIII. Remarks on the character of the metals and alloys—Hardness, fracture and color of alloys; malleability and ductility of alloys; strength or cohesion of alloys; alloy balance; table for converting decimal proportions into divisions of the pound avoirdupois; fusibility of alloys; M. Mallett's process for the protection of iron from oxidation; palladamizing process.

Chap. XIV. Melting and mixing the metals—The various furnaces, etc., for melting the metals; antimony, copper, gold and silver, and their alloys; observations on the management of the furnace, and on mixing alloys; Britannia metal; Barron's furnace.

Chap. XV. Casting and founding—Metallic molds, earthen molds, complex molds, metal molds for pewter works, bearings for locomotive engines, type founding, plaster of Paris molds and sand molds, stereotype founding, molding sand and flasks, patterns, molds and molded simple objects, foundry patterns, cores of molds, molding cored works, core boxes, false core and drawback, reversing and figure casting, casting figures, ornaments, branches and foliage, filling the molds, gun metal and pot metal, iron founders' flasks and sand molds, remarks on patterns for iron castings, loam molding, melting and pouring iron, new method of manufacturing drop shot.

Chap. XVI. Works in sheet metal made by joining—On malleability, etc., division of the subject, terrestrial globes, works in sheet metal made by cutting, bending and joining, a hexagonal box, polygonal figures of all kinds, prismatic vessels, pyramids, frustums of pyramids, mixed polygonal figures, radiating pieces for polygonal vases, polygonal vases of unequal sides, tools for working in sheet metals, modes of bending curved work, improved machine for rolling up sheet-metal pipe, angle and surface joints, Francis's metallic life boats.

Chap. XVII. Works in sheet metal made by raising; and the flattening of thin plates of metal—Circular works spun in the lathe, works raised by the hammer, solid and hollow blows, raising and hollowing, raising globes, vases, jelly molds, stamping, peculiarities in the tools and methods, principle and practice of flattening thin plates and metals with the hammer.

Chap. XVIII. Processes dependent on ductility—Drawing wires, etc., drawing metal tubes, hydraulic press and arrangement for manufacturing lead pipe.

Chap. XIX. Soldering—General remarks and tabular view, tabular view of the process of soldering, hard soldering, soft soldering, soldering per se, or burning together, alloys and their melting heats, fluxes, modes of applying heat, modes of applying heat in soldering, the use of the blow pipe, the workshop blow pipe, examples of hard soldering, examples of soft soldering, Richemont's airo-hydrogen blow pipe.

Chap. XX. Shears—Cutting nippers for wire, scissors and shears for soft flexible materials, shears for metal worked by manual power, engineers' shearing tools, generally worked by steam power.

Chap. XXI. Punches—Punches used without guides, punches used with simple guides, punches used in fly-presses and miscellaneous examples of their products, punching machinery used by engineers.

Chap. XXII. Drills—Drills for metal, used by hand, O'Tool's pin drill, methods of working drills by hand power, drill stocks, pump drill, press drill, expanding braces and lever drill, ratchet drill, differential screw drill, drilling and boring machine, broaches for making taper holes.

Chap. XXIII. Screw-cutting tools—Originating screw, cutting internal screw with taps, the principle of chamfering, transverse sections of taps, die stocks, master taps, bolt-screwing machine, shaping machine, screws cut by hand in a common lathe, cutting screws in lathes with traversing mandrels; cutting screws in lathes with traversing tools, Healey's screw-cutting apparatus, system of change wheels for screw cutting, screw tools for angular threads, screw tools for square threads, various modes of originating and improving screws, fusee engine, Ramsden's screw-cutting engine, Clement's mode of originating the screw guide, chucking and resuming lathe, engine lathe, screw threads considered in respect to their proportions, forces and general characters, the measures and relative strengths of screws, sections derived from the angular thread, sections derived from square threads, table for angular thread screws, table for small screws of fine angular threads, approximate values of Holtzapffel's original screw threads, Holtzapffel's original taps.

Chap. XXIV. History of the art of electro-metallurgy.

Chap. XXV. Description of galvanic batteries and their respective peculiarities.

Chap. XXVI. Electrotype processes.

Chap. XXVII. Miscellaneous applications of the process of coating with copper.

Chap. XXVIII. Bronzing in various colors.

Chap. XXIX. Depositions of metals upon one another.

Chap. XXX. Electro-plating.

Chap. XXXI. Electro-gilding.

Chap. XXXII. Results of experiments on the deposition on other metals as coatings.

Chap. XXXIII. Theoretical observations.

Index.

☞ The above, or any of my Books sent by mail, postage, at the publication price.

☞ My new Catalogue of Practical and Scientific Books, will be sent free of postage to any one who will favor me with his address.

HENRY CAREY BAIRD,
Industrial Publisher,
1s 1] 406 Walnut street, Philadelphia.

IMPORTANT TO CAPITALISTS. I wish to consult immediately with any party having a factory or building, with or without tools, suitable for manufacturing an entirely new machine never introduced; work similar to sewing machine work. The machine bears the same relation to articles in it line that Howe's invention bears to sewing machines, but is more valuable than his invention. Twenty-five to fifty thousand will be wanted the first year; profits five to eight hundred per cent. Factory to be put into a new stock company to be formed to take that and the machine. Part of stock to be taken in place where factory is located. At least one hundred thousand dollars necessary to be subscribed besides amount for factory. Any community desiring to secure a large and thriving manufacturing business in its midst will find this an extraordinary opportunity. Address C. A. S., care of S. R. Niles, Newspaper Advertising Agent, Scollay's Building, Court street, Boston. 13 2—N

FABRICATION OF VINEGAR. Prof. H. DUSSAUCE, Chemist, is ready to furnish the most recent methods of manufacturing Vinegar by the slow and quick processes, with and without alcohol, directly from corn. Also, process to manufacture vinegar and acetic acid by distillation of wood. Methods of assaying vinegars. Address

1*] New Lebanon, N. Y.

LAFLER'S NEW IRONCLAD BRICK Machine makes two kinds of Brick from the same Machine, viz: Common and Pressed. For descriptive circular address J. A. LAFLER, Inventor and Manufacturer, Albion, Orleans County, N. Y. 13 2*

WHITON'S PATENT CENTERING Machines for centering all sizes of Lathe work, a very useful tool for machinists. Also, Lathe Chucks (Patented Oct. 9, 1866), from 3-in. to 24-in. diameter, made of the best materials by D. E. WHITON,
West Stafford, Conn.
Cuts and description sent on application. 13 2

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports, etc., on the useful arts. 1 tf

T. N. HICKCOX & CO., 280 Pearl St., New York, Manufacturers of STAMPED BRASS GOODS, Plain and Fancy Pomade and Patent Brass Mucilage Caps, Brass Labels for Oil Cans, Insurance Companies, etc. Steel Dies of any design. Light Machinery manufactured to order. Prompt attention paid to articles of new manufacture and Patent Goods. Models for the Patent Office neatly executed. 13 2*

WANTED—GOOD MEN TO SELL Andrew's Gas Generator. Can be attached to any lamp; makes gas from common oil, and burns it conveniently as a candle; will not blow out; the best gas light in use. Retail for $1 each. Will furnish any good man with $10,000 to operate with. No reference required. Terms sent free. Address 13 2*] J. C. TILTON, Pittsburgh, Pa.

HICKCOX'S Stencil Establishment, 280 Pearl St., N. Y.—Marking Plates, Canceling Stamps and Seal Presses, Burning Brands, Steel Stamps, Dies and Punches, Machine Brass Alphabets, Frames, Brushes, Indelible and Stencil Inks, wholesale and retail, at lowest prices. 13 2*

MACHINERY.—WANTED, TO CONtract to build some staple article, of wood or metal, or both combined, by a first-class workman, with good tools and power. Machinery and patterns got up. Workmanship and materials of the best. Address Box 523, Post-office, Paterson, N. J. 13 2*

MANUFACTURERS TAKE NOTICE.—The undersigned will sell, or give on a Royalty, his Patent for his improved Vise. It closes at a half turn, and opens to any width. For further particulars address I. S. RALSTON, Patentee, Indiana Town, Indiana County, Pa. P. S.—No. of Pat. 61,457. 13 2

FOR SALE OR LICENCE ON ROYALty. A new wrench; Munn & Co. say "'tis the best we have seen." Patent just ordered to issue. Address S. S. BARNABY, Macon, Ga. 13 3*

FOR SALE—One 24-foot Hadley Falls Lathe, 30 in. swing, with extension to swing 40 in. Back and follower rests, gibbed without screw. Also, one 7-foot pulley, 20-in. face, 6¼ bore. Address 13 3*] THOMAS MANF'G. CO., Thomaston, Conn.

TO INVENTORS AND OTHERS.

Notice is hereby given that the members of a Commission, acting under the authority of the Secretary of the Treasury, will meet in the City of New York at the Office of the Supervising Inspector of Steamboats, No. 23 Pine street, on the SECOND MONDAY in April proximo, for the purpose of examining and testing the merits of such Inventions of a life-saving character as may be brought before them.

Said Inventions will embrace Boilers of Steam-engines, Anti-incrustators, Safety-valves, Steam-gauges, Water-gauges, Steering Apparatus, Life-boats, with detaching apparatus, &c., &c., &c.

Inventors may appear in person before the Commission, for the purpose of explaining their inventions; but no expenses will be allowed under any circumstances.

H. McCULLOCH, Secretary of the Treasury.

WASHINGTON, D. C., March 15, 1867. 13 3

THE BISHOP GUTTA PERCHA COMPANY—The original and only manufacturers in the United States of pure Gutta Percha Goods, Gutta Percha Insulated Submarine Telegraph Cables, Insulated Telegraph Wire, Water, Beer and Soda Pipe, Chemical Vessels, Tissue Sheet for hatters, Artificial Flower Makers, etc. Factory, Nos. 208, 210 and 212 East 25th street. Office and salesroom, No. 113 Liberty street (west of Broadway), New York. SAMUEL C. BISHOP, 13 4] General Agent.

TURBINE WATER WHEEL, VALENTINE & CO., Ft. Edward, N. Y. This is thoroughly proved a first-class wheel. New Improvements, prices moderate. Agents wanted in every Co. Circulars gratis. 13 4*

WOOD-WORKERS' GREAT TIME Saver—the finest glue joints, end grain, sides, or miter, with common glue—no sizing or preparing of wood. On receipt of 50 cts. (the only possible expense), this new process, plain and simple, will be sent to any address. JOHNSON & TAIT, 13 tf] 1,334, Vienna street, Philadelphia, Pa.

PRESSURE BLOWERS—Equal in Force to Piston Blowers, and a perfect substitute for both Fan and Pistons—running more easily than either. Adapted for Blast, and Cupola, and Heating Purposes, Forges, Steamships, Boilers, Ventilation, etc., etc. Prices according to sizes, ranging from $25 to $1,500. Address for Circular B. F. STURTEVANT, 13 tf] 72 Sudbury street, Boston, Mass.

JOSEPH C. CLAYTON, COUNSELLOR-AT-LAW, ADVOCATE IN PATENT CAUSES, Intelligencer Building, Washington City, D. C. 13 10*

CARPENTERS & BUILDERS.

SEND for Catalogue of New Architectural Works inclosing stamp. 13 tf] A. J. BICKNELL, 282 River st., Troy, N. Y.

MARBLE DEALERS.

J. SCHUMACHER'S Monumental work, 45 plates and 114 designs, price $10. R. E. Lauritz's work, 20 large folio plates, and 73 designs, price $10. Prang's Text Book of Alphabets, $3. Sent Post-paid, or by Express, C. O. D. A. J. BICKNELL, Troy, N. Y. 13 tf

HUTCHINSON & LAURENCE, 8 Dey st., Have on hand, and furnish to order, Steam Engines and Boilers, Circular-saw Mills, Cotton Gins, Iron & Wood-working Machinery, Shafting Belting, etc. 12 4

PLATINUM—In ALL FORMS, for ALL purposes. Platinum scrap and ore purchased. 12 3*] H. M. RAYNOR, Office 748 Broadway, N. Y.

IMPORTANT to EVERY HOUSEKEEPER—Read advertisement, No More Poor Bread, in No. 11 Scientific American. 12 4

MILL-STONE DRESSING DIAMONDS Set in Patent Protector and Guide. Sold by JOHN DICKINSON, Patentee and Sole Manufacturer, and Importer of Diamonds for all mechanical purposes; also, Manufacturer of GLAZIERS' DIAMONDS, No. 64 Nassau street, New York City. Old diamonds reset. N. B.—Send postage stamp for descriptive circular of the Dresser. 9 12*

PATENT SHINGLE, STAVE, AND Barrel Machinery, Comprising Shingle Mills, Heading Mills, Stave Cutters, Stave Jointers, Shingle and Heading Jointers, Heading Rounders and Planers, Equalizing and Cut-off Saws. Send for Illustrated List. FULLER & FORD, 9 8* tf—C.] 282 and 284 Madison street, Chicago, Ill

A MESSIEURS LES INVENTEURS—Avis important. Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Francais peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications recived in confidence. MUNN & CO., Scientific American Office, No. 37 Park Row, New York.

AMES' Celebrated Portable and Stationary STEAM ENGINES, All Sizes, and Superior to all others. Also, PAYES' PATENT TRIP HAMMER. Write for Circular. [11 4*] H. M. AMES, Oswego, N. Y.

500 AGENTS Wanted in a new business. 11 13* N.] H. B. SHAW, Alfred, Me.

$25 A DAY! Fifteen new articles for Agents. [11 13*N.] O. T. GAREY, Biddeford, Me.

$125 Per Month and expenses. Shaw & Clark S. M. Co., Biddeford, Me. 11 4* N.

ROLLING MILL ENGINES—WITH Sault's patent Frictionless Slide Valve, link motion reverse gear, shafting, hangers, mill gear, etc. Address 11 23* tf] M. & T. SAULT, New Haven, Conn.

PATENTEES TAKE NOTICE. Having made large additions to our works, we can add one or two machines to our list of manufactures. The machines must be strictly first class, and well protected. BLYMYER, DAY & CO., Manufacturers of Agricultural Machines and Tools Mansfield, Ohio. 9 tf

THE CELEBRATED "SCHENCK" WOODWORTH PLANERS, WITH NEW AND IMPORTANT IMPROVEMENTS, Manufactured by the SCHENCK MACHINE CO., MATTEAWAN, N. Y. JOHN B. SCHENCK, President. T. J. B. SCHENCK, Treas. 11 tf

1866.—TOPLIFF'S PATENT PERPETUAL LAMP WICK, received First Premium at N. Y. State Fair, and special premium, Book of Transactions. Needs no trimming. Rare inducements to Agents. Sample sent for 20 cents; two for 30 cents. MURPHY & COLE, 81 Newark ave., Jersey City. 3 tf 6

HARRISON STEAM BOILER.

NO MORE DESTRUCTION OF LIFE AND PROPERTY BY STEAM BOILER EXPLOSIONS.

GREAT REDUCTION IN PRICE.

From the rapid manner in which the HARRISON STEAM BOILER is coming into use, but little need be said of its conceded merits.

They may be summed up briefly as follows:—

Absolute safety from explosion, as it cannot be burst under any practicable steam pressure.

Less first cost.

Economy in fuel equal to the best in use.

Facility of transportation.

It occupies but about one third the ground area of ordinary boilers, with no increase in hight.

In consequence of recent improvements in its manufacture, this Boiler can be furnished to the public AT LESS COST than heretofore, and is now much the cheapest article in the market.

For Price and Circular apply to JOSEPH HARRISON, JR., Harrison Boiler Works, 5 12*] Gray's Ferry Road, Philadelphia.

Branch Office, 119 Broadway, New York, Rooms 9 and 10 I. B. HYDE Agent

R. BALL & CO., SCHOOL STREET, WORCESTER, MASS., Manufacturers of Woodworth's, Daniell's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood. Send for our Illustrated Catalogue. 1 25*

WOOD, LIGHT & CO.—MANUFACturers of Machinists' Tools and Naysmyth Hammers, Lathes from 4 to 20 feet long, and from 15 to 100 inches swing. Planers from 24 to 60 inches wide and from 4 to 46 feet long. Upright Drills. Milling and Index Milling Machines. Profile or Edging Machines. Gun Barrel Machines Shafting, Mill Gearing, Pulleys and Hangers, with Patent Self-oiling Boxes. Works, Junction Shop, Worcester, Mass. Warehouse at 107 Liberty street, New York. 10 tf

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOADLEY & Co., Lawrence, Mass. 1 tf

SPOKE AND HANDLE MACHINE,—For turning Spokes, Yankee Ax, Plow, Pick, Adze, and Hammer Handles, Whiffletrees, and irregular forms generally. Capacity 180 Spokes and 200 Hammer Handles per hour. For cut and description, address the Subscriber, Manufacturer and Patentee, at Warren, Trumbull county, Ohio. [7 10*] E. R. WISELL.

RICHARDSON, MERIAM & CO., Manufacturer and Dealers in DANIELS'S AND WOODWORTH PLANERS, Boring, Matching, Molding, Mortising and Tenoning Machines, Scroll, Cut-off, and Slitting Saws, Saw Mills, Saw Arbors, Spoke and Wood-turning Lathes, and other wood-working Machinery. Warehouse, 10 Liberty street, New York. Manufactory, Worcester, Mass. 10 tf

THE EUROPEAN INVENTOR'S AGENCY CO., 95, Newgate street, London, E. C. MR. T. BROWN, C. E., Manager.

This Company undertake the purchase, sale, or licensing of Patents in any part of the World, on Commission only. No business as Agents for procuring Letters Patent undertaken.

Information for Inventors or Owners of Patents, or for those desirous of purchasing Patents, will be freely given.

The Offices of the Company are at the disposal of Inventors and those interested in Inventions; also, for the convenience of those having no London address their letters can be addressed to the offices.

Further particulars on application. 1 18*

GRIST MILL AND FACTORY SITE near New York, for sale cheap. Address 12 3] H. D. BEACH, Tom's River, N. J.

BLYMYER, DAY & CO., Mansfield, Ohio, Manufacture **Blacksmith's Drills and Screw Cutters,** for hand use. **Drag and Circular Sawing Machines,** 1, 2, and 4 horse. **Cutting Boxes.** The Eureka. **Corn Shellers,** Star Pattern. **Cider Mills.** The Eureka. **Sulkey Revolving Rake.** New thing and best extant. **Garden Cultivator.** Crawford's Patent. **Cane Mills.** Victor Pattern. **Evaporators.** Cook's—for Sorgo or Maple. **Amalgam Bells.** For Church, School, and Farm. **Refrigerators.** New Principle. Pure **Sorgo** and **Imphee Seed.** Selected varieties. Send for Circular. 12 cow3*]

PAPER-MILL MACHINERY. Megaw's Improved Rotary Pump for paper mills, steam engines and boilers, manufactured by 10 cow 4*] MEGAW & BILLANY, Wilmington, Del.

TO MANUFACTURERS OF TEXTILE FABRICS.—Dutcher's Patent Temples, adapted to weaving all kinds of goods; also, Thompson's Patent Oil Cans for oiling Machinery—neat and economical; also, Patent Shuttle Guides which will protect the weaver and save the owner the cost of the guides every year. Furnished by E. D. & G. DRAPER, 6 11* cow] Hopedale, Mass.

ALCOTT'S CONCENTRIC LATHES.—For Broom, Hoe, and Rake Handles, Chair Rounds, etc., and all other kinds of Wood-working Machinery, for sale by S. C. HILLS, 12 Platt street, New York. 3 tf b

CASTINGS.—THE UNDERSIGNED are now prepared to do every variety of Brass and Composition Castings. HAYDEN, GERE & CO., 3 12* 84 Beekman street.

HAYDEN, GERE & CO., 84 BEEKMAN street, New York, manufacture every variety of Brass Work for steam, water and gas. Globe Valves, Steam, Gage and Air Cocks, Whistles, Oil Cups, Water Gages, Plain Bibbs, Stops, Hose Pipes, Couplings, etc. Address as above for price lists. Illustrated catalogue furnished to customers. 3 12*

PORTABLE AND STATIONARY Steam Engines and Boilers, Circular Saw Mills, Mill Work, Cotton Gins and Cotton Gin Materials, manufactured by the ALBERTSON & DOUGLASS MACHINE CO., New London, Conn. 1 tf

THE "McGOWAN" AND "BUCKEYE" Double-acting Hand and Power Pumps, for railroads, factories, mills, etc. Manufactured by McGOWAN BROTHERS, 91 and 93 Elm street, Cincinnati, Ohio. Send for circular. 12 4*



CHASE'S IMPROVED Dollar Microscope, illustrated full size in Scientific American, Jan. 26. Most valuable, amusing, interesting, instructive, and useful thing in the world for old and young, adapted to counterfeit money, cloth, flowers, pictures, living insects, etc., etc. Sent by mail on receipt of $1, with directions, etc. Agents wanted. Address O. N. CHASE 9 La Grange street, Boston, or, 11 4*] FOWLER & WELLS, New York.

GUN MACHINERY.—For Sale, part or the whole of a select lot of special machines, in perfect working order, comprising among others, Rifling Machines, Barrel Drills, Barrel Lathes, Barrel Polishing, Edging Machines, Revolving Head Lathes, etc., etc., and many valuable fixtures. Address W. NICHOLS, Jr., 12 2—N.] Box 1013, Boston, Mass.

LE COUNT'S IMPROVED HOLLOW Lathe Dog, the lightest, strongest, neatest, and cheapest made. A set of 8 dogs, from ¾ to 2 inches, $8. 12 dogs to 4 inches, $17.50. Send for circular. The trade supplied. C. W. LE COUNT, 10 13*] South Norwalk, Conn.

GOULD MACHINE COMPANY, Of Newark, N. J., and 102 Liberty street, New York. IRON AND WOOD-WORKING MACHINERY, STEAM ENGINES, BOILERS, SAW MILLS, ETC. 1 tf

FOR ENGINE BUILDERS' AND STEAM Fitters' Brass Work, address F. LUNKENHEIMER, 10 26*] Cincinnati Brass Works.

SPOKE-LATHES, TENONING AND Spoke-Polishing Machinery of approved Patterns manufactured by J. GLEASON, 10 10*] 1030 Germantown Avenue, Philadelphia, Pa.

NITRO-GLYCERIN.—UNITED STATES BLASTING OIL CO.—We are now prepared to fill all orders for Nitro-Glycerin, and respectfully invite the attention of Contractors, Miners and Quarrymen to the immense economy in the use of the same. Address orders to JAMES DEVEAU, Sec., 2 52*] 32 Pine street, New York

AIR SPRING FORGE HAMMERS ARE made by CHAS. MERRILL & SONS, 556 Grand street, New York. They will do more and better work, with less power and repairs, than any other Hammer. Send for a circular. 4 tf

ANDREWS'S PATENT PUMPS, ENGINES, etc.— CENTRIFUGAL PUMPS, from 90 Gals. to 40,000 Gals. per minute, capacity. OSCILLATING ENGINES (Double and Single), from 2 to 250 horse-power. TUBULAR BOILERS, from 2 to 50 horse-power, consume all smoke. STEAM HOISTERS to raise from ¼ to 6 tons. PORTABLE ENGINES, 2 to 20 horse-power. These machines are all first-class, and are unsurpassed for compactness, simplicity, durability, and economy of working. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO., 1 tf No. 414 Water street N. Y

WHEELER & WILSON, 625 BROADway, N. Y.—Lock-stitch Sewing Machine and Buttonhole do. 1t

FIRST-CLASS MACHINISTS' TOOLS. PRATT, WHITNEY & CO., Flower street, Hartford, Conn., Manufacturers of Engine Lathes, (15) fifteen inches to (8) eight ft. swing; Power Planers, (16) sixteen inches to (5) five feet wide, and of any length desired, and special machinery. Also only makers of Engine Lathes with Slate's Patent Taper Attachment, conceded by all who have used it to be most perfect and simple in its construction and almost indispensable for good workmanship. For a circular and price list address as above. 3 26*

T. F. RANDOLPH & BRO., —MODEL MAKERS,— 7 8*] 67 West 6th st., Cincinnati, Ohio.

SHAW & JUSTICE'S POWER HAMMER is Moderate in Price, is driven with one-tenth the power used by other Hammers, and will not cost the one-hundredth part of what is usually spent in repairs. Its power is far in excess of any Hammer known. Manufactured by PHILIP S. JUSTICE, 14 North 5th street, Phila., and 42 Cliff-st., New York. Shops 17th and Coates-sts., Philadelphia. 8 8* tf

JUST PUBLISHED—THE INVENTOR'S and MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO. 37 Park Row, N. Y.

PATENT POWER AND FOOT-PUNCHING PRESSES, the best in market, manufactured by N. C. STILES & CO., West Meriden, Conn. Cutting and Stamping Dies made to order. Send for Circulars. [14] tf

MODELS, PATTERNS, EXPERIMENTAL and other Machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos. 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN Office. 1 tf

MASON'S PATENT FRICTION CLUTCHES, for starting Machinery, especially Heavy Machinery, without sudden shock or jar, are manufactured by VOLNEY W. MASON, 14 tf] Providence, R. I.

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

WROUGHT-IRON WELDED TUBE of all sizes, for Steam, Gas, or Water purposes. Brass work and Iron Fittings of every kind to suit the same; also, PEACE'S Improved Gas-Pipe Screwing and Cutting off Machines, for both Hand and Steam power, to screw and cut off from ⅜ to 4-in. pipe, and all other tools used by Steam and Gas-Fitters. Manufactured and for sale by CAMDEN TUBE WORKS, Second and Stevens streets, Camden, N. J.

STEAM ENGINES—OF ANY POWER desired for manufactories, of superior construction, with patent frictionless slide valve and variable expension. Address M. & T. SAULT, New Haven, Conn. 11 23*tf

VAN DE WATER CELEBRATED WATER WHEEL.—For Sale at the Eagle Iron Works, Buffalo, N. Y. [5 11*] DUNBAR & HOWELL.

LATHE CHUCKS—HORTON'S PATENT—from 4 to 24 inches. Manufacturer's address, E. HORTON & SON, Windsor Locks, Conn. 5 25*.

ERICSSON CALORIC ENGINES OF GREATLY IMPROVED CONSTRUCTION.—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton Gins' Air Pumps, Shafting, Pulleys, Gearing Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON, 1 tf—D] 164 Duane street, cor. Hudson, New York.

TO STOVE FOUNDERIES—Valuable Patent for sale. Wilson's combined funnel elbow and damper. See Scientific American of March 9, 1867. Address WILSON & WOOD, 12 3*] Wilmington, Del.

TAYLOR'S PATENT GROOVERS.—These groovers will cut a perfect groove, across and with the grain, ¼ to 1½ inch wide and ¾ deep—price $35. Sold only by S. C. HILLS, 12 Platt street, N. Y., who has for sale all kinds of machinery 12 4*

FOR SALE.—Foundery, Machine Shop and Planing Mill, at Waukegan, Ill., thirty-five miles north of Chicago, on the Lake Shore, with a good supply of patterns suited to the times, including patterns for four sizes Stationary Engines, Shop-right Patterns and Flasks for Leonard's Seamless Thimble Skeins, suitable Machinery for Finishing and for Sash, Blinds, and Doors, Planing and Resawing Lumber, with sufficient Power. Will be sold low to a cash customer. Apply to the subscribers, TIFFANY & LUCAS, 12 5*] Waukegan, Ill.

$200 A MONTH IS BEING MADE with our IMPROVED STENCIL DIES, by Ladies and Gentlemen. Send for our free Catalogue containing Samples and Prices. Address 14 tf—R.] S. M. SPENCER & CO., Brattleboro, Vt.

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, N. Y. 1 tf

WOOD & MANN STEAM ENGINE CO.'S CELEBRATED PORTABLE AND STATIONARY STEAM ENGINES AND BOILERS, from 4 to 25 horse-power. Also, PORTABLE SAW MILLS.

We have the oldest, largest, and most complete works in the United States, devoted exclusively to the manufacture of Portable Engines and Saw Mills, which, for simplicity, compactness, power, and economy of fuel, are conceded by experts to be superior to any ever offered to the public.

The great amount of boiler room, fire surface, and cylinder area, which we give to the rated horse-power, make our Engines the most powerful and cheapest in use; and they are adapted to every purpose where power is required.

All sizes constantly on hand, or furnished on short notice. Descriptive circulars, with price list, sent on application. WOOD & MANN STEAM ENGINE CO. Utica, N. Y. Branch office 96 Malden Lane N. Y. City. 1 32*

STATIONARY ENGINES Built under the BABCOCK & WILCOX PATENTS.

An entirely novel arrangement of valve gear, guaranteed to give a more regular speed, and to consume less fuel per horse-power than any engine in use Call or send for a circular. HOWARD ROGERS, 1 20*] 59 Vesey street, New York.

MATCHES—FOR SALE—A set of machines for the Manufacture of the Square Match, with frames, slats, and tools complete, for sale at a low price. THOMAS ALLEN, 11 4*] 321 Olive street, St. Louis, Mo.

BARNES' Patent SHINGLE MACHINE.—State and county Rights of this unsurpassed machine for sale. It will cut shingles, box stuff, veneering, staves, laths, etc., more rapidly than any other machine, with less power, and can be changed from one to the other instantly. Address H. D. BARNES & CO., 11 8*] Fair Haven, Conn., for machines or information.

SHEET AND ROLL BRASS.

German Silver, Brass, and Copper Wire, etc. Especial attention to particular sizes and widths for Machinists and Type Founders. Manufactured by the THOMAS MANUFACTURING COMPANY, Thomaston, Conn. 1 24*

TAYLOR, BROTHERS & CO.'S BEST YORKSHIRE IRON.—This Iron is of a Superior Quality or locomotive and gun parts, cotton and other machinery, and is capable of receiving the highest finish. A good assortment of bars in stock and for sale by JOHN B. TAFT, sole agent for the United States and Canadas, No. 18 Batterymarch-st., Boston. 1 40*—B.

THE BEST POWER HAMMER MADE is the Dead Stroke Hammer of Shaw & Justice. Sizes suited for manufacturing awl blades or engine shafts; consume but little space, and require but little power. Manufactured by PHILIP S. JUSTICE, 14 North 5th street, Phila., and 42 Cliff-st., New York. Shops 17th and Coates-sts., Philadelphia. 8 8* tf

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven, Ct. 14 tf

CAN I OBTAIN A PATENT?—For Advice and instructions address MUNN & CO., 37 Park Row, New York for TWENTY YEARS Attorneys for American and Foreign Patents, Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN $3 a year; 30,000 Patent cases have been prepared by M. & Co.

IMPORTANT. MOST VALUABLE MACHINE for all kinds of irregular and straight work in wood, called the Variety Molding and Planing Machine, indispensable to competition in all branches of wood-working. Our improved guards make it safe to operate. Combination collars for cutters, saving 100 per cent, and feed table and connection, for waved moldings and planing, place it above all others. Evidence of the superiority of these machines is the large numbers we sell, in the different states, and parties laying aside others and purchasing ours, for cutting and shaping irregular forms, sash work, etc.

We hear there are manufacturers infringing on some one or more of our nine patents in this machine. We caution the public from purchasing such.

All communications must be addressed "Combination Molding and Planing Machine Company, cor. 1st ave. and 29th-st., New York, where all our machines are manufactured, tested before delivery, and warranted.

Send for descriptive pamphlet. Agents solicited. [14 tf

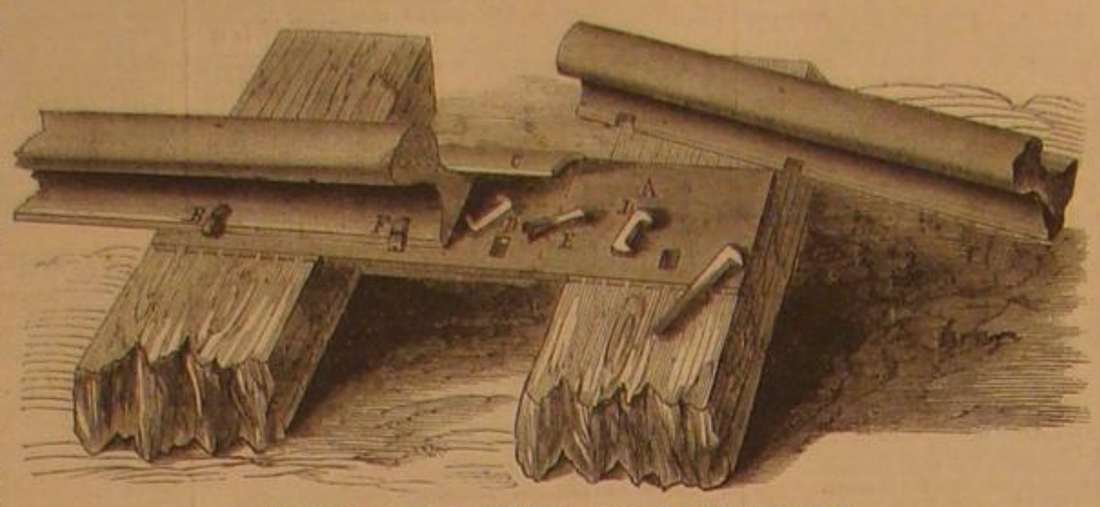
OIL! OIL!! OIL!!! For Railroads, Steamers, and for machinery and Burning, PEASE'S Improved Engine Signal, and Car Oils, indorsed and recommended by the highest authority in the United States and Europe. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American", after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No. 61 and 63 Main street, Buffalo N. Y.

N. B.—Reliable orders filled for any part of the world 1 tf

Improved Rail Joint and Base Plate.

Any device which shall lessen the enormous expense of repairs to the roadway and rolling stock of a road is valuable. Much attention has lately been given to the subject, both in Europe and this country, and there are a number of contrivances which, at least in part and temporarily, obviate this trouble and improve the road. One of the greatest sources of deterioration and cost is the unevenness of the road at the points of contact of the rails. The ends of the two rails are usually brought together on a sleeper and rest on a chair or clamp intended to hold them in line and on the same level. But they are not always efficient for this purpose.

The improvement illustrated in the engraving is claimed by the inventor to be superior to the ordinary modes of connecting rails. It is very simple and does not appear to be costly.



WEBB'S RAIL JOINT AND BASE PLATE.

A is a base plate of wrought iron, extending across two sleepersand the space between them. It is somewhat wider than the base of the rail, sufficiently so to admit of the ordinary rectangular holes to be punched through. The base of the rail is laid close to the plain edge of the base plate. On this side both rail and plate are secured to the sleeper by the ordinary hook-headed spike. On the other side—the near side in the engraving—the rail and plate are secured by two spikes in each hole, one passing through the slot in the base of the rail and projecting its head over the rail, while the other is driven with the head reversed, this spike acting as a key, as seen at B.

The clamp C, is also of wrought iron, flanged on one edge to receive the edge of the rail, and passes under the base plate between the sleepers. The rails are secured to the base plate and the base plate and clamp are fastened together by gibs D, and split keys, E. The gibs are passed through the holes in the base plate and clamp, which correspond, and the key is driven through and spread on the other side, thus securing all firmly in place, as seen at F.

It will be seen that with the base plate and clamp there is a large amount of metal under the ends of the rails, and that while sufficient rigidity is secured, the ends of the rails are kept perfectly in line. This method is adapted to any form of rail, requiring only the ordinary spike and the punched holes. It can be readily attached to any broken rails by punching two holes without removing them from their place.

Patented through the Scientific American Patent Agency, Jan. 22, 1867, by Geo. Webb, whom address, Williamsport, Pa.

Metallic Roofing.—A new mode of applying zinc roofing has been adopted of late with much satisfaction on extensive buildings in England. The plan is very simple. The joints between the sheets (running up and down the slope) are at once fastened and rendered water-tight by half-round ribs of wood which are neatly covered with zinc by machinery, and have two parallel longitudinal channels in their flat under side, to receive the turned-up adjacent edges of the zinc sheets. There is a little play for the zinc flanges in these channels, so that when the ribs are screwed down, the metal can extend and contract with the changes of temperature so as neither to open seams by contraction or crowd up in waves by expansion. The transverse joints (parallel with the ridge of the roof) overlap of course, and have only to be secured each by a screw to the rib, and over this a neat molded cap, fitting the rib, is soldered to the edge of the upper sheet only. The appearance of the roof, with its ribs and caps in a regular figure, and its flat surface at all times perfectly smooth, must be very neat and ornamental.

INCREASED FORCE IN THE PATENT OFFICE.

On March 23d a bill passed the House authorizing the Commissioner of Patents to appoint from time to time such additional principal examiners and first and second assistant examiners as may be required to transact the current business of the Office with dispatch, not to exceed four additional of each class; also, a solicitor of the Patent Office, with a salary of $3,000, and fixing the salary of the first assistant examiner and disbursing clerk at $2,000, and the librarian (who also acts as translator) at $2,500. We trust that this important measure will pass the Senate without delay. Its adoption will secure for inventors a more prompt and energetic disposal of their cases. Push on the good work.

Prof. Loomis, of Yale, states that the average temperature in the month of February was seven degrees higher than the average for this month for the last eighty-eight years, and that it counterbalances the excessive cold of the two preceding months, so that on the whole the past winter must be ranked as an ordinary one.

Advertisements.

RATES OF ADVERTISING.

Back Page.....75 *cents a line.*
Back Page, for engravings.....$1.00 *a line.*
Inside Page.....40 *cents a line.*
Inside Page, for engravings.....60 *cents a line.*

☞ Specimen Copies Free. ☜

ENLARGEMENT OF THE
ILLUSTRATED
AMERICAN JOURNAL OF MINING.
Volume III., commencing March 30.
☞ Twenty Pages Every Week. ☜
The organ of the gold, silver, copper, iron, lead, coal, slate, oil, and other mineral interests.
Full of invaluable information to the mechanic, miner, metallurgist, mineralogist, and chemist.
Original papers by celebrated scientists. Mining news from all parts. Weekly stock, metal, mineral, and ore reports.
Published every Saturday, $4 per annum, by
WESTERN & COMPANY,
37 Park Row, New York City.

W. A. ELLIS,
14*2 Manufacturer of Plow and Cultivator Handles, Ashtabula, Ohio.

TRADE BARTLETT'S MARK.
REVERSIBLE
SEWING MACHINES.
Now acknowledged to be
THE CHEAPEST GOOD SEWING MACHINES.
J. W. BARTLETT, Patentee,
14 ostf] Principal, Office 569 Broadway, New York.

"Nothing Succeeds Like Success."

AMERICAN POPULAR LIFE INSURANCE CO.,
NOS. 419 AND 421 BROADWAY, N. Y.
Best Lives Taken at Lowest Rates!

Of this Company, Mr. Erastus Brooks, one of its Stockholders and Directors, writes in the Express, of which he is one of the editors:

"The American Popular Life Insurance Company held its first annual meeting a few days since. The business of the first six months has been very successful, and has been conducted upon the safest and most economical business principles, alike for the stockholders and parties insured. There are some plans in the organization of this Company popular in their character, which make it well worth general investigation, and which the officers specially invite.

Extra Lives are Rated Down, and Save Money in this Company.

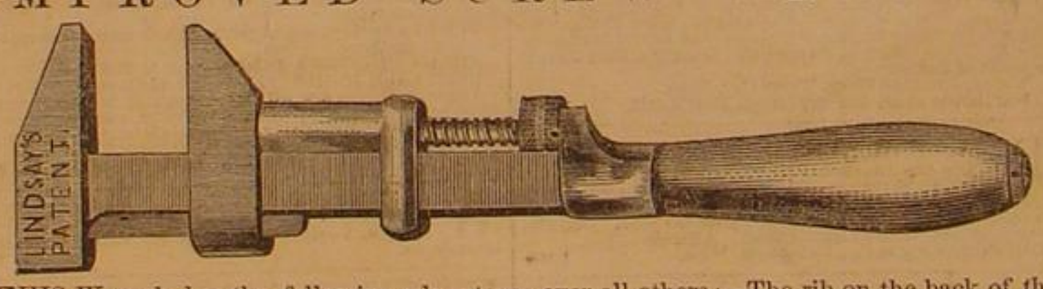
Send or call for
NEW CIRCULAR,
explaining the features of the Company.
☞ Agents wanted in City and Country. ☜ 14 2os

WONDERFUL DISCOVERY!—In making Cider Without Apples. Immense profits realized. A fortune can be made from it at this time when apples are so scarce. An enterprising man can make $5,000 this season without leaving home. To a Western man this knowledge is a fortune in itself. Full directions, with individual rights, sent for 25 cents. Address
14 ost*] JULIUS RISING, Southwick, Mass.

Wild Moss Mills, Carrollton, Mo., March 14, 1867.
ALONZO WARREN, Esq., Boston, Mass.:
Dear Sir—The first-class, high finished, hollow shaft, Globe coupling Turbine Water Wheel purchased of you last summer has been running three months. Went together like a clock; runs strong and steady; economical in using water; journals work cool; answers all recommendations. I am well pleased—satisfied enough to pay for this unsolicited notice of its merits through the Scientific American. Respectfully yours,
1os J. F. LAWTON

CIRCULAR SAWS,
WITH
EMERSON'S PATENT MOVABLE TEETH.
These Saws cut More and Better Lumber in the same time, and with Less Power, than any other Saw in the world, with Less Expenditure of Labor and Files to keep in order, and never Wear Smaller. Also,
EMERSON'S PATENT GAUGING AND SHARPENING SWAGE,
For Spreading the Points of Saw Teeth. Send for New Descriptive Pamphlet, with Price List.
AMERICAN SAW COMPANY,
2 Jacob street, near Ferry street, New York.

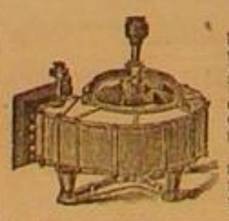
BEFORE PURCHASING, PLEASE EXAMINE LINDSAY'S
IMPROVED SCREW WRENCH.



THIS Wrench has the following advantages over all others:—The rib on the back of the bar (see cut), is FORGED WITH THE BAR and PREVENTS the same from BENDING or BREAKING. The workmanship is perfect, The parts are interchangeable and subjected to rigid inspection, the same as in gun work. The material is warranted of the best quality.
☞ We Warrant our Wrenches to out-wear three of any other ever offered to the Trade or Consumer. ☜
We are Manufacturing these Wrenches at an average rate of Five Hundred in every twenty-four hours.
☞ There never has been, to our knowledge, a fault found with these Wrenches, or Wrench returned. ☜
☞ For sale at all hardware stores. ☜
14] MANVEL & LINDSAY,
Machinists and Manufacturers, New York.

EUROPEAN AGENCY for the Exhibition and Sale of American Patents and Manufactures.
BLANCHARD & McKEAN.
No. 82 Boulevard de Sebastopol, Paris, France.
GEO. A. BLANCHARD.] 10 os13* [J. A. McKEAN.

TURBINE WATER WHEELS.



The REYNOLDS PATENT embodies the progressive spirit of the age. Simplicity, Economy, Durability, Accessibility all combined. The only Turbine that excels Overshots. Awarded the Gold Medal by American Institute.
Shafting, Gearing and Pulleys furnished for all kinds of Mills, made on Mechanical Principles, under my personal supervision, having had long experience. Circulars sent free.
GEORGE TALLCOT,
4 os 13* tf—H] No. 96 LIBERTY STREET, NEW YORK.

DRAWING INSTRUMENTS
OF EVERY DESCRIPTION—
Swiss, German Silver, and French
TRANSITS, LEVELS, SURVEYOR'S COMPASSES, etc.,
DRAWING PAPER, WATER COLORS, etc.,
And all supplies for Engineers, Architects, and Machinists.
Sets of Instruments furnished for schools, and cases made to order. A Priced and Illustrated Catalogue sent free by mail on application.
WILLIAM Y. McALLISTER,
8 8* os] 728 Chestnut street, Philadelphia, Pa.

ZIMMERMAN'S PATENT
STEAM COOKING APPARATUS,
For cooking all kinds of vegetables and meats at one time and together, without flavoring each other in the least. All offensive odors done away. Saves labor, fuel, and time. Dinner can be cooked over one stove hole. Fit any kind of stove. Several sizes; within reach of all. Soup can be made in lower receptacle, vegetables and meat cooked in center, and puddings steamed on top, at one time. Seeing is believing.
No patent ever issued has met with a greater success in the same period—200 steamers sold in this city in six weeks: none returned. Fifteen States sold in same time.
We offer Massachusetts, Connecticut, Rhode Island, New York State, western half of Michigan, and Illinois without Cook County.
Large profits in their manufacture and sale.
Send for illustrated circulars to
S. W. JOHNSON & CO.,
Detroit, Mich.
escription and cut appeared some months ago in Scientific American. 13 2os

Scientific American.
ENLARGED FOR 1867.

This is the oldest, the largest and most widely circulated journal of its class now published. It is the constant aim of the Editors to discuss all subjects relating to the industrial arts and sciences, in a plain, practical, and attractive manner.
All the latest and best Inventions of the day are described and illustrated by Splendid Engravings prepared expressly for its columns by the first Mechanical Engravers in the country.
It would be impossible within the limits of this Prospectus, to enumerate the great variety of subjects discussed and illustrated. A few only can be indicated, such as Steam and Mechanical Engineering, Fire-arms, Mechanics' Tools, Manufacturing Machines, Farm Implements, Hydraulic Engines, Wood-working Machines, Chemical Apparatus, Household Utensils, Curious Inventions, beside all the varied articles designed to lighten the labors of man in the Shop, Factory, Warehouse, and Household
The Scientific American has always been the Advocate of the Rights of American Inventors. Each number contains a weekly list of Claims of Patents, furnished expressly for it by the Patent Office, together with notes descriptive of American and European Patented Inventions.
Patent Law Decisions, and questions arising under these laws, are fully and freely discussed by an able writer on Patent Law.
Correspondents frequently write that a single recipe will repay them the whole cost of a year's subscription.
With such advantages and facilities, the columns of the Scientific American are of special value to all who desire to be well informed about the progress of Art, Science Invention, and Discovery.
Published Weekly, two volumes each year, commencing January and July,
Per annum.....$3 00
Six months.....1 50
Ten copies for One Year.....25 00
Canada subscriptions, 25 cents extra. Specimen copies sent free Address
MUNN & CO., Publishers,
No. 37 Park Row, New York City

MORSE'S PATENT STRAIGHT-LIP
INCREASE TWIST DRILLS, Etc.,



Pronounced by all mechanics who have used them the best drills extant. A full supply, either straight or taper shanks, in size from 3-100 to 2 in. by 64ths, may be found at the regular Agencies as below and at the Factory,
New Bedford,
Mass., U. S. A.
Drills of any size or length made to order.
Circulars sent on application.

M. T. Davidson & Co.,
84 John street, N. Y.
Peter A. Frasse,
95 Fulton street, N. Y.
A. J. Wilkinson & Co.
and May & Co.,
Boston, Mass.
Homer Foot & Co.,
Springfield, Mass.
Wm. P. Walter & Sons,
Philadelphia, Pa.
Francis & Gridley,
Hartford, Conn.
Marsh, Pillsbury & Co.,
San Francisco, Cal.
W. Bingham & Co.,
Cleveland, Ohio.
Hawkins & James,
Chicago, Ill.
Larrabee & North,
Chicago, Ill.

PATTERN LETTERS To put on Patterns, for castings. KNIGHT BROS., Seneca Falls, N. Y. 12 6*

MACHINERY.—
We are prepared to furnish
FIRST-CLASS MACHINISTS' TOOLS OF EVERY DESCRIPTION, ON SHORT NOTICE AND REASONABLE PRICES.
SAMPLES of the TOOLS manufactured by us may be seen at our Wareroom, and we invite an inspection of their Workmanship and Design by those in want of superior Machinery.
NEW YORK STEAM-ENGINE CO.
Office and Wareroom
7 os 13* 222 Pearl street, New York.

BEET SUGAR MAKING.—AN EXPERIENCE of twenty-five years as makers of the most improved cane sugar machinery and refining machinery, as well as the possession of complete drawings of the Most Successful European Beet-Sugar Factories, with details of the machinery and processes employed, enable the undersigned to give correct estimates and to execute orders for such work with fidelity and promptness
MERRICK & SONS,
13 1os 3is] Southwark Foundery, Philadelphia.

Receipts.—When money is paid at the office for subscriptions, a receipt for it will be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-* cknowledgment of their funds.

City Subscribers.—The Scientific American will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

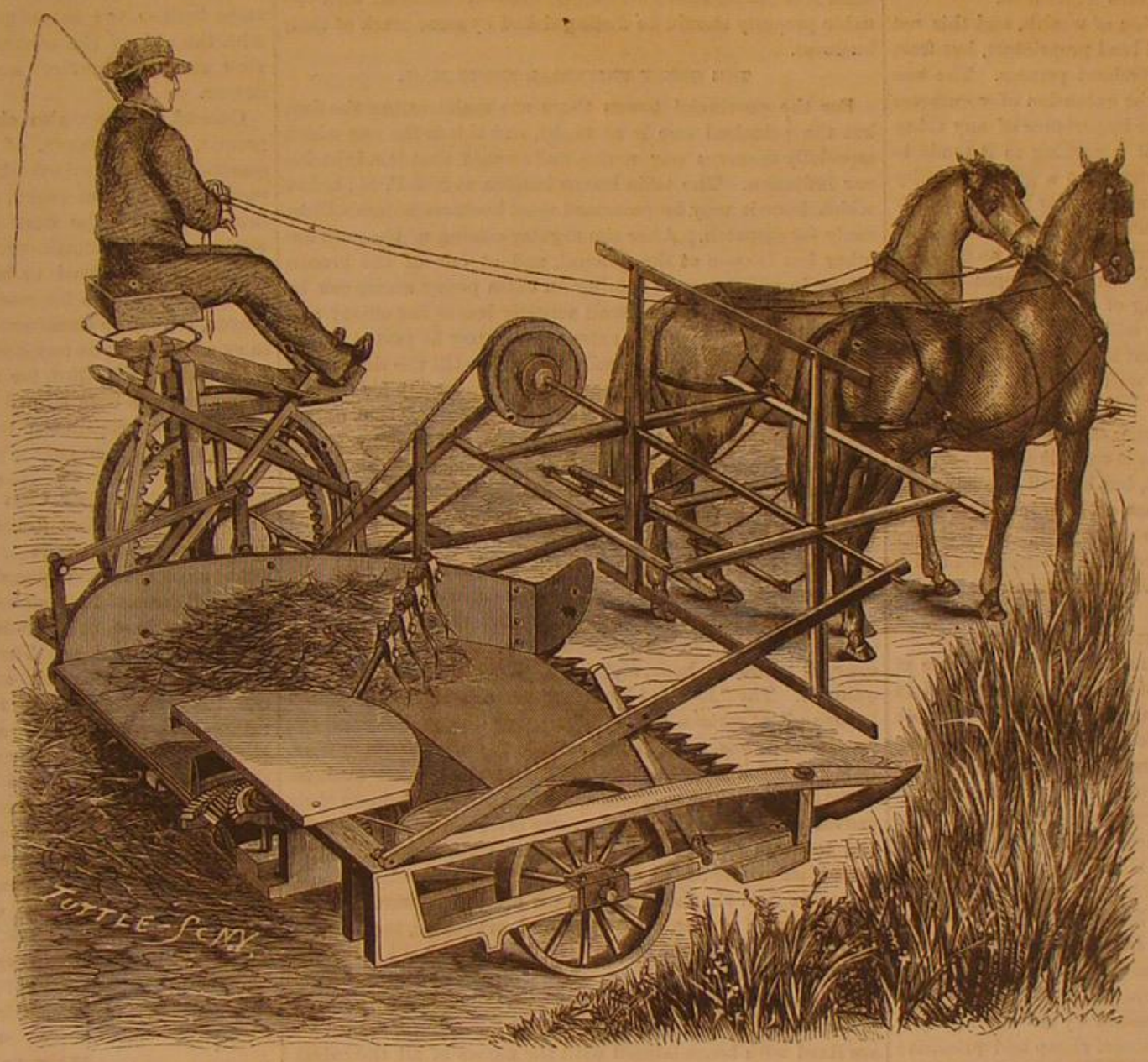
Vol. XVI.—No. 15. [NEW SERIES.] NEW YORK, APRIL 13, 1867. $3 per Annum. [IN ADVANCE.]

Raking Attachment for Harvesters.

The object of the improvement shown in the engraving is to clear the platform of the harvester and lay the grain in winrows convenient for binding into sheaves. The harvester proper, does not differ essentially from others, the principle of action and the mode of construction being similar to the harvester in general use; but the prominent feature of this implement is a device for raking the grain from the platform. This appliance, although working automatically by the motion of the machine, is entirely under the control of the driver, who by means of a brake operated by the foot can instantly stop or start it.

The rake has a bar projecting from the semicircular box on the side opposite the driver's seat at an angle, the bar being furnished with teeth of unequal length to suit the angle. At the inner end, the rake bar turns in a journal attached to a radial frame which is pivoted on a vertical shaft. A bevel gear revolves loosely on the rake shaft, the hub of which turns against a collar secured to the rake shaft. This bevel gear meshes into a beveled toothed segment fixed to the frame, so that when it traverses on the face of the segment it receives a rotary motion. The vertical shaft has also a bevel quadrant gear engaging with a quadrant gear secured to a horizontal shaft actuated by a crank on the shaft of the main driving wheel. On the rake shaft is a collar-clutch which works by friction.

The operation of the rake is as follows: As the harvester moves over the field the crank on the driving shaft gives motion to the quadrant gear on the horizontal shaft, which gives motion to the rake arm, swinging it around from the point furthest from the driver's seat to the opening nearest his position. While performing this quarter revolution the teeth of the rake fit closely to the platform. After this partial revolution is effected the rake starts back again, performing half a revolution horizontally, the teeth coming into position at the end of its traverse, ready to take the gathered grain and sweep it off the back of the harvester. Although the action of this semi-revolving and sweeping rake is produced by the driving machinery, it is controlled, as before mentioned, by a brake operated by the driver's foot, so that he can rake off and deposit the load according to his judgment.



McGAUGHEY'S RAKING ATTACHMENT FOR HARVESTERS.

This improvement in harvesters was patented Feb. 9, 1864, through the Scientific American Patent Agency. Address for facts relating to the sale of rights, etc., Harrison & McGaughey, Saint Anthony, Minn.

Improved Car Truck.

The breaking of a car axle is always a misfortune, and not unfrequently is the cause of a catastrophe which is fatal to life and greatly injurious to property. The intention of the improvement herewith represented is to diminish the danger to such accidents and to give increased facilities for turning curves. It is intended also for supporting the trucks and retaining them in position if an axle should break, and for guiding the trucks if a flange of a wheel should break.

Let A be the bottom frame of a car to which the trucks are pivoted at B. The axles of the wheels each have four bearings or boxes, two on the outside and two on the inside of the wheels. They are shown by the dotted lines on the bars, C, in Fig. 1. It will be seen that each wheel is supported in such a manner that if the axle should break in the central portion or on the outside of the wheel, the wheel will be kept in position and therefore cannot run off the track. To the under side of the car frame are secured four pendant long loops, in which are linked smaller loops attached to the frame of the truck at front and rear. They are seen by the dotted lines on D, Fig. 1, and at E, Fig. 2. These loops serve as supports for the truck in case of accident, enabling the trucks to keep the track and also preventing serious consequences. The bars, F, are pivoted at their ends to the trucks, crossing each other diagonally. They unite the two trucks so that one may be a guide for the other in rounding a curve if the flange of a wheel should break, while they do not interfere with the free and independent action of the trucks when running under ordinary circumstances. Thus the co-operation of the two trucks is assured. Those interested in railroad matters can obtain any additional information desired by addressing the patentee, B. Heiderich, Brady's Bend, Pa.

Fig. 1.

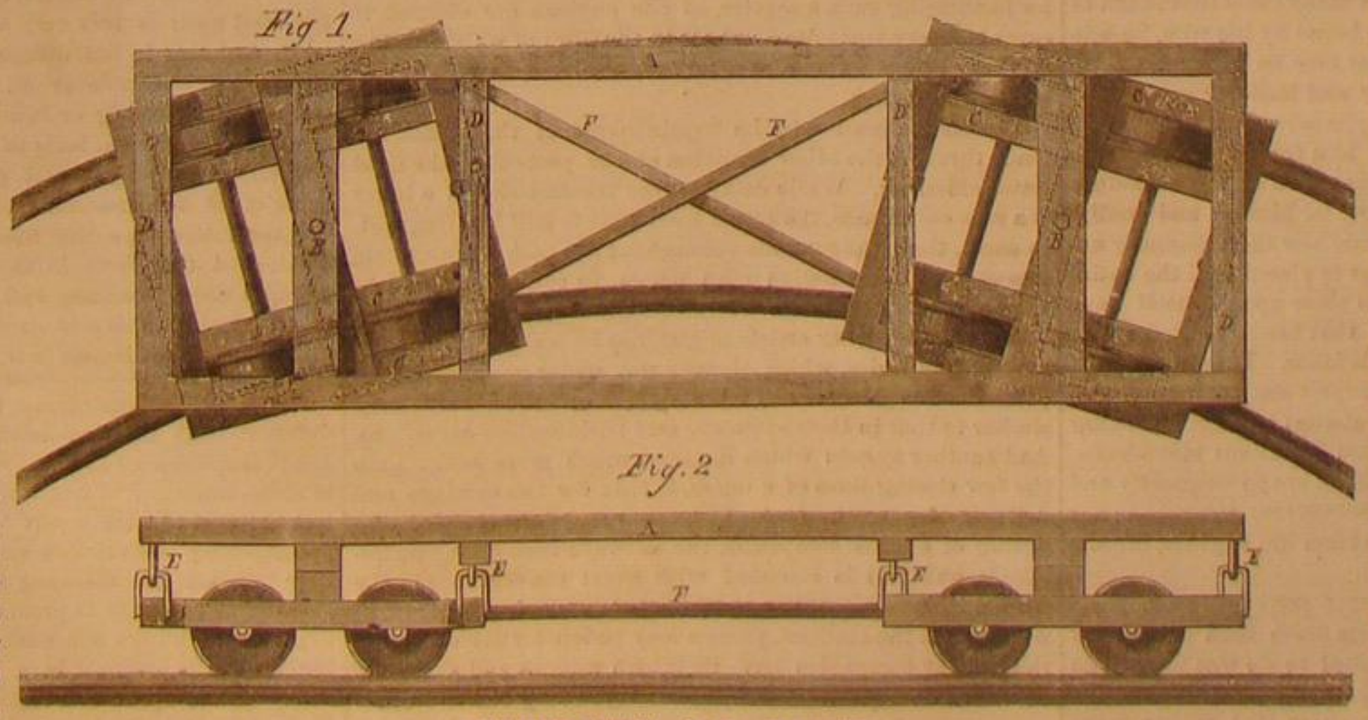


Fig. 2.

HEIDERICH'S CAR TRUCK.

The improvement was patented through the Scientific American Patent Agency on the 13th day of November, 1866.

The Aniline Dyes.

A new red has been obtained by Coupier by a combination of two of the hydro-carbide bases of coal tar, which he has decided to be incapable of yielding a color in their separate condition It is named *toluen red*, and is pronounced the richest red yet known. The so-called aniline dyes are among the most beautiful results of chemistry. The series already includes and rivals the colors of the rainbow, and Coupier's analyses promise indefinite varieties of beauty to come. Beginning with the admired varieties of red and purple, such as *mauve, magenta*, etc., additions like that above named have followed, including the splendid green called verdine, unchanged by candle light, a blue as clear as opal or the Italian sky, a good yellow, and a fair black. The intensity of these colors is shown in the fact that one grain of magenta in a million of water gives a good red, one in ten millions, a rosepink, one in twenty millions gives a blush to the water, and one in fifty millions a reddish glow.

Aniline is, however, but a modification of one of a variety of hydro-carbides constituting the very variable bases of benzine and coal tar, and of which some combination is supposed by the investigator above referred to, to be necessary to the production of colors. M. Coupier has been engaged in the endeavor to realize industrially the isolation and management of these bases, in order to establish methods for uniform results; with the above instalment of theoretical and practical success. The rectified naphtha is resolved into benzol which makes aniline, toluen which makes tolouiden, xylen and hence xyleden, and a number of other distinct hydrocarbides, the possible compounds of which with each other and with oxygen, etc., when fully ascertained, will probably yield a complete and uniform series of dyes before which the old vegetable and mineral dye stuffs will rapidly pass into disuse.

Monkeys in the Cotton Fields.

A cotton planter from Georgia gave his experience, some time ago, in the Galveston (Texas) *News*, on training monkey's for picking cotton. He writes that in 1849 he owned a cotton plantation in Georgia, and that having occasion to visit the Island of Trinidad, he was persuaded to buy twenty-three monkeys, at a round price, to test their latent capacities for cotton picking. The letter adds:—

"I was mighty well pleased when I received my monkeys. Their arrival turned my plantation topsy-turvey. For two weeks nothing was done by whites or blacks but play with the monkeys. The overseer got one of the brightest looking, and remained at his house most of the time watching the monkey's tricks, and I must confess that my wife, myself and children were in the same business. Seeing this would not pay, I began making preparations to go to work. I had reckoned on one negro managing ten moneys, and five monkeys picking as much as three negroes.

For the next two weeks, all hands, whites and blacks, were engaged in the cotton fields, teaching monkeys. The result was somewhat different from my calculations. Instead of one negro managing ten monkeys, etc., it took ten negroes to manage one monkey, and then the monkey did not pick a pound or an ounce of cotton. I became disgusted, gave all

my neighbors that would accept a monkey, and about a fortnight since sold the last eight to a traveling menagerie at $5 a piece. My monkey speculation has thrown me behind six weeks in cotton picking. The next time I go to Trinidad I don't believe I shall want any monkeys."

[From our Foreign Correspondent.]

THE BRITISH POSTAL SYSTEM.

MANCHESTER, March 9, 1867.

CONTRASTS OF BRITISH AND AMERICAN GENIUS.

To one whose views are not so narrow as to insist that all that is good in any respect is centered in his own immediate circle of acquaintance, and who is not on the other hand so affected as to despise what is familiar or homely, there can hardly be a pleasanter exercise than in comparing the peculiar genius which characterizes two such nations as England and America. Sprung originally from the same stock, speaking the same language, and addicted in the main to the same pursuits, there is nevertheless a difference in the character of the two peoples so marked as to be apparent to the most unreflecting. This is shown in nothing more clearly than in the varied channels in which the inventive faculty of the two nations has chiefly run, and the direction in which the greatest progress has been made on either side of the water.

BRITISH INVENTION GRASPS AT POWER.

England is *par excellence* the nation of wealth, and this not in any great degree from its titled land proprietors, but from its far more important class of merchant princes. The one idea pervading all her action is the extension of commerce both at home and abroad, and the importance of any thing that may be proposed is judged of according as it tends to promote this object. Let it be shown that a greater facility of communication for mercantile purposes may be obtained by a given innovation, and they will assuredly take the lead of all other nations in introducing it, though it require an expenditure of millions of money. The government appears to understand and share fully the feeling of the people, and considers it its duty to further what will tend to fulfill these demands. And furthermore, as what is done is meant for use and for continual use, it must be well done. Other things meet with less encouragement. If any great increase of personal comfort or domestic convenience can be forcibly shown to result from any improvement, it is very likely that an Englishman will sometime adopt it, but he will probably not make haste to do so, nor will he turn aside to investigate beforehand what it may be likely to accomplish. Such things he is quite willing to allow everybody else to experiment with before him: when they have reached a good result he will begin to take some notice of them.

AMERICAN INVENTION PERFECTS COMFORT.

In America the case is as nearly as possible the reverse of all this. True there are plenty of men deeply absorbed in business, and interested in any thing which tends to promote its interests, but as a rule they have not the means to carry out any very extensive undertakings. The magnitude of the country renders the difficulty so much the greater, and to maintain railway communication over such great distances it is necessary that roads should be constructed with the least possible outlay. As for governmental encouragement—well I don't think I need say anything about that, for our representatives are so much occupied with looking after the welfare of the country that they of course cannot attend to any such matters as these. Necessity is the mother of invention, and it is this which has given our countrymen a world-wide reputation for ingenuity such as is possessed by no other people. The very fact of our having to construct cheap and primitive railways has compelled us to design locomotives which would adapt themselves to them, as experience in Canada has abundantly shown that rigid English engines are totally useless on American roads. We accordingly find a great variety of devices brought out in the American locomotive which render it a machine most admirably adapted to its work, and of late years most of these have been more or less adopted in England.

But again, the American not being brought up in entire dependence on servants, is quite familiar with most of the details of household affairs, and knowing in many cases that much of the burden of such matters must be borne by his wife, he sets himself to lighten that load as far as may be by manifold ingenious contrivances to lessen labor and hasten results. Exposed to severe cold in winter and oppressive heat in summer, he builds his house so as to shield him from either extreme, and then finds numberless appliances which he can introduce into it to make it a comfortable abode for himself and family. And so we might continue to illustrate how the apparently unfavorable circumstances in which he is placed and the entire dependence which he is obliged to place upon himself have made him thorough master of all that tends to make him comfortable and to lighten domestic labor. It is in America therefore that we should naturally expect such great and useful inventions as sewing machines, clothes wringers, cooking stoves, hot-air furnaces, sleeping cars, luxurious steamboats, and the host of similar appliances which are so frequently and well illustrated in the pages of the SCIENTIFIC AMERICAN; nor is it but a step further to such as steam fire engines, breech-loading rifles and the like.

SUPERIORITY OF BRITISH POSTAL CONVENIENCES.

But I have already occupied more space than I intended with this comparison. What I wished to do was to give an illustration of some of the commercial facilities which are provided in England, as it is in such matters that we can learn most from them, and that I take it is the object of all comparison. I have already in former letters spoken of the conveniences of underground, and especially *above*-ground railways, and very much more might be said without any danger of exhausting the subject or unduly lauding it. I think, however, that a few remarks on the *mail service* may be quite as interesting and the subject hardly less important.

HOW NOT TO DO IT—HOW TO DO IT.

To those who have dropped a letter addressed to a Broadway firm into the box at one of the up-town lamp posts on Monday and had it safely delivered at its destination as early as Wednesday of the same week, having perhaps in the mean time called in person at the house for which it was intended, the advantages of the system existing in London may perhaps be appreciable. There are some six or eight collections and deliveries during the day, and the officials there seem to think it as well, when they have received a letter for a city address, to deliver it the next time the postman goes his round. Accordingly if you post your billet at eleven in the morning your friend will no doubt receive it before three, and probably in that way you will have saved a day in the accomplishment of your business. To facilitate city collection and distribution it is usual to have two boxes side by side, one marked in red letters, "For London and twelve miles around," and the other in black, "Inland, Colonial and Foreign Mails." Should you by mistake, however, drop your letter into the wrong box, it will make no difference except that perhaps it may not be delivered till the next morning instead of in the afternoon. The carriers all wear a simple and convenient uniform, and this I think a very good thing if only for appearance's sake, since it is proper that government officials intrusted with valuable property should be distinguished by some mark of their business.

THE GREAT UNIVERSAL NIGHT MAIL.

For the provincial towns there are mails during the day, but the principal one is at night, and this is the one which especially deserves our notice and (would that it might be) our imitation. The train leaves London at 8:40 P. M., before which hour it may be presumed most business letters will be ready for dispatch. After the regular closing of the mail another box is open at the general, and at one of the branch offices, in which letters bearing an extra penny stamp can be posted up to the time the mail actually leaves the office; and after this letters with two extra stamps may be posted in the traveling post-office at the railway station till the time of its departure. The train is one provided expressly for the service and called the "Limited Mail," from the fact that only a limited number of passengers are taken. Seats may be secured in advance, but ordinary tickets are not available unless there happens to be room in the carriages. For the purpose of seeing the operation of this, I made the journey between London and Glasgow by this train a short time since. The distance is 400 miles, and the through time less than 10¼ hours, out of which about one hour is consumed by thirteen stops. The average speed, therefore, for the whole distance (a part of the way being over heavy gradients) is considerably over 40 miles an hour, and it frequently rises to nearly or quite 60. The "Limited Mail" forms a trunk from which branch off, at certain stations along the line, mails for all the provincial towns, so that not only do the merchants in Glasgow and Edinburgh find their letters, written after business hours in London the previous evening, awaiting them on their arrival at their offices, but the same is true in every other city and town in the country. A similar train leaves Glasgow somewhat earlier in the evening and reaches London at a little before 5 A. M., the running time being the same, and this starting with a single carriage and post-office, receives the contributions of all the towns as it passes along till it reaches London with all the affairs of the nation on its shoulders. The traveling post-office vans are well arranged for the work of assorting the letters for the various branch lines. The sides are lined with boxes labeled with the names of all the principal towns, and into these the clerks rapidly distribute the mail as they are whirled along on their nocturnal course.

This service is undertaken by the London and Northwestern Railway, and it has been accomplished at no little expense. They are of course compensated by the government, as the number of passengers is much too small to defray the expenses of the train and all attendance that it is necessary to provide for at the various points along the route. It will be seen how well adapted Mr. Ramsbottom's water troughs are for facilitating such a service, as the engines are obliged to carry but very little dead weight in the form of water, having it ready beneath them at short intervals to be scooped up without stopping.

The same attention to the requirements of the public extends through the other branches of the post-office, the dead letter office, etc. While delay in the transmission of a letter is a rare occurrence, the actual loss of one is still less frequent. In short, the arrangements throughout are such as one would expect to find in a nation with whom, as correctly stated in the first part of my letter, business is the first and great thing.

A very interesting article might also be written on the telegraph companies, which, though not under government supervision in the same way as the postal service, are still very similar to that in their extensive and business-like operations. And another system which deserves much more notice than the few closing lines of a letter, is that for the carriage and delivery of parcels. Instead of this being done through the agency of express companies, the railways themselves undertake it, and this is attended with great convenience to the public. There are offices at numerous points in the cities at which, or at the stations, parcels may be left for dispatch, and the railway companies have their own wagons and attend to the safe delivery themselves, the charge being but trifling.

SLADE.

A POWERFUL LOCOMOTIVE is now building at Bordentown for the Camden and Amboy Railroad. It is a ten-wheel engine with six 4½-feet drivers, intended for coal traffic, and calculated to draw the heaviest coal trains unaided.

Hellography, or Sun-Engraving.

Mr. Charles Nègre of Avignon described his beautiful process of chemical steel engraving before the Photographic Society of Paris, at the last meeting reported in our foreign exchanges of March 1st. The steel plate is first coated with a varnish of some soluble substance mixed with bichromate of potash, which has the property of becoming fixed, or insoluble in water, by the action of light. This coating is then exposed to the wrong side of the negative obtained directly in the camera, and the light transmitted through the light portions of the negative fixes the varnish, while the dark parts leave it soluble so far as covered by them. The soluble portion of the varnish being washed off, the residue perfectly represents the lights of the negative, which are the shades of the future picture. The plate is then placed in a gold bath and submitted to the action of electricity, which beautifully gilds the exposed parts of the surface with a layer of gold inseparable from the steel, and distributed of course to the minutest points unprotected by the fixed varnish. All that remains is to clean off the fixed varnish and subject the surface to the action of diluted acid, which has no effect upon the gilded parts, but etches the exposed surface of steel with a delicate exactness which no manual skill could imitate. The plate is now ready to give impressions with ink, although it will of course receive any desired additions or alterations at the hands of the engraver. The process is of inestimable value both to the investigation and diffusion of science, and with the aid of the microscope will introduce to common view many of the most instructive and curious *minutiæ* of nature.

Colored prints are also obtained by a similar but shorter process, by Mr. Pouncy, of Dorchester, England. A similar sensitized coating mixed with oil color of any desired tint, is used on translucent paper, and when the portion protected from fixing by the dark parts of the negative has been washed off, the remainder, constituting the shades of the picture, is transferred as in lithography to any surface upon which it is to be impressed, or if ceramic colors are employed, it may be transferred to potter's "biscuit," and burnt in as a design upon any description of ware.

Mr. Osborn's method, for applying which on a large scale a company has been formed in this city, employs a sensitized coating of a preparation transferable to lithographic stone, and thus obtains an engraving for printing.

Our Cast Car Wheels.

It is often said that figures do not lie, but we cannot see with what reason it is said, for they certainly tell very different stories for some purposes than others. The *American Railroad Journal* finds statistics quite contradictory to those of the apostle of chilled wheels in England, from whom we quoted not long since. That paper estimates that not less than *ten thousand broken wheels* are taken out from under cars and engines on our roads in a year. The system of ringing every wheel with a hammer at the principal stopping places, as practiced generally on our railroads, detects the most of these fractures before they are completed; but no less than four serious accidents have occurred from this cause within the last winter. Deepening the chill and then annealing the center, may mitigate the evil, but nothing has yet done away the brittleness that comes of hardening, in cast iron. The majority of chilled wheels break in the tread, and probably always will. The very process involves actual cracking in many cases, and in still more an approach to cracking, in the form of a concealed over-tension which percussion in use will soon bring to fracture.

How to Buy Meat.

Dr. Letheby gives the following description of good and bad meats, with which his duties as sanitary officer in the city of London have required him to be very familiar:—Good meat is neither of a pale pinkish nor a deep purple tint. It has a marbled appearance, from a ramification of little veins of intercellular fat; and the fat of the internal organs especially is firm, hard and suety, and is never wet, whereas that of diseased meat is soft and watery. The feel of healthy meat is somewhat elastic, and hardly moistens the finger. Diseased meat is soft and wet. Good meat has but little odor, and this is not disagreeable; whereas diseased meat smells faint and cadaverous. Good meat bears cooking without much shrinking or losing much of its weight; but bad meat shrivels up and boils to pieces; this is due to the larger proportion of watery and gelatinous material, and the absence of fat and true muscular substance in the meat. Under the microscope the fiber should be clear and well defined, and free from infusorial animalculæ; while that of diseased meat is sodden and tumid, as if it had been soaked in water, the transverse streaks are indistinct and wide apart, and animalculæ abound in it.

ANOTHER PRESERVATIVE for animal substances, not very different from the *eau hemostatique* or blood-staying water, has been presented to the French Academy. It is composed of alum, benzine and water, and is said to cover the substance to be preserved with a sort of filtering cuticle, excluding the decomposing animalcules according to Pasteur, while admitting pure air and allowing free evaporation. That air has in itself no tendency to promote decay, accords with common experience, though not with the common impression. The butcher keeps his meat in a current of dry pure air, and a carcass hung up in the elevated atmosphere of some of our Rocky Mountain regions, will dry perfectly sweet and sound throughout, without other curing. Putting these facts and Pasteur's discovery together, is there not probably a practicable principle which may be applied to the preservation of fruits and meats, and even of the human body, without the aid of a vacuum?

Editorial Summary.

CASELLI'S PANTELEGRAPH—introduced some ten years ago—does not appear to have made the rapid progress of machines which attempt less perfect results: but we see it noticed among the variety of instruments now used in France. As our readers may perhaps remember, it produces a *fac simile* of the dispatch as written by the sender on a non-conductive surface with a chemical ink which gives a conductive quality to the portion covered by it. The document is fed by clock-work under the point of a pendulum which forms part of the circuit and oscillates in exact time with a similar conductor at the receiving station—the latter receiving the current through a sensitized paper placed like that through which the sending current is transmitted. As the transmitting pendulum swings over the face of the dispatch, the current, passing through the conductive part of the surface only, transmits to the receiving paper a correspondent succession of marks, and as the dispatch is fed forward a thread's breadth at each oscillation, the receiving paper consequently presents a *fac simile* of the handwriting, drawing, or any figure traced upon the transmitting paper.

TESTING STEEL RAILS.—The test at the "Cyclops" steel works, Sheffield, is a blow from a tun hammer dropped from a hight of 36½ feet, and striking with a V-corner upon the rail midway between supports placed three feet apart. It is apparent that this test is grossly disproportionate as to tensile strength or toughness, in comparison to hardness, which is the great virtue required, in the face of the rail. Nevertheless, a steel rail at Chalk Farm is said to be now wearing out the twenty-fifth face of iron rails adjoining it. At a special professional test, held in Sheffield, in February last, the 68-lb. double headed steel rail was bent at a right angle by the third blow of the tun hammer, falling thirty feet: the first, with a fall of 20 feet, having bent the rail 5 inches in a length of four feet, and the second having straightened it back. No cracking was produced. A hydraulic pressure of 20 tuns on a similar rail caused a deflection of $\frac{5}{16}$ inch, and a permanent set of ¼ inch. Thirty tuns gave a deflection of 2¾ inches and a permanent set of 2·55 inches.

HOW IS IT?—We observe in the Detroit *Union* a circumstantial report of the deliberate medical murder of a little daughter of Alfred Woodruff, of Greenfield, seven miles from Detroit, who died, as alleged, not of hydrophobia, with which she was hopelessly suffering, but by *smothering*, resolved on by "science and skill" after "a long and painful consultation." If this be, as we presume, a silly repetition of vulgar misreport, its authoritative exposure is of the highest importance. The matter of such a publication should not be passed over, for the impression is very general, as we happen to know, among the uneducated classes, that smothering to death in cases of hydrophobia is a usual practice, allowed by medical jurisprudence; and while every opportunity should be taken to eradicate so demoralizing an impression, at least an uncontradicted statement in a respectable daily paper ought by no means to be allowed to confirm it.

TESTING BESSEMER STEEL for carbon, is done in a simple manner by the English manufacturers. A standard piece of steel is kept on hand, in which the proportion of carbon has been accurately determined by chemical analysis. A few filings from this are dissolved in nitric acid of a certain gravity and kept in a vial. The shade of brown given to nitric acid by a certain proportion of carbon is very exact and uniform, and hence, a specimen of exact weight being taken from each charge and dissolved in half the standard weight of acid, and the solution then diluted with water until it reaches the exact color of the standard solution, the comparative specific gravity of the two solutions will determine the proportion of carbon in the specimen, to a hundredth of one per cent. There is not the slightest appreciable variation of ingredients, throughout different parts of the same charge.

BEEF-CURING BY VENOUS INJECTION is practised by a firm at Corpus Christi, Texas, according to report, with perfect success. The blood is withdrawn by tapping the right ventricle of the heart—the animal having been stunned—after which the veins are forcibly injected with brine through a hose the nozzle of which is tightly inserted in an orifice in the left ventricle while the orifice in the right ventricle is closed. After filling, the right ventricle is opened, and allowed, under a continued pressure of brine, to run clear of the remaining blood. On making an incision at any point in the carcase, the brine spirts out the same as blood from the living animal, only with greater force. Even the hide is perfectly salted, and the carcase can be kept or transported whole as it stands, or skinned, cut up and packed, with perfect safety from decomposition.

MAGNESIA CRUCIBLES are proposed for obtaining compact steel or iron, free from the bubbles which are due to the action of the carbon on the silica of the ordinary crucibles. Lime crucibles for the same purpose may be formed within the ordinary clay crucible, by first ramming the latter with plumbago, then turning out the plumbago to a thin shell, then ramming with caustic lime and turning the proper cavity. The use of the plumbago between the clay and the inner shell, is to prevent the melting of the latter from contact with the clay in the furnace.

GLYCONINE.—Four parts weight of yolk of eggs, with five parts of glycerin, make an unctuous compound of the consistency of honey, unalterable by the atmosphere, and forming an inoffensive covering for sore or injured parts, impervious to air, yet easily removed by water.

THE SPRENGEL AIR PUMP is an instrument of beautiful simplicity and said to be a great improvement on the common kind in point of efficiency. The vessel to be exhausted is connected by a branch pipe to a vertical tube through which successive drops of mercury are allowed to fall from a reservoir at its top. Each drop carries the air clean before it, the vacuum created being filled from the vessel to be exhausted, and the process is continued as rapidly as the drops can succeed one another, until a perfect Torricellian vacuum is realized, as shown by a barometer opening into the branch pipe, which, it is said, will mark as high as a close barometer by the side of it.

A NEW GAS ENGINE by M. Hugon—who claims to have invented and discarded, fourteen years ago, the Lenoir electro-gas engine—substitutes a constant gas light for the electric spark, to explode the mixture of gas and air in the cylinder. The gas jets which fire the mixture, and are of course extinguished by the explosion, flow by flexible pipes through orifices in the ends of the slide valve, and as often as extinguished are relighted by constantly burning jets which they meet in their oscillations. A very small jet of water is also introduced into the cylinder at each explosion, which by its instant vaporization extracts heat and serves moreover as a partial lubricator.

VALUE OF FUEL BY THEORY.—1 lb. of carbon in burning gives 14,400 units of heat. 14,400×772—11,116,800 foot lbs. On the supposition that 1 hour is occupied in the burning, then 11,116,800÷60—185,280 foot lbs., represents the mechanical value of the heat for one minute. 185,280÷33,000—56 horse power. In other words the mechanical value of one pound of carbon burned in one hour is 5·6 horse power, and one horse-power per hour is equivalent to 1÷5·6 lbs. carbon burned per hour. Thus it will be seen that our engineers realize only about 5 per cent of the value of fuel.

PARKESINE.—This is the name applied, in honor of its inventor, to a coarse collodion discovered by Mr. Alexander Parkes, of Birmingham, and introduced at the Exhibition of 1862. It is now alleged that the article can be produced at a cost of only a few cents per pound, and that its qualities are similar and equal to those of hard rubber, with the advantage of every variety of color from the purest white downward, and of resisting the action of water and heat. Specimens illustrating all the properties claimed, are to be at the Paris Exposition.

ALMOST PERPETUAL MOTION.—We saw lately a watch which never needs winding up. It was bought in Paris by one of our friends, and looks very much like perpetual motion. It is inclosed in a gold hunting case, and on examining it we found that the closing of the case, after looking at the time, performed the function of winding up in an almost imperceptible manner. It was stated to run a month without interruption, and all that is necessary to keep it going is to see the time at least once a month.

AMERICAN IRON FOR ENGLISH GUNS.—It is well known that the English have been unsuccessful in procuring a cast iron gun like our "Rodman," for want, it is supposed, of the proper quality of iron. It is reported that the Admiralty have obtained through the British Minister, Sir Frederick Bruce, samples of the Pennsylvania iron from which our monster guns are cast, for the purpose of further experiments in casting heavy ordnance.

WET AND DRY LUBRICANTS are each attracting much attention in Europe. The water-box of the French inventor vies with the dry, impalpable plumbago powder of the Battersea Plumbago Crucible Company: both being reported as giving results decidedly superior to oil, under comparative tests. The plumbago powder is said to adhere to the surface of the metal, perfectly filling the finest inequalities.

FILTRATION AND REFRIGERATION OF AIR.—A simple machine patented by a Mr. Cabanes, consists in principle of a rotary fan drawing a powerful current of air through a case packed with sponges which may be saturated with any purifying, ozonizing, or freezing mixture, and thus a cool, pure, fresh, or if you please perfumed breeze may be enjoyed in any situation and at any season.

TANNING BY PNEUMATIC PRESSURE, for effecting which by a new method a patent has been taken out in Europe, is no doubt substantially the same thing as tanning in a vacuum, which we lately noticed as introduced in Illinois: the effect in either case being to force the tanning liquid rapidly through the pores of the hides, and thus reduce the time of this process from months to hours.

CYANOGEN, a deadly gas, is found in England among the constant products of the combustion of bituminous coal. In iron furnaces 1·34 per cent by volume of the gas present is cyanogen, at a hight of 2¾ feet, while at a hight of 12 feet hardly a trace of it can be detected. A bad draft may give the occupants of a room thus warmed, more chemical poisons than they suspect.

THE SNIDER RIFLE is not giving satisfaction under the English army tests. It is found deficient as compared with the Enfield rifle in accuracy, rapidity and range, and develops serious defects in the working of the ammunition, partly from faulty workmanship.

SUBSTITUTE FOR ALBUMEN.—It has recently been found by Thom, Roberts, and Rosenstath, from a long series of experiments, that dried gluten, or lucine, employed under new conditions, fixes colors as solidly as albumen, and may be substituted for it with considerable economy.

TRACK-LAYING MACHINE.—A California inventor has produced a model of a machine for laying railroad track, ties-truing and all, at the rate of 2½ miles in 12 hours. The grade being ready for the track, the machine moves forward, projecting a leveling scraper before it, and dropping the ties at exact distances from the open arms of a large wheel revolved by the forward movement. As each sleeper drops, four heavy stamps drop upon it, bed it firmly in the earth and hold it still while two planing-machines cut the seat at each end for the rail or chair, to the proper depth. When ties enough for a length of rail are laid, the machine stops for a moment while a rail is lowered from each side by automatic cranes to be adjusted and spiked at leisure by the attendants.

AN ELECTRIC RIFLE has been made by a Frenchman, with a sufficient battery inclosed in the stock, the wires from which emerge near the breech and are connected by a simple movement with a very fine platinum wire within the charge, which is thus rendered incandescent. Practically, such an arrangement has more chance of being useful in artillery. The French are a wonderful people for wonderful inventions.

GRANULATED GUN COTTON is offered for military purposes, by a process which consists in reducing the gun cotton to a paper pulp, solidifying it by pressure, cutting it up, and finally varnishing the grains with collodion. Or, the pulp is mixed with a small proportion of gum or collodion and agitated in a vessel until granulation results.

THE ALLOYS OF STEEL WITH PLATINUM are said to be very perfect in every proportion that has been tried. The best proportion for edge instruments is about 1·5 per cent of the latter metal. Equal parts by weight form a beautiful alloy which takes a fine polish and does not tarnish: the color is the finest imaginable for a mirror.

MR. WHITWORTH maintains the superiority of his flat-fronted shot and shell as the only form for penetrating armor at various angles. He admits that the ogival head gives the best penetration at right angles, but maintains that an enemy cannot be expected to present himself in that favorable position as a target.

PRUSSIA.—A correspondent calls our attention to a very large statement of the recent increase of the Prussian marine, contained in one of our foreign clippings some time ago. We have not the statistics of the great German ports now Prussian, and cannot say how far the statement may have been exaggerated.

HYDRO-CARBON GASES are obtained and burned on a new plan by a Russian who is said to be applying it to the engine of a small steamboat to run on the Neva. Air is forced through turpentine or other oils, emerging charged with their vapor, and burning with intense heat. The effectiveness of the method seems more probable than its safety.

A VERY SIMPLE "HYGRODEIK" is a few grains of quicklime laid on a plate. If it does not absorb more than one fortieth of its own weight of water in twenty-four hours, as determined by accurate weighing, the room, says Dr. Coffee, may be fit to live in. In a damp, newly built room, it will increase as much as five per cent.

A FIREMAN'S PROTECTOR, recently tested in Quebec, consists of a finely perforated brass ball attached to the nozzle about where it joins the hose, so as to present itself toward the fireman when playing upon the fire, and to throw over him a heavy spray of water as a protector from the heat.

PARAFFINE WATER-PROOF.—Dr. Stenhouse, says *Chambers' Journal*, announces that leather may be made water-proof and its durability doubled at the same time, by applying repeated coatings of paraffine and oil, the absorption being assisted by warmth.

SCOTCH SNOW PLOW.—The Highland Railway, Scotland, is subject to very heavy drifts of snow. Plows are used which, driven by five or six engines, clean the track of ten feet of snow at the rate of 25 miles an hour in new snow, and 10 or 15 in tough snow.

"VIENNA," says the *Nord*, "is the only city in the world where the snow is removed as fast as it falls, but the expense is enormous. All the men out of work are set to sweep the streets at 60 kreutzers [about 34 cents] a day."

AN ENORMOUS CAPITAL.—£70,000,000, or over $300,000,000 are said (in *Engineering*) to be invested in the London and North-western Railway and its leased lines. It has now 80 miles of steel track.

AMERICAN-PATTERN LOCOMOTIVES have been ordered in England to a considerable extent for foreign railways, and one large firm have lately gone into the manufacture of such engines.

HARD-SURFACE CASTING.—Iron cast in molds lined with a paste of finely pulverized metallic antimony and alcohol, will be covered with an extremely hard alloy of antimony and iron.

TRADES UNION TYRANNY is rampart in Sheffield. All the file makers are reported on a strike on account of the employment of a single non-union workman by one of the manufacturers.

STEEL CRANKS.—Ramsbottom saws his steel cranks out of a plain flat slab.

INCINERATION OR BURIAL.

A correspondent has taken the trouble to send us from a long distance (San Francisco), an article on the above topic which editors there had thought useless to publish. Independently of the quality of the production, we are inclined to think that Christendom, whether wisely or not, is so generally set against burning its dead as to justify the editorial conclusion. It can do no harm, however, to look at the question, and it may be instructive to glance at the conduct and experience of other races and times in relation to this interesting subject.

The utilitarian arguments for burning the dead are of great absolute force, especially in cities and populous regions. If ample room could be secured in perpetuity for all the generations of the living to rest at last forever undisturbed beneath the ground, one of the strongest of these arguments would be taken away. But this cannot be, at least in the ordinary manner, unless the whole term of mortal life on this small planet is destined to a restriction which has not been unequivocally revealed. It is true that we need not concern ourselves about exigencies which can only arise in the course of thousands of years, may never arise at all, or may be met by means now unimagined, long before they arise. But local necessities do arise which render the burial system extremely inconvenient, to say the least. It is impossible to locate burial grounds with an absolute certainty that it will never be imperatively necessary to invade and disturb them. No treatment of the dead could be more revolting to humane sensibility than the indecent scenes which have been enacted in this and many other cities when the interest of the living has prompted the removal of past generations of the dead from their once sacred resting places. Could they and those who loved them have had a voice in the matter, none can doubt that they would have preferred the funeral pyre or the calcining retort to the shovel and cart and the ghoul-like hands of the plunder-seeking laborer twice imbruted by a brutal task. Burning or anything that should prevent forever the recurrence of such desecration, would lend a grace to our civilization beyond what it can boast as yet.

In all old and densely populated countries, close and even cumulative burial has become an evil not only brutal and brutalizing in its necessary incidents, but pestilential in its effects. It might be just (though of no practical use) to urge greater liberality in the appropriation for the dead, but for the fact that in some countries every foot of land devoted to waste subtracts from the daily bread of the poor. It is not practically possible and not always even humane, to enforce a sufficient liberality in land to prevent close burial in such circumstances, while men are what they are. The consequence is that the ground sometimes becomes saturated with the products of decomposition and can absorb no more, but yields them to the atmosphere in pestilential gases. Long before this extreme result is reached, however, the rank soil becomes prolific of deadly exhalations, and communicates poison to subterranean water currents and thence to wells. The mortuary records of such localities give abundant evidence of the effect, and that with fearful emphasis in times of pestilence. The ancients felt wisely though they reasoned rudely that the burial of the dead among the abodes of the living was a pollution to be prohibited. It seems as if burial could hardly be maintained with propriety for dense populations without eventually far more liberal appropriations—the construction of subterranean cities of the dead, for example—unless, which is perhaps more likely, the progress of science shall reveal some cheap and effectual means for general embalming. Again, the practice of burial incurs the risk of burying alive; a source of greater suffering on the whole in anticipation than in consequence. A kindred dread possesses the mass of mankind in regard to "being put in the ground" after death. It is rather a degrading apprehension, and really counteracts to a large extent the conviction and the consolation of immortality. Possibly if the vote of mankind were taken in reference to the disposal of their own bodies, the decision of the majority might not be the same as if we should vote in the character of survivors; fondly clinging, as we do in that capacity, to the longest preservation of the mortal remains, even beyond our sight; just as old letters and other relics, which we feel that we can never bear to look at, we can as little bear to burn.

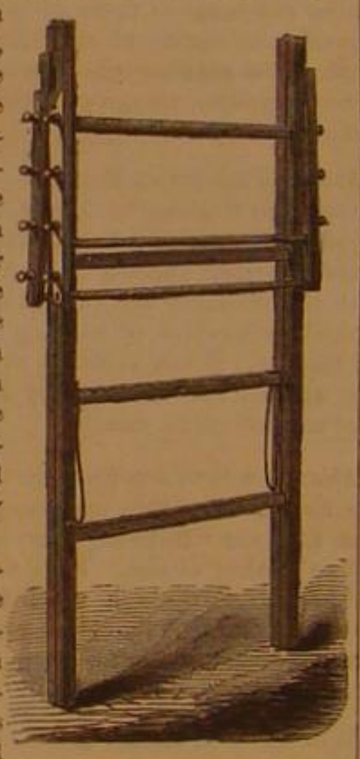
The general history of incineration and burial is highly suggestive, and not favorable, in weight of example, to the former. The ancient Egyptians carried "reverence for the dust of man" to a degree of scrupulous and expensive care which has never been emulated except by individuals. The Romans, originally the most virtuous and humane in their stern fashion of all the great heathen nations, preserved their dead generally by burial until the times of the emperors, when faith, honor and purity had become nearly extinct, and burning the dead became the general custom until the predominance of Christianity put an end to it and substituted burial, in Rome and in the fiercely barbarous parts of Europe where burning had prevailed, as in Britain, from remote ages. The Hebrews practiced burial, as every reader of the Books of Moses may remember, and this was the custom of Abraham and his contemporaries (Genesis xxiii., 6); hence, probably of the few former generations back to Noah, and also back of Noah and the deluge. The Greeks practiced burial and burning indifferently, according to individual preference or circumstances. It is unnecessary to add that all Christian communities have adhered tenaciously to burial, thus far. Indeed there seems to be a historical and instinctive if not rational connection between the preservation of the body and the hope of resurrection as well as the general moral vigor of races. The virtuous North American Indian always buried, and the civilized but dissolute Asiatic has generally burned. The same principles which produce a polite, skeptical and materialistic civilization seem to have operated to extinguish the imaginative and religious tenderness for the human body which makes us cling to burial and constantly improve and refine its incidents. We need but mention, finally, the serious addition which burning would make to the chances of impunity in crime, by destroying the only evidence in many cases before suspicion was aroused. On the whole, we are inclined to think that the true direction for improvement is that of more reverent and secure preservation rather than of summary destruction.

SEEMAN & CATROW'S FOLDING CLOTHES HORSE.

The form and construction of this clothes horse is plainly seen in the two engravings presented herewith. The two



supports are hinged at the top so as to be closed when not in use, the horizontal bars being pivoted to the uprights and closing against the sides. When in position for use the ends lock, as seen in the engraving. The horizontal bars on which the clothes are hung are so arranged with reference to one another that in no case will the fabrics overlap or interfere with the free circulation of air. For the amount of drying surface which this horse exposes to the air, the contrivance, when in use, takes up less room than many others intended for the same purpose. It can be instantly folded or expanded, and is durable, simple, and cheaply manufactured.



State, district, and manufacturer's rights are for sale, or the whole patent right can be obtained on reasonable terms from the patentees, Seeman & Catrow, Middletown, Ohio. This improvement was patented through the Scientific American Patent Agency, January 22, 1867.

[For the Scientific American.]

THE STEAM INDICATOR—ITS VALUE AND USE.

Since we have had an instrument that is reliable for all speeds and conditions of the steam engine the indicator is becoming popular and its use is being called to the aid of the constructing engineer, the users of steam engines, and particularly to landlords letting power and their tenants. Owing to the imperfection of instruments formerly used, especially for engines that made more than twenty revolutions per minute, much doubt was justly felt with regard to the indicator being a correct measure of a steam engine or of its condition. Fortunately this difficulty is removed by the invention of a new instrument. Engines can now be correctly indicated under any attainable speed. To show the accuracy and uniformity of its action, I will, as an example, give the following: I applied a pair of indicators (one at each end of the cylinder) to an engine 20·5 by 48 inches, making fifty revolutions per minute, variable cut-off by the governor, valves badly set, one end doing three fourths of the work. I took six pairs of diagrams each day for three successive days, thirty-six diagrams in all, varying from twelve horse-power to seventy-five horse-power. I worked them all up separately. I then divided the average pressure per square inch on the piston by the horse-power indicator, and found the quotient four; showing that it required four pounds pressure for each horse-power. This result was uniform without a fraction on all the 36 diagrams. It would seem that this proves beyond a doubt that the two instruments were alike, uniform in their indications, and that it is practicable to measure the diagrams exactly.

Now, it has been questioned by some engineers that the indicator is a correct measurer of the steam engine! Let the above statement be analyzed and I think no reasonable doubt can be entertained for a moment of its uniformity; this conceded the next question is, is it mechanically correct? I answer that there is the same facility to make it correct as there is any weighing apparatus, and equal ability to test it.

The greatest opponents the indicator has are those whose secrets it reveals. It has spoiled many a theory and revealed bad proportions and arrangements of valves, ports, etc. It shows strong and incontestible facts in favor of working steam expansively—hence the opponents of expansion have to condemn it or admit their error.

So long as it is uniform in its action it is reliable as a measure. I care not what you call the result; horse-power, indicated horse-power, or, if you please, indigrams, it is a measure of power exerted and shows the exact condition of the engine and the action of the steam inside.

Inasmuch as many engineers using the instrument have made working up of the diagrams a mystery, and with one exception—Chief-Engineer King, U. S. N.—in his "Notes on Steam"—the writers on the subject have mystified the mystery, I will in a future paper give rules, very simple rules, for using the indicator.

F. W. Bacon.

84 John street, New York.

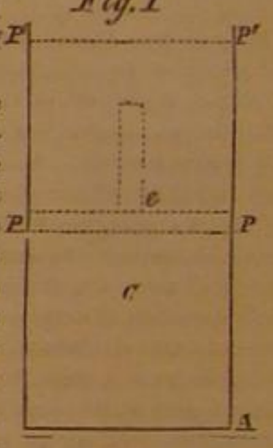
Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Unit of Heat—Mr. Morley's Fallacy.

Messrs. Editors:—Permit me to say a few words in reply to Mr. Morley's article on "The Mechanical Equivalent of Heat," concluded on page 169. The writer of that article finds that the piston, *e*, in the figure may be raised one foot, from P to P′, by the application of an outside force which he computes at an average of 540 foot lbs., and as a corollary deduction thinks that 540 foot lbs. is all the work done in the case. He seems to have overlooked the fact that the inclosed air loses heat by expansion. This loss of heat (computed by the rule from Prof. Rankine, given in your issue of March 24, 1866), would be 121·4°. If the specific heat of air, with the pressure constant, is 0·24, the absolute specific heat, from the data given by Tyndall, is 0·17, and the quantity of water equal in absolute heat to the cubic foot of air is 1·29 × 0·17 = 0·22 oz. But 0·22 oz. of water cooled 121·4° is equal to 1·67 lbs. cooled 1°, or the destruction of 1·67 units of heat.

Fig. 1



By Prof. Rankine's rule, also, if the pressure of the atmosphere on the piston be 2160 lbs., and the expansive force of the inclosed air equal to it when the piston is at P, the expansive force or upward pressure on the piston is reduced to 814 lbs., producing a partial vacuum of 1346 lbs., when the piston is raised to P′, without the application of heat. If the vacuum increased at the uniform rate of 1346 lbs. per foot, the average would be 673 lbs., but the variation of the rate of increase is such that the average is 856 lbs.; hence the work done by the application of outside force is 856 foot lbs. This leaves 1,304 foot lbs. to be accounted for by the destruction of 121·4° of the heat of the inclosed air.

But we have already seen that that destruction amounts to 1·67 units of heat. Dividing 1,304 by 1·67 gives 781 foot lbs., from the data taken in this case, as the equivalent of one unit of heat.

The second case supposed by Mr. Morley "to vary the proposition," only requires a corresponding computation on the same basis to bring the same result.

The difference of 9 foot lbs. between this result and the accepted equivalent may be ascribed to slight errors in the data used. For instance, Prof. Tyndall's estimate of the pressure of air of the given density, differs from that given by some other good authorities, by more than enough to account for the excess.

The accepted equivalent of heat may not be perfectly correct, I only contend that the method of calculation of Dr. Mayer as given by Tyndall, contains no radical error or defect.

O. A. Benton.

Leedsville, N. Y., March 18, 1867.

[The above exposes pretty plainly the fallacy of Mr. Morley's reasoning to those who are familiar with the data used. To others the following suggestions will have more weight. No one can doubt that in Tyndall's illustration the air (2,160 lbs.) is lifted. What lifted it? Was the lifting force due solely to heat as Mayer assumes, or did the initial elastic force of the air contribute something? At the end of the raising, the air has the same elastic force or tension as at the beginning, and therefore none of it could have been used or consumed in doing the work. We consider Mayer's method of determining the mechanical equivalent of heat impregnable and one of the happiest thoughts of the nineteenth century.—We have received in addition to the above communications several others of similar purport and of equal merit; if our paper were large enough it would afford us pleasure to print all of them.—Eds.

Our Iron Clad Navy.

Allow me, Messrs. Editors, to briefly state my reasons for dissenting from some of the statements made by your correspondent, Y. Z., in No. 13, current volume. The bill of Mr. Grimes from which he anticipates so much benefit to our navy is, in my opinion, only an attempt to create an admiralty board, a creation which has not as yet been productive of such good results in England that we should crave its existence here. Your correspondent speaks of sixteen iron-clads, which "will not float and are entirely useless." I presume he refers to our draft monitors. Without intend-

ing to endorse or excuse the blunders committed by the Navy Department in constructing these vessels, it may be stated that fifteen out of the twenty have been increased in depth and the remainder altered to torpedo boats. They all float with sufficient buoyancy when fully equipped. He says that the *Dictator*, *Puritan*, *Roanoke* "are not safe for cruising at sea." Judging from my own experience with monitors I cannot but think this opinion absurd. In stating that the *Puritan* is of the same model of the *Dictator*, Y. Z., errs; the *Puritan* having some 800 tuns more displacement than her consort. It was decided to leave one turret off the *Puritan* so that the other could be made larger, in order to accommodate the 20 inch guns which have already been cast for her.

Your correspondent further says that "eight of the iron-clads were built after the model of the *Manhattan* of 844 tuns," and that "we have nine iron-clads of the *Canonicus* model of 1,034 tuns." Now as the *Manhattan* and the *Canonicus* are duplicates of the other, this statement is incorrect. Again he compares the *Monadnock* and the *Miantonomah*, having their seven inches of armor, with the *Kalamazoo*, etc., with fourteen inches of plating, and thinks "it is doubtful if they are equal to others."

It seems to me that the pointing out of these faults in his data is sufficient, without comment, to show that the conclusions of your correspondent ought not to be accepted as authority except with some reservations. In conclusion I would say that, with all their faults, our monitors stand now as superior to any war ships which float. In this I am sustained by the disinterested testimony and opinion of such a man as John Bourne, and the reports of those who have taken them into action. ENGINEER.

Boiler Explosions.

MESSRS. EDITORS:—I have been using steam for the past fifteen years and I have yet to see any thing confirmatory of the Colburn theory.

The causes of boiler explosions, apart from defect in material or manufacture, may be summed up as follows: Overheating, by which the boiler may be injured and the pressure of steam increased; irregular heating, by which one part is made very hot while another portion is comparatively cool, as when the water is allowed to get too low, thus destroying the equality of tension; or, the sudden cooling of a portion by cold water, thus contracting that portion while another part is expanded by heat.

A boiler would not explode merely by suddenly injecting a large quantity of cool water into the steam space; it would merely lower the pressure. But if the water was thrown against the hot plates it might cause an explosion, not from the amount of steam instantly generated, but from a sudden contracting of the metal.

I have known a locomotive with steam blowing off—at east ninety pounds to the square inch—to break through a bridge and be instantly immersed in water ten feet deep, without injury to the boiler. I have seen an exposed boiler working at seventy-five pounds pressure suddenly flooded with rain to such an extent that the pressure was lowered twenty pounds in as many minutes, but no explosion occurred. In both these cases the contraction of the metal by cooling was uniform. In the case of the *Ceres*, when the water rushed in upon the boilers causing an explosion, I account for the catastrophe by supposing that only a portion of the heated iron was reached at once, and that contracted before the water had time to reach the other parts. When a boiler explodes upon the starting or stopping of the engine or from a sudden jar, the inference is that it was before strained to its utmost capacity.

Mr. Colburn's theory can be easily tested. Get up steam on a boiler to, say forty pounds, then suddenly open the safety valve. The simple result will be a lowering instead of an increase of the pressure. J. J. REINHART.

Lovgootee, Ind.

Treatment of Steel in Hardening.

MESSRS. EDITORS:—Your correspondent, "V," in your issue of Feb. 16th, makes some remarks on the working of steel which are no doubt mainly correct, but I would, before indicating the color for the proper temper of the tools he enumerates, go back to the condition of the steel before it is tempered. Assuming that the steel in the bar was of a character best adapted for the desired tool, the first important question is, how has it been hammered? and next, how hardened? Some smiths hammer their steel more thoroughly than others. That the quality of their tools may be the same as others which have received less hammering, the color in tempering must be of a darker shade, and those who heat their steel a few degrees hotter to harden must give a corresponding deeper shade of color in tempering. Steel hardened in pure soft water requires more heat than the same steel hardened in brine or some metallic solution, or in other words the greater the conductibility and density of the bath the quicker the heat is abstracted from the steel. A comparatively low heat very quickly absorbed will make steel as hard as a higher heat more slowly chilled, but if we give the steel the same heat for the different baths we have different degrees of hardness that can only be regulated by difference of color when tempered.

The same subject receives a criticism from "W. L. D.," in issue March 23d, in which he attributes difference in temper to difference of color which the same steel with the same heat would assume with a fine or coarse polished surface. This is true, but I think the treatment of the steel in hammering, the heat it receives in hardening, with the density and conductibility of the hardening bath, are the chief contingencies to be considered in obtaining the proper temper, and unless due attention is paid to all of them, a standard for the degrees of heat necessary for tempering tools for different purposes will be of no avail. If a piece of steel is properly hammered and hardened it admits of more variation in the shades of tempering colors than when less attention has been paid in hammering, and will still be a good tool. B. F. S.

Connecticut, March 22, 1867.

Breakage of Chimneys.

MESSRS EDITORS:—The great cause of lamp chimneys being so brittle and breaking so easy, is owing to the material they are made from. (There is shoddy in glass as well as in cloth.) Cheapness being the order of the day a great many manufacturers make chimneys from silicate of lime instead of silicate of lead. The glass made from the silicate of lime has about the following proportions—sand, 100; soda, 45; lime, 20 to 25; nitre, 7 to 10. Lime being a non-conductor of heat the chimney will not bear the expansion caused by the heat, and if by gradual heating the chimney does not break on the lamp, a few times heating makes it so brittle that it breaks with the least effort at cleaning it no matter how much care is used.

The silicate of lead has about the following proportions;—sand, 100; lead, 40 to 50; soda, 20 to 25; niter, 10 to 15. Lead being very ductile and a good conductor of heat, a chimney made from this formula will almost melt before it will crack with the heat. The uninitiated may tell the difference of the chimneys made by these different qualities of glass by ringing them, the vibration from the lead glass chimney has a sweet bell like sound while the lime glass has a short harsh sound. The difference of the cost in manufacture is only in material, about 15 cents per dozen.

Another point is in annealing; chimneys as a general rule are not annealed; under a powerful microscope the difference can be seen in the glass, the particles in the annealed glass lie close and compact, while the unannealed seem ready to diverge.

There is more economy in using lead glass annealed chimneys at 15 cents each, then there is in using lime glass chimneys at 5 cents each. Cheap and dear are truly relative terms in this case.

AN OLD SUBSCRIBER TO YOUR VALUABLE JOURNAL.

Philadelphia, March 16, 1867.

Where the Day Begins.

MESSRS. EDITORS:—The criticisms of your correspondents on your article relative to the length of the day are very amusing. But are you not in error in supposing that the "day line" has not been definitely fixed? I am not aware of any special legislation upon the subject, but its position is practically defined by the regulations relative to the computation of longitude. The longitude of Greenwich (or Washington, if that is the starting point), is 0, and the meridians are numbered thence both eastward and westward to 180—just half-way around the earth. This 180th meridian is the "day line." For, since the day commences at midnight, when it is Monday, 12 M., at Greenwich, and midnight at 180, it is Monday throughout all the earth. A moment later Tuesday has commenced at the 180th meridian, and follows midnight westward. It is Monday still at all places westward from the place of midnight to the day line, and Tuesday from that point to the place of midnight. When it is midnight at Greenwich, it is Tuesday over all that half of the world called the Eastern Hemisphere, and Monday over the American half. It is the common practice of navigators to add a day to their reckoning whenever they cross the 180th meridian going westward, and subtract a day whenever they cross in the opposite direction. This, it is readily seen, will always bring them out on the right day of the week, no matter how many times they cruise from one day into another. It is a little remarkable that this 180th meridian from Greenwich lies wholly in the ocean, crossing scarcely a league of habitable ground. Thus is realized the ancient poetic fancy that the day is born from out the sea. D.

[The zero of longitude was not fixed upon with any reference to the question of day line, and there is no necessary relation between the two, and the agreement is not general that the meridian of 180° shall be the day line. Moreover, there are in use four different reckonings of longitude. England and the United States adopt Greenwich as the starting point, Germany and eastern Europe, Ferro (one of the Canary Islands); France, Paris; Spain, Madrid. But the reckoning of the day is practically the same all over Europe and America. When all the nations agree on a common zero of longitude, the day line will probably be made to accord with it.—EDS.

Yellow Rain.

MESSRS. EDITORS:—It seems that the days of miracles have not yet passed. On the night of the 12th inst. we in this section had a copious fall of rain of about two and a half inches, and such vessels as were left standing out were found to contain water impregnated with a yellow substance such as is contained in the inclosed vial. We learn to-day from Bowling Green, fourteen miles distant, that it was the same there, and the inhabitants, believing it to be sulphur, are somewhat alarmed, not knowing but what it is the beginning of a preparation of that great fire in which sinners expect to find themselves ensconced in a coming day! Whatever it is, we are not chemists enough to make out. Clothes that were lying out were made yellow with the substance. It seems to be odorless—has the resemblance of farina contained in the anthers of plants. It may be a fertilizer—who knows? If so, who can tell how much is received from the atmosphere in finer undiscernible particles throughout the year? Being ignorant ourselves, we would like to hear from you, who are more knowing. H. L. EADES.

South Union, Ky., March 13, 1867.

[There are many instances on record of solid substances ordinarily abiding on the ground or in the sea, falling down with the rain. Thus there have been showers of fish, frogs, insects, vegetable matters like pollen, and sand. When we remember the force of tornadoes, whirlwinds, and waterspouts, and how the moderate wind transports musketoes, we have a sufficient clue to an explanation. These extraordinary rains have always been a terror to superstitious people; in the yellow rain they smell sulphur, and in the red rain blood. A friend informs us that he has frequently seen red snow on the mountains in Colorado, and he is satisfied that the color comes from an insect. We will make a microscopic examination of the specimen received, and may be able to determine what kind of vegetable or animal it is and where it came from. Mr. Eades has our thanks for his courtesy in sending it.—EDS.

Terrific Explosion of a Spoonfull of Water.

MESSRS. EDITORS:—I see in your issue of the 23d inst., under the head, "Answers to Correspondents," some remarks on the explosive force of water when freezing. Some forty years ago, near Granville, Licking Co., Ohio, a heavy forge anvil, of some 1,000 lbs. or more, was damaged by a slight crack in one side some three inches deep, and an opening so slight as scarcely to admit the thinnest knife blade. It was tumbled out, and one terrible winter night, when filled with water, which could not have exceeded one table-spoonfull, the frost rent that mighty mass of iron in twain, with an explosion like a seventy-four pounder. In this case, wherein was the cause equal to the effect? B. F. E.

Dayton, Ohio, March 20th.

Science Familiarly Illustrated.

Adipocere.

A few days since Mr. E. Northrup a very worthy farmer of Newtown, Conn., brought us a very fine specimen of adipocere which had been taken from a peat bog. Several pounds of the curious substance had been collected by himself and neighbors, and hopes were raised that the bog might prove a veritable mine of soap and candles. To most of the villagers the substance was a great mystery, as to its nature and origin; but the theory prevailed that it was a mineral substance allied to petroleum and that it must be considered as a trustworthy "show" of oil.

It is probably the case that the word adipocere and the thing to which it is applied are unknown to most of our readers and we proceed to make the whole matter as plain as possible.

The word adipocere (derived from two Greek words which signify respectively wax and fat) indicates something of the nature of the substance, for the substance looks and acts very much like wax and fat. Most people who see a very good specimen for the first time, would be very sure that it contains each of these ingredients.

Adipocere was first distinctly noticed and described about a century ago in France. Since then it has been found and is known to be constantly produced in all parts of the world, excepting perhaps the polar regions. In 1787 there occurred an opportunity of collecting a very large quantity, and the most eminent chemists made a careful examination of it and determined its nature and some of the conditions under which it is formed. At this time, on account of the increase and encroachment of the living population of Paris, it became necessary to dig up and carry away the contents of some of the ancient cemeteries. It had been the custom to bury poor people in pits, thirty feet deep and twenty feet square. Into these pits the bodies placed in cheap boxes were packed as closely as possible without any intervening earth to within a foot of the top: this last foot was soil and the whole of the covering of mother earth which protected the remains of 1200 to 1500 human beings; for that was the number of bodies actually placed in each of these pits.

The first pit that was examined by the chemists Fourcroy and Thouset, had been filled and closed up fifteen years before. On opening some of the coffins, for the wood was quite sound, only tinged of a yellow color, the bodies were found within, shrunk so as to leave a considerable vacant space in the upper part of the coffin, and flattened as if they had been subjected to a strong compression; the linen which covered them adhered firmly, and upon being removed, presented to view only irregular masses of a soft, ductile, grayish white matter, apparently intermediate between fat and wax; the bones were enveloped in this and were found to be very brittle. The bones and the hair were the only parts of the body which were not very much changed. All else, the brain, the heart, the contents of the abdomen, muscles, nerves etc., had disappeared, and in their place was that peculiar, soft, ductile, grayish white substance which the chemists then agreed to call adipocere. The bodies were so much diminished in size and weight, and they had such a consistence, that the grave diggers found it most convenient in carrying on their work to roll them up from head to heels and thus get each one in a compact form for handling.

Adipocere partakes of the nature of wax and fat and may be used in the arts as substitutes for these. In fact it is said that large quantities of the adipocere dug out of the pits of Paris, were used in making soap and candles. To such base uses may we come at last. Great Cæsar dead and turned to waxy fat might make us soap and light and help to grease our hubs.

But all dead bodies do not turn to adipocere. To the experienced Paris grave diggers, it was not a new substance, and they had observed that it was found only in the pits, and consequently it was the fate of poor folks only. Adipocere has

been found in considerable quantity in the potters' field, of New York city, which has been removed to satisfy the necessities of our rapidly increasing population.

There are circumstances however in which a body buried by itself may change into adipocere. Probably all the conditions are not well understood, but it is certain that the change has been brought about in bodies which had been buried in running water.

As might be supposed, the formation of adipocere is not limited to the human body. The fact is that the bodies of very many of the larger animals have been found changed into it, and without doubt the body of an ox or a cat would in like circumstances be changed in the same way as the body of a man. The specimen received from Mr. Northrup, which suggested this article, no doubt originated from the body of a sheep.

As to the chemical nature of adipocere, it may be considered an ammoniacal soap. In the decomposition of the animal substances of the body, the solid fat acids, manganic, stearic, etc., combine with ammonia, to form adipocere, which being a permanent compound remains after all else is dissipated.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The regular meeting of this branch of the American Institute, was held on Thursday evening, March 21st, Prof. Tillman presiding.

A new portable printing machine was exhibited designed for general use not only for printing of circulars, bill heads, etc., but to be employed by the business man for transacting his correspondence, it being claimed that letters can be printed by its use more quickly they than can be written with pen or pencil. A machine of somewhat similar construction for stereotyping, was then shown. In this machine the letters, figures and some of the most frequently recurring words are arranged on the periphery of a wheel. As in the former machine, the type are operated by a set of keys as in a pianoforte: by pressing down either key the corresponding letter, figure or word is in the one case printed or, in the latter machine, is pressed into the plastic material from which may be cast a stereotype plate, ready for printing. A steam plow having the great recommendation in its favor that the spaders assist rather than retard its progress: and an improved ventilator for chimney tops, were also exhibited and their construction and advantages explained by their inventors.

BRIDGE BUILDING.

Mr. Blanchard read a paper on this subject therein proposing an easy and practical solution of the mathematical question involved, and suggesting a readier way of arriving at the old results and one better adapted to the capacities of mechanics than the formulæ laid down by engineers. He began by considering the whole span from pier to pier to be divided into such a number of shorter spans, that each may be covered with sufficient security by a single length of simple beams. The points of division between these sub-spans may be called "bearing points" and the erection of a structure containing these bearing points is what we call bridge building. As in the consideration of the circle, we make the curve as a polygon of an indefinite number of sides, so in the arch it is necessary to reason from point to point of the curve in straight lines. The bearing points of the bridge can only be supported by oblique supports acting from the ends of the structure and may act by compression, as in the arch, by tension, as in the suspension cables, or a combination of both as in the truss bridge. It is a theorem in statics that when a body is held in equilibrium by three forces acting from different directions, these forces are relatively equal to the three sides of a triangle, each side of which is drawn at right angles to the direction of the force it represents. From this it follows that if a body in equilibrium is acted upon by any number of forces, the relative magnitude of each is represented by the sides of a polygon each side of which, as before, drawn at right angles to the force it represents. By an application of this law the proportions of the timbers or irons that form the supports of the bearing points may be determined by regarding each point as maintained in a state of stability by three or more contending forces that neutralize each other. The weight of the load, a vertical force, is to be resisted by oblique supports acting from different directions. The greater the inclination of the braces the greater the strain, while the more upright they stand the less the strain becomes. By resolving the strain into thrust and weight the strain upon the tie rod at the bottom is obtained; also the strain upon straining beams which it is necessary to introduce between the heads of the braces when more than one is employed.

In a truss bridge the braces near the center of the bridge transfer their strain to those next nearer the ends, which have this strain in addition to their own to carry: this load is then transferred to the next, thus the strain constantly increases by regular additions from the center to the ends of the bridge. The top and bottom cords perform the secondary part of holding the braces in position, the former being the aggregate of all the straining beams placed between the heads of the braces to resist the inward thrust, while the latter is the aggregate of all the rods with which are connected the feet of each pair of braces to prevent the outward thrust. Mr. Blanchard then explained the necessity for using counterbraces when the load is unevenly distributed, illustrating his views with numerous diagrams and models. The able and interesting article by Dr. Stephens, read at this meeting, we shall refer to again at some future time.

A COATING FOR FLOORS, fire-proof, durable and ornamental, might be applied from a strong solution of soluble glass. Water of course could not be allowed to remain on it.

To Silver Glass.

1. Dissolve 10 grains of nitrate of silver in 1 oz. of water. Then add strong ammonia drop by drop till the cloudiness at first produced is cleared up.

2. Dissolve 10 grains of Rochelle salt in 1 oz. of water.

These solutions may be kept apart for any period. For use they are mixed and filtered. After mixture they must be used as soon as possible. The glass must be carefully cleaned; any foreign matter leaves streaks. The glass is placed in a horizontal position and as much of the solution is poured on as it can sustain. Or the solution may be put into an earthen or glass dish and the glass immersed in it. The silvering is completed in half an hour or more.

CAUTIONS.—The operation should be carried on in a room warmed to about 70°. Any vibration of the glass or liquid caused by wagons in the street or machinery in the workshop is fatal to success. If the liquid and glass be exposed to full sunlight the process goes on better. But all the preliminary preparations should be made in a feebler light.

This plan gives only bright silvering. To secure a mat surface seen through the glass silver leaf or paper should be used. A mat surface may be produced on the bright silver by deposition of more silver by the battery; but this will not show itself through the glass.

PROF. WHEATSTONE'S TELEGRAPH is operated by drawing through the sending instrument a strip of paper perforated beforehand with the proper characters of the despatch. The perforations give the connections, and are prepared with an instrument as rapidly as in the usual mode of telegraphing, by any number of assistants which the pressure of business may require, the line being occupied only by the rapid drawing through of the prepared despatches. An ingenious instrument by the same inventor, is used by the Emperor of the French for secret despatches. The words, sent in cypher, of which the sending operator knows nothing, are translated into intelligible print by a proper arrangement of effects in the receiving instrument; and yet the attendant of the latter is as ignorant as the former, for the printed telegram is reeled off into a locked box, as fast as printed, without allowing a letter to be seen.

PUTTING UP FLOWERS FOR WINTER.—Some of our fair friends, when about canning fresh fruits for winter store, may perhaps like to put up a few fresh flowers. We give them a newspaper method for trial. Cut choice buds just ready to open, with a good stem, say three inches long, the end of which is to be immediately covered with sealing wax. Dry the buds partially in the air, and wrap each in a piece of soft paper, clean and dry, and fasten them up in a tight dry box. When wanted, take them at night, cut off the sealed end of the stem, and put them into water containing a little niter or salt. The next day or thereabout, the buds may be expected to expand.

MR. WHITNEY, of Effingham, Ill., whose engraving of a "Coffee Roaster" was recently published in these columns, in acknowledging the receipt of his engravings, model, and patent, adds: "Thanks for the promptness you have exhibited in all your transactions with us. We have sold the state of Indiana, and probably Kentucky, and are now in correspondence with a large number of persons negotiating sales of counties in different parts of the United States. Illustrating and advertising in your paper pays.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

VENT PEG OR VALVE.—Stephen Bourne, Headstone Drive, Harrow, Eng.—This invention relates to a valve or vent peg for beer casks, etc., and consists in making the valve or vent peg of india-rubber and with one or more openings in such a manner that by the elasticity of the rubber or other material they will be held closed while by the extension of the rubber they will be opened and thus a communication established between the inner and outer faces of the valve.

HOOP SKIRT.—August Fellheimer, New York City.—This invention consists in forming loops at each end of the hoops composing the skirt by bending such end over and then securing it to the main portion, by means of which hooploops a reliable and durable connection is established between the hoop and their sliding tubular fastenings or the tapes of the skirt, as the case may be.

LOCK.—E. P. Porter and G. W. Hallett, Waterford, N. Y.—In the lock embraced in this invention a series of spring catches are so arranged with regard to the bolt that when the bolt is out they will interlock with the same and will hold it in such position when releasing said catches from the bolt by a suitable key; the bolt is then free to be drawn in.

AUTOMATIC BOILER FEED.—Henry O. Demarest, New York City.—This invention relates to a boiler feed which consists principally of two chambers which oscillate on a suitable rod, their ends being pared off and ground steam tight against seats which are formed by the end pieces of a suitable frame. Suitable channels in the seats and chambers allow said chambers to fill and discharge alternately each chamber when full being made to descend by its own gravity and in descending it opens the communication with the steam boiler and if the water in the boiler is below the desired level steam is admitted to said chamber and the water contained in it sinks down into the boiler, and while one chamber discharges the other fills and an automatic boiler feed is obtained which when once properly adjusted requires no further attention.

CORN PLANTER.—A. M. Corbet, Bethlehem, Iowa.—This invention consists in a novel manner of constructing and aranging the slides in the seed box which are so made that the flow of seed may be regulated according to the quantity required to be sown. The slides are furthermore provided with slots or perforations in such a manner that the seed may pass from one slide to the other without clogging up; the hole in the lower slide being closed while the seed passes through the scrapers to the ground.

POUNCING HATS AND HAT BODIES.—John L. Lablaux, Newark, N. J.—This invention relates to a machine on which hats and hat bodies of various sizes and shapes may be pounced with the greatest rapidity and ease.

AIR PUMP.—Daniel Carpenter, Peekskill, N. J.—This invention relates to an air pump of novel construction which is to be applied for the purpose of creating a vacuum in boxes or vessels, which are to be used for preserving meat, vegetables or any other article. This invention will prove to be of especial value for long journeys on ships, but also for many other purposes

MANUFACTURING MATCH SPLINTS.—Emry Andrews and William Tucker, Portland, Me.—This invention consists in a rack arranged with slats which are strung on wires with washers interposed between them in such a manner that the match splints can be firmly clamped between the slats and the principal strain is thrown on the wires. The rack is fed down by a compensating feed composed of a feed bar which moved down against the action of springs by means of cams on the driving shaft and which is so constructed that it moves the rack for the thickness of one slat for each stroke of the head which pushes the cards against the knives. The slats of the rack are opened by suitable wedges so that the match splints can readily enter between them. The cards are driven against the knives by a toothed feed plate which drives the splints clear through the knives. Said knives are firmly secured on two screws supporting the ends thereof and they are kept apart by washers interposed between them. A portion of the knives are placed in the rear of the others so that they do not all cut simultaneously and the wood is relived of a part of the compression which it would receive were all the knives in a line. The cutting edges of the knives are concave whereby a drawing cut is produced each way from the center of the card and the knife is less liable to follow the grain of the wood than it is when made with a rectilinear cutting edge.

TOOL HANDLE.—William Runde, New York City.—The object of this invention is to so arrange a tool handle that all kinds of shoemakers' and saddlers' tools may be easily held therein, and that they may be easily removed therefrom and replaced without trouble.

CLOTHESPIN.—William M. Doty, New York City.—The object of this invention is to make a clothespin or fastener in the simplest and least costly manner, and to construct it so as to be strong and easily applied to or removed from a clothesline as may be desired.

IRONING MACHINE.—P. O'Thayne, New York City.—This invention relates to a machine for ironing clothes or articles of any description, said machine being composed chiefly of a movable flat or segmental board in combination with a smoothing iron which is heated by a gas flame and which is so arranged that it can be depressed on the board and that it can be revolved if it should be desirable.

CONVERTING MOTION.—Wm. H. Huribut, Elgin, Ill.—This invention consists in the employment or use of a spiral flanged cam in combination with the crosshead of a steam engine, or other equivalent part of another motor and with a shaft to which a revolving motion is to be imparted in such a manner that by the action of the crosshead or other equivalent part on the spiral-flanged cam the reciprocating motion of the piston of a steam engine or the reciprocating motion of an equivalent part of another motor is converted in a continuous rotory motion of the shaft said spiral-flanged cam acting as a substitute for the crank.

DRILLS FOR OIL AND OTHER WELLS.—Washington Tingley, New York City.—The object of this invention is to improve the construction of drills for oil and other wells, so that they will penetrate the rock with ease and rapidity, ream out the bore as the drill advances into the rock, and keep the bore at its full diameter, and also gather within itself the detritus produced by the action of the drill after the manner of a sand plow.

BELTING PULLEY.—Moses Lewis and Samuel Miller, Greenville, Conn.—This invention consists in constructing pulleys upon shafts running at right angles in such a manner that the belt being at a half turn or twist the strain is equal from one belt to the other.

PAINT CAN.—Herman Miller, Hoboken, N. Y.—The object of this invention is to so arrange cans, in which ready made paint is kept for sale, that the same may be opened and reclosed with ease, and still be at all times air-tight.

PRESS.—David King, Aberdeen, Ohio.—This invention consists in constructing a screw press in such a manner that the screw after it has been turned or run down may by turning the lever by means of a rack and pinion, be elevated rapidly thus saving the time of running the screw up and down in the nut.

HOISTING APPARATUS.—George L. and Wm. M. Howland, Topsham, Me.—This invention consists in the use of a third pawl, whereby the notched bar may be raised two or more teeth at a time, which pawl can be easily thrown out of gear to test the device, operate for raising or lowering, and consists also in making the connections between the lower pawls more flexible, by the application of one more link, whereby the operation will be easier and a less amount of power required.

TOOL FOR CUTTING BOILER TUBES.—Peter Hoffman, Jersey City, N. J.—This invention relates to a tool for cutting boiler tubes which is composed of a split or sectional bar, one end of which is made to fit the tube to be cut, while its other end, which carries the cutter, is open to receive a wedge in such a manner that when the cutter bar is inserted in the tube to be cut and the wedge is placed in its slotted end, the points or teeth of the cutter catch in the inner surface of the tube and by turning the wedge and cutter bar and driving said wedge in gradually, the tube is cut in a short time and without producing the least jar in the joints of the boiler.

WAGON BRAKE.—B. B. Scofield, Woodhull, Ill.—This invention furnishes an improved brake for wagons, carriages, etc., simple in construction and effective in operation.

WIRE POINTING.—John Lockwood, Wilton, Conn.—This invention consists of a simple and convenient machine for pointing wire for drawing.

LOCKS.—Chas. Gschwine, and Chas. Reichard, Union Hill, N. J.—The object of this invention is to arrange a lock in such a manner that it cannot be unlocked, unless the position of the key is reversed. The invention consists in so constructing the spring catch and the bolt, and combining them with a dog, or pawl that the bolt cannot be unlocked, unless it is first pressed back by the dog. The latter can in turn only be operated by placing the spindle of the key into the lower end of the key hole, while for locking and unlocking the spindle is pressed through the upper end of the key hole.

FIRE ARM.—Thomas Restell, London, England.—This invention relates to certain improvements in breech-loading needle guns which are so constructed that they serve also as canes and which are operated in an easy and simple manner.

LOCK.—L. S. Chase, New York City.—This invention relates to a lock in which the bit of the key acts on a series of pins or spring stops which are inserted in a revolving disk and which correspond in number and position to a similar number of pins inserted in suitable cavities in the lock plate. Said revolving disk is provided with a circular ward which extends clear up to the inner lock plate and prevents the feeling of the lock, and a bridge in this ward protects a portion of the tumblers and pins. The bit of the key acts on the tumblers but the bolt is thrown by a nose projecting from the circumference of the velocity disk.

HOT BLAST FOR FURNACE.—Job Froggett, Youngstown, Ohio.—This invention consists in a novel arrangement for heating the air which is forced into furnaces for smelting and other purposes.

CHURN.—Daniel C. Merrill, South Paris, Maine.—This invention consists principally in the construction of the dasher, in making the horizontal arm of the standard adjustable, so that it may be extended or contracted to accommodate different sized churns; in combining an adjustable slide or socket with the balance wheel for the reception of the end of the adjustable sliding arm attached to the dasher handle.

DRESS IMPROVER.—John Stademann and Henry Sanerbier, New York City.—This invention relates to a device to be applied to male and female garments for the purpose of giving it fullness. It is more especially designed for giving fullness to the chest of male wearers and to supersede the use of padding in the upper part of the fronts of vests and also to give prominence to the waists of ladies' dresses in front of the breasts. This result is attained by having the swaged wire cloth or wire gauze divided into two parts and connected when necessary by hooks and eyes, slides or elastics, so that they may be attached to or inserted in the garment.

METER ATTACHMENT.—Isaac P. Tice, New York City.—This invention consists in applying a plurality of meters to a still in such a manner that the amount of low grade spirits, or that which requires to be re-distilled, and has passed through the still, will be made known or indicated to a government official or detective, so that the government cannot be defrauded of revenue by an inaccurate statement of the amount of low spirits, or that below proof, produced by any distillation or series of distillations,

WAGON.—Benjamin Ryder, Jr., South Orrington, Me.—The object of this invention is to obviate the necessity of employing so many wagons for the various purposes of the farm and road, and it consists in adapting one wagon by a proper arrangement of parts to all or nearly all the various uses for which a common wagon is required.

PEAT MACHINE.—Thomas J. Wells, St. Anthony, Minn.—This invention relates to a new and improved machine for grinding peat and pressing it into molds, so that it may be used for fuel. The invention consists of two rotary conical grinders, one revolving at a greater speed than the other, and placed within a suitable case, and also in reciprocating molds arranged with the discharge end of the case of the grinders, and provided with plungers.

STEAMBOATS FOR PROTECTION AGAINST FIRE.—Abraham. G. Polhamens, Nyack, N. Y.—This invention relates to an improvement in the construction of steamboats to protect them against danger of fire, and consists in the construction of an iron tank or reservoir of water, as a foundation for the boilers and furnaces.

DETACHING BOATS FROM DAVITS.—Johann A. Libbertz, Hamburg, Germany.—This invention relates to a means for detaching boats from davits, and of that class which admit of both ends of a boat, being detached simultaneously by the manipulation of a single lever by one person. The object of the invention is to obtain a simple, efficient and economical device for the purpose, and one which may be operated with the greatest facility.

HAND POWER LOOM.—Deen, Bolding & Perry, Wassonville, Ohio.—This invention consists in so constructing and arranging the mechanism of a hand power loom that the operation of the treadles, and the consequent shifting of the harness, the necessary motions of the picker staffs to insure the effective throw of the shuttle shall be governed by the action of the batten, and be at all times under the full control of the weaver.

SPRING FOR VEHICLES.—J. B. Stuart, Bunker Hill, Ill.—This invention relates to a spring for carriages and other wheel vehicles. The object of the invention is to obtain an axle spring which will be strong and durable, possess a requisite degree of elasticity, and still hold the body of the vehicle firmly so as to prevent all side surging and a backward and forward play or movement, and render unnecessary the use of a perch or reach with its accompanying braces.

HEMP BRAKE.—Simeon Sherman, Weston, Mo.—The hemp is passed between breaking rollers, and thence is carried forward by and between endless carriers where it is exposed to the breaking and loosening action of oscillating beaters above and below whose teeth strike it in concert between the intervals of the bars of the carrier.

STEAM GANG PLOW.—W. H. H. Heydrick, Chestnut Hill, Pa.—The invention consists of an arrangement of devices by which the plows are caused serially to enter the ground on a given line at right angles to the course of the machine, and to be withdrawn in a similar manner, so that although they are arranged in a receding series obliquely to the line of motion, they shall begin their furrows and terminate in a line at right angles to the course of the machine.

SECURING TEETH TO THE SICKLE BARS OF HARVESTERS.—C. S. Williamson, Covert, N. Y.—This invention has for its object the attaching of teeth to the sickle bars of harvesters, in such a manner that they may be readily detached when necessary, for the purpose of being ground or to have new ones applied, and also readily attached to the sickle bar.

HOISTING AND CANTING.—James Tracy, Brewer's Village, Me.—This invention relates to improvements in machinery to be connected with a gang saw mill for canting and hoisting the timber after it has been cut into plank upon the table of a circular saw for edging the plank. This operation is usually performed by hand by several men with great labor, whereas by the application of my improved machinery the manual labor is saved and the operation is performed with great dispatch.

FLOUR AND GRAIN ELEVATOR.—Henry Stanley, St. Johnsbury, Vt.—This invention consists in an improved mode of constructing a reservoir or air chamber for cooling flour or grain by exposure to atmospheric air.

HOOP SKIRT.—Louis Fellheimer, New York City.—The object of this invention is to provide a hoop skirt which will overcome the ojection heretofore experienced by ladies on entering and leaving carriages from the entanglement of their feet in the skirts. Another object is to provide a hoop skirt which will fit either stout or slender females.

HARROW.—Caleb Bates, Kingston, Mass.—This invention relates to a harrow of that class which are arranged with a revolving toothed portion, and are commonly termed revolving harrows. The invention consists in the application of swinging blades to the revolving portion or portions, whereby said portions are made to rotate under the draught movement of the implement. This invention also consists in constructing two revolving portions in such a manner that they may be made to gear into each other like toothed wheels, so as to insure a simultaneous movement or rotation of both portions.

THRIBBLE SWITCH FOR RAILROADS.—James Tillinghast, Buffalo, N. Y.—The object of this invention is to avoid accidents by a wrong adjustment of the switch—a contingency of not unfrequent occurrence, especially in those cases whereby thribble switches are employed.

SAFETY ATTACHMENT FOR POCKET BOOKS.—Simon B. Parker, New York City.—This invention relates to pocket books, whereby the same cannot be illegitimately abstracted from the pocket.

ADJUSTABLE RUNNERS FOR CHAIRS, CAMP STOOLS, ETC.—W. H. Stroup, Pittsburg, Pa.—This invention has for its object to furnish a runner, so constructed and arranged that it may be attached to chairs, camp stools, etc., to adapt them for use as sleds on skating ponds, and from which they may be removed without injury to the legs of said chairs or stools.

RIDING SADDLE.—Samuel S. Spurgin, Jacksonville, Ill.—The elastic membrane which is strained between the pommel and cantle and supports the seat, is fastened to and upon the springs whose ends rest upon the side plates.

HANDLING GRAIN.—Fayette Clark, Marcellus, N. Y.—This invention consists of a scoop having a handle at each end, and is intended to facilitate and expedite the handling of grain.

HAY LOADING WAGON.—Eli Sweet, Whitney's Point, N. Y.—This invention relates to new and improved devices to be attached to wagons for loading hay or fodder in the field or barn, and consists in the combination of a crane and single pulley rope with a pitchfork and a sliding tongue in connection with a brake on the forewheels, in such manner that by the sliding of the tongue, when it is tripped, the horses hoist the fork with the hay and at the same time chock the wagon by the action of the brake, the whole draft being very light and the operation convenient.

CRUSHING AND PULVERIZING CLODS OF EARTH.—John Custer, Corsica, Ohio.—This invention relates to improvements in a machine for crushing and pulverizing clods of earth after the ground has been plowed.

FLOUR SIFTER.—James A. Sinclair, Woodsfield, Ohio.—This invention has for its object to furnish an improved machine for sifting flour meal, or screening grapes, cherries, berries, etc.

STOVE-PIPE DAMPER.—Thomas K. Anderson, Hornellsville, N. Y.—This invention consists in an improved self-adjusting stove pipe damper so constructed and arranged that the draft of the stove shall regulate the damper so as to maintain a uniform fire.

METER AND SEPARATOR.—Isaac P. Tice, New York, City.—The object of this invention is to obtain a simple and efficient device by which the amount of whiskey produced in a distillery may be ascertained by government officials with positive accuracy. It is well known that a large amount of whiskey is distilled in the United States for which the government receives no returns in the way of revenue tax, and this invention will effectually prevent that fraud being practiced. The successful operation of a device for this purpose must possess three essential requisites:—First, A positive or sealed connection of the worm with the meter. Second, An accurate measuring or weighing mechanism with an indicator or register connected therewith accessible only to the government inspector or official. Third, A separater by which the high spirits or that above a certain grade which does not require to be run through the still a second time may be separated from the low grade which requires a second distillation.

METER AND SEPARATOR.—Isaac P. Tice, New York City.—This invention relates to a spirit Meter and Separator designed for use in distilleries for the purpose of enabling government officials to ascertain with positive accuracy the amount of whiskey or other spirits distilled therein, and at the same time effect a separation of the "proof" from the low grade spirits, as revenue is rated and paid on "proof" spirits or that having a grade of 50° by hydrometer. The object of the invention is to prevent the stupendous frauds now perpetrated on the part of a large number of distillers against the government, false returns being rendered on the amount of spirits distilled.

WINDOW SASH FASTENER.—Orville M. Ridgway, La Porte, Ind.—This invention consists in the combination of a metallic spring and rubber block, with the opposite edges of the window sash for the purpose of holding it securely at any point to which it may be raised.

CORN CULTIVATOR.—H. P. Kynett, Sisbow, Iowa.—This invention relates to an improved construction of a cultivator for Indian corn to work with a double beam on both sides of a row of corn at the same time.

OBTAINING GREATER HEAT FROM PERMANENT INFLAMMABLE GASES.—Simon Stephens.—For this purpose, these gases are mixed with steam before reaching the burners, which increases the volume of the flame, so as to cause it to fill the spaces where the heat is to be applied. The steam may either be passed into the gas pipe, or may be used to cause an increased draft of air to act on the flame; and the mixture of gas and steam may be used in conjunction with ordinary solid fuel. The inventor applies the flame so obtained to the production of a lime light, etc.

THE SOLUTION AND TREATMENT OF VARIOUS GUMS, RESINS, ETC.—Edmund Hunt.—This object is obtained by the use of some acid or alkaline substance which is an oleaginous fluid at any temperature below 300° Fah. Oleic acid, carbolic acid, etc., answer for solvents; but the selection must be determined by the cost. Waste pieces of vulcanized india-rubber may be utilized by this means; also ebonite, etc. The gum, etc., should be reduced to small particles before being subjected to the action of the solvent. Heat and agitation are applied to hasten solution, and the solvent should be saturated. Different gums require different treatment.

PRESERVATION OF ANIMAL SUBSTANCES.—Henry Medlock and William Bailey.—This is effected by dissolving ordinary commercial gelatin in boiling water, in the proportion of two pounds of the former to ten of the latter; then adding to the solution of gelatin an equal volume of a solution of bisulphite of lime, having a specific gravity of about 1070. While the mixture is still warm, the meat, poultry, etc., which is to be preserved, is dipped in, or brushed over with it two or three times. When the mixture of gelatin and bisulphate has solidified on the surface, the animal substance is to be packed as air tight as possible; and if it is to be transported to a considerable distance, the interior of the box, etc., containing it should be brushed over with the mixed solution. To preserve hides, it is necessary only to coat their inner surface with the mixture. When animals are treated in this way, the viscera and blood must be removed, and their interiors also coated with the mixture. The latter may be removed by soaking in water.

REFINING PARAFFINE WAX.—J. Leach, St. James' street, Hatcham. Dated 23rd July, 1866.—This invention consists in the more speedy, effectual, and economical method of treating crude paraffine, so as to render it white, hard, and more suitable for the purposes for which it is employed. The process adopted is, First, to boil the crude paraffine for about two hours, more or less, with a solution of caustic alkali, which has the effect of precipitating the oil with which the paraffine is combined. The precipitated oil is then removed by washing. The paraffine is then submitted to the action of animal charcoal, after which it is filtered and pressed. It is then re-melted, washed, and again subjected to the purifying power of charcoal, after which it is again filtered and treated with about five per cent of naphtha and pressed. To remove more completely any impurity that may still exist, it is re-melted, washed, treated with charcoal, and filtered.

TANNING OF HIDES AND SKINS.—G. Mountford, Grasscroft, Yorkshire, and G. L. Loverside, Manchester. Dated 23rd June, 1866.—This invention relates to an improved method of tanning by the employment of valonia and oak bark, in conjunction with American pearl ashes, and which, as is well understood, consists essentially of carbonate of potash, whereby a considerable diminution of the time required for the process of tanning is effected, and a leather or tanned hide or skin of a superior equality is obtained. In cases where it is advisable to give a yellowish color to the leather, turmeric may be used with the valonia or valonia and oak bark.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

A. G., of Wis.—Aluminium may be deposited by the battery from a fused mixture of anhydrous chlorides of aluminium and sodium. We consider it doubtful if aluminium has ever been deposited by the battery from an aqueous solution. There has been an abundance of rubbish printed on the subject.

J. S. P., of Pa.—Black band ore, especially that containing two or more per cent of free carbon may be smelted profitably in small furnaces. The fan blast is not recommended for smelting furnaces. The fan does not give economically over one lb. pressure, while in iron smelting upwards of two lbs. pressure is desirable. We know of nothing better than the blast furnace process.

A. S. M., of O.—The ordinary working effective pressure in the Ericcson and other air engines we understand to be 5 to 8 lbs.

H. H. W., of Mass., wants to know the best way of extinguishing a lamp, as he is warned against blowing down the chimney. Our practice has been to turn the wick down until the flame is feeble and then blow down the chimney.

N. G. T., of N. Y.—"Will the pressure on a slide valve be increased by enlarging the ports, the pressure in the steam chest remaining the same." Certainly, why not?"

C. D. M., of Pa.—Any salt of copper introduced into a flame will give it a green color. The green color of fire works is due to sulphide and other preparations of copper. The best way of producing monochromatic light for indoor exhibitions is to surround the flame with colored glass. At the theatres the lime light and colored glasses, have superseded the old fashioned pyrotechnic compounds.

A. S., of Mo.—There is no electric light which can yet compete with the lime light, for use with a traveling stereoptican exhibition. If a battery be used as a source of the electricity 25 to 50 of Grove's cups would be needed; and a sufficiently powerful magneto electric machine would weigh tuns, and the strength of more than one man to operate it. Yet we have little doubt that electric light will some day come into fashion and be cheap enough. As long as we know that light represents or is equivalent to a very small amount of electricity or mechanical force we cannot give up the hope that we shall learn how to manufacture our light with as little labor and trouble as we now grind coffee.

G. W. S., of Pa.—"What mineral if any is contained in the enclosed sample of rock?" The sample of rock weighs about ten grains and is mainly sulphide of zinc. Such ore is often called by miners "black jack" and is one of the important sources of zinc.

H. C., of N. Y.—The sample of "stuff" which you say was taken from what was represented as a bed of sulphuret of silver, is sulphide of iron. Did you think it was gold?

J. D., of Idaho, informs us that the cultivation of beets for sugar is engaging much attention just now in the Pacific States.

J. E., of Pa.—We do not think there is any material which can be long used in the solid form as a float in a steam boiler. Wood is ordinarily considered to be lighter than water. But its apparent lightness is due to its porosity. When wood is for a long time kept under water air escapes out of its pores and it sinks. Hollow floats are commonly made of copper. What is the objection to them?

D. G. S., of Pa.—You will find coal tar and coal tar asphaltum a good covering for your wire ropes, and they are not corrosive to iron. The "sulphur water," of coal mines is always acid and unprotected wire rope coming in contact with it is soon used up. There is probably no cheaper protective coating than some sort of tar.

E. R., of Vt.—"When a sugar maple is tapped does the sap come from above or from the roots." The water of sap for the most part enters, at the roots and travels upward, on its way up; in the trunk and branches of the tree the saccharine matter is formed. When the tree is tapped the sap flows down by gravity. Below the tap there is very little saccharine matter.

D. R. M., of Pa.—You ask whether it will be cheaper to use one boiler, 30 feet by 5 feet, to run an engine 14 by 30 inches, rather than two of those dimensions, the pressure of steam on the two being 30 pounds and the velocity of your engine 70 revolutions. You omit to give us the character of your boilers, whether cylinder or flue, the amount of heating and grate surface, and the point of cut-off, if any, of your engine. So we can only reply that if you can make steam enough without unduly forcing the fire, one boiler ought to run your engine with less fuel than two. Certainly if the boilers are at all what boilers should be, one should be sufficient for your engine.

R. F., of Ill.—We cannot understand your reasons for considering a cylinder of boiler iron 52 inches in diameter less able to withstand a certain pressure per square inch than one of the same grade of iron 72 inches diameter; for these are exactly the facts in the boiler to which you refer. After very careful examination of upright boilers built on the Densmore plan, we cannot conscientiously consider them as inferior in strength, from anything in their peculiarities of construction, to any other cylinder boilers. By tests which have been made it has been proved that the inner tube cylinder you suppose to be a weak part, is stronger than other portions. We consider it safe, and believe the accident you refer to is attributable to other causes rather than defects in the plan or construction.

T. S. C., of Ohio.—We have examined your diagrams and are reluctantly forced, to give an opinion against your projects. You expect to gain power by attaching an eccentric to your crank-pin and thus increase the radius of the crank motion. It is a pretty theory, but you will gain nothing from it in practice but friction. You say you can gain 30 per cent of power—or "the utilization of power will be 20 per cent—and increased friction only 5 per cent, a handsome advantage of 15 per cent." If this is so, why not increase the throw of the eccentric and make a gain of 100 per cent? Please look into this matter more carefully and closely. . . . Your plan of using steam expansively is not new and in its arrangement of the two cylinders is really absurd. A similar plan, but more correct, is now in successful operation. We preserve your diagrams subject to your order. Do not get discouraged at one failure.

T. P. K.—Your combination of gearing for driving rolls is good. The power of the engine you describe as of 6 inch bore, 18 inch-stroke, 90 revolutions, and 60 pounds pressure is 13.53 horse-power. The power exerted on the rolls is that, less the intervening friction. The weight that could be raised by a rope passing around or between the rolls would be as much greater than the power directly by the engine as the surface of the rolls move slower than the periphery of the driving pulley on the engine shaft, less the friction. As much greater the weight you could thus raise than that raised by the engine direct would correspond to the velocity. There is no actual gain in power but a loss by friction. From these remarks and your data you can easily calculate the results.

J. H., of N. J., sends a copy by photography of a scientific document. But the copy is greatly reduced in size from the original, and is not legible to the unassisted eye, and under the microscope is quite indistinct. We shall be pleased to consider the subject if he will send us a paper which we can read.

T. E. L., of N. Y.—You can grind and polish the speculum of a telescope as you would any other disk of hard metal by chucking it in a lathe and grinding with emery and oil, polishing with flour of emery, crocus, and rouge. Care must must be taken not to scratch it.

J. W. G., of Pa.—Crocus or Colcothar—sesqui-oxide of iron—is used for polishing metals and glass. It is the oxide of iron remaining after the distillation of the acid from sulphate of iron.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Dayton, Allen & Co., Richmond, Va., want machinery, with cost of manufacturing 40-gallon liquor casks.

The address of A. S. Munger is Ansonia, Conn.

Wire and Nail Manufacturers are requested to send their addresses to Willis Weaver, Salem, Ohio.

G. D. Humphrey, Emporia, Kansas, wishes to correspond with manufacturers of wind mills or wind powers.

J. Shelon, Newport, Ky., enquires where he can obtain a gage to show the heat of the blast after it leaves the hot blast.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

228.—MACHINE FOR PULLING FLAX, ETC.—Samuel W. Tyler, Troy, N. Y. Jan. 28, 1867.

351.—MODE OF ATTACHING TEETH TO SAWS.—Warren P. Miller, San Francisco, Cal. Feb. 7, 1867.

373.—PRESERVING ANIMAL MATTERS WITHOUT LOSS OF FLAVOR.—Lewis H. Spear, Braintree, Vt. Feb. 10, 1867.

385.—TREATING VEGETABLE SUBSTANCES IN THE MANUFACTURE OF PAPER PULP AND FIBERS.—Benj. C. Tilghman, Philadelphia, Pa. Feb. 11, 1867.

403.—MACHINERY FOR MOLDING AND PRESSING BRICK.—Emery R. Gard, Chicago, Ill. Feb. 15, 1867.

405.—MACHINERY FOR CLEANING WHEAT, ETC.—Samuel D. Mack, New York City. Feb. 15, 1867.

463.—APPARATUS FOR LETTING ON AND SHUTTING OFF GAS, AND IGNITING THE SAME.—Edwin E. Bean and Wm. H. Mumber, Boston, Mass. Feb. 20, 1867.

464.—BOAT DETACHING APPARATUS.—Gideon B. Massey, New York City. Feb. 20, 1867.

465.—FILES AND HANDLES.—Alfred Weed, Boston, Mass. Feb. 20, 1867.

254.—WRITING PAPER.—Joseph E. Hover, Philadelphia, Pa. Jan. 30, 1867.

286.—ATMOSPHERIC PLATES OF ARTIFICIAL TEETH.—Nehemiah T. Folsom, Laconia, N. H. Feb. 1, 1867.

292.—STEAM GENERATOR.—Eli Thayer, Worcester, Mass., Sabin P. Pond, Providence, R. I., and Daniel B. Pond, Woonsocket, R. I. Feb. 2, 1867.

298.—SELF-OILING SPINDLES FOR SPINNING, DOUBLING, AND WINDING FRAMES.—Francis Rabbeth, Ilion, N. Y., and John E. Atwood, Willimantic, Conn. Feb. 2, 1867.

302.—MACHINE FOR MAKING MACHINE KNITTING NEEDLES AND OTHER NEEDLES.—Chas. P. S. Wardwell, Gilford, N. H. Feb. 2, 1867.

316.—WEAVERS' HARNESS.—Cullen Whipple, Cranston, R. I. Feb. 4, 1867.

324.—APPARATUS FOR DRYING YARN.—Hugh Whitehill, Newburgh, N. Y. Feb. 5, 1867.

336.—BOBBINS IN SPINNING MACHINERY.—Metallic Bobbin Company, New York City. Feb. 6, 1867.

353.—MECHANICAL MOVEMENTS TO BE APPLIED TO AUTOMATON TOYS AND HOBBY HORSES.—Wm. F. Goodwin, Washington, D. C., and Henry S. Cohu, New York City. Feb. 7, 1867.

429.—WATER METER.—Robert Westcott and Job S. Crane, Elizabeth, N. J. Feb. 15, 1867.

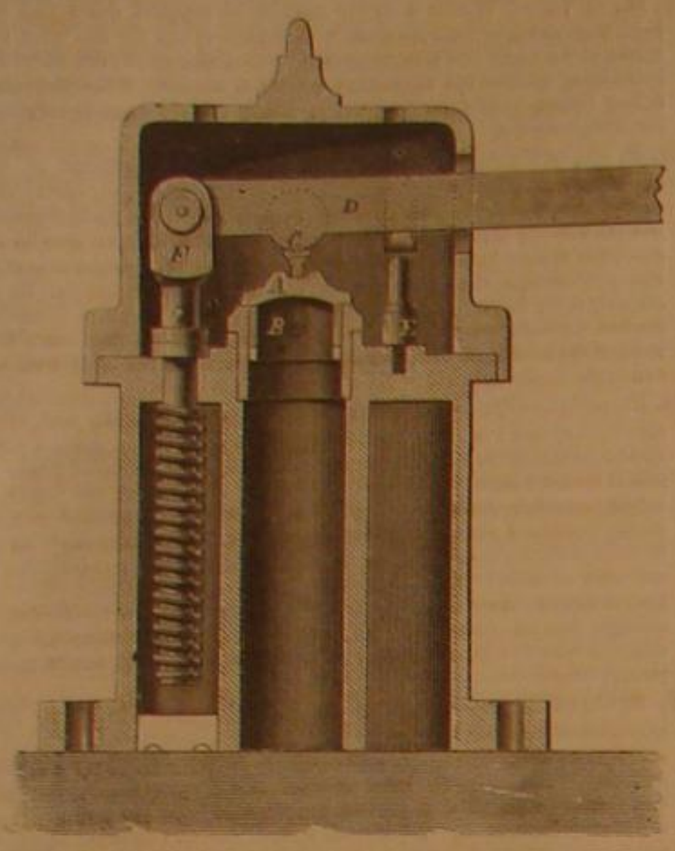
438.—RAILROAD SWITCH INDICATOR.—Thos. S. Hall, Stamford, Conn. Feb. 19, 1867.

503.—GENERATING HEAT BY THE ADMIXTURE AND COMBUSTION OF A HYDRO-CARBON VAPOR, AIR, AND THE GASEOUS COMPONENTS OF STEAM.—Henry R. Foote, Boston, Mass. Feb. 28, 1867.

503.—SELF-LUBRICATING AXLE FOR CARRIAGES AND OTHER VEHICLES.—Silas S. Putnam, Dorchester, Mass. March 2, 1867.

SWANN'S SAFETY VALVE.

Some safety valves are misnomers; they are anything but safe. The engraving, however, represents one which, it is claimed, cannot become dangerous by the overloading of the lever. The view is a vertical section. It shows the main peculiarity of this valve in the use of a yielding instead of a



rigid fulcrum at the end of the lever. A is the valve, which is a hollow cylinder closed at the top end by a cap forming a part of the casting. This fits loosely into the cylindrical space, B, and is held down by the pivot, C, on the lever, D. Holes are bored in the sides of the cylindrical valve for the escape of the steam when the valve is lifted from its seat.

The stud, E, has guides on its sides which hold the lever, D, in position, so that the point, C, will always be over the center of the valve. The fulcrum, F, is ordinarily held in position by the tension of the spiral spring, but if additional weight beyond that calculated for the pressure desired, is hung upon the lever, D, it will bring the lever to bear upon the stud, E, thus changing the lever from one of the third class where the power is applied between the fulcrum and the weight, to one of the first class where the fulcrum is between the power and the weight. Consequently, the addition of weight to the end of the lever disturbs the relations of the lever and the fulcrum, F, and by the yielding of the spring on F compels the opening of the valve and the consequent escape of steam. Therefore, no overloading of the valve lever will produce the result desired, and tampering in this way with the safety valve is impossible. The tension of the spring on the shank of the fulcrum, F, must be regulated by the pressure of steam per inch on the boiler, and this can be determined by a nut, not shown, on the end of the shank.

At the end of the lever is a wire, not shown in the engraving, which passes through a packed gland on the boiler and has at the other end a float. If the water gets low the float suspended from the end of the lever by the wire becomes an additional weight and acts precisely as a weight placed on the end of the lever, thus becoming a low-water alarm by blowing off the steam. The whole valve is inclosed by a cylindrical case covered by a cap having perforations for the escape of the steam.

This valve is the invention of J. R. Swann, of Edinburgh, Scotland. One of them may be seen at No. 254 Broadway. For particulars address Walter Anderson, corner of Franklin and Elm streets, New York City, or Messrs. Teschemacher & Stearns, 43 Exchange street, Boston, Mass.

Artificial Atmosphere.

M. Galibert's device for supplying an insulated atmosphere of pure air for breathing in the presence of deadly or suffocating vapors, smoke, etc., meets with high approbation in France and England. It is a very simple matter, the only difficulty being to obtain a material for an air-holder impenetrable to gases. This is made by gluing together two very strong linen and hemp cloths, each coated with eight layers of india-rubber varnish. Reservoirs of this material measuring 80 litres, or about 488 cubic inches, are strapped on a man's back and connected with the mouth by two tubes, one for inhalation and the other for expiration, valved, we presume, in such a manner as to allow the passage of air only in the proper direction in each. The nostrils are closed by compression from an elastic clip, and the eyes are protected by goggles fitted air-tight. Thus armed, the fireman has no fear of smoke, nor the miner or worker among chemicals, of foul gases. Several reservoirs can be carried in reserve. Bags of a larger size are also inserted in gas mains and inflated with compressed air, to serve as stoppers when required for mechanical operations.

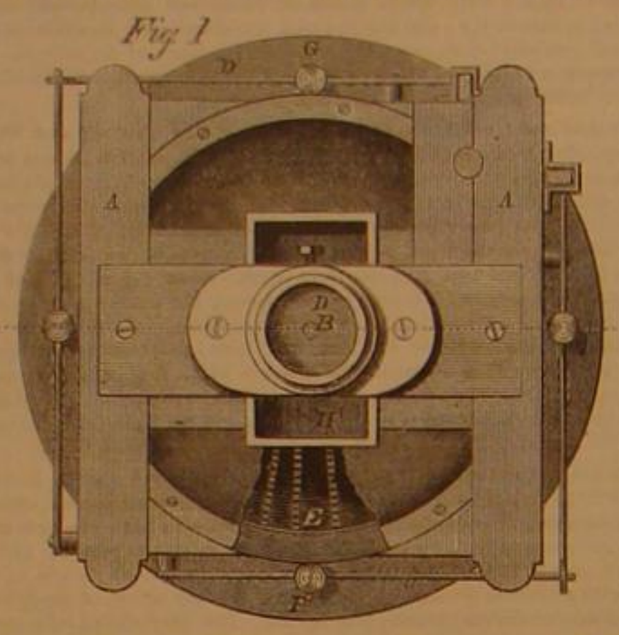
Fine Calf Leather.

Mr. Robert Schwabe, the celebrated leather manufacturer, whose patent and other calf-skins are among the standard brands, states in the *Gerber Zeitung*:—"I employ no secret arts to make my hides tender, but use only water. I use a fulling machine for leather similar to that used in fulling cloth. After heating my upper leather hides in this a second time, they are so tender that they can be put in lime without being stretched; after from sixteen to twenty days' liming, the unhaired and shaved hides are again handled, and by this operation they are so thoroughly cleared of lime, that it is unnecessary to slick them, and they need to be rubbed down only to clear off the hair. Immediately after this I handle them a third time, and this time in water, so it may be regarded rather as a washing. Although my upper leather has been handled for the fourth time, and sometimes the fifth in warm water after the stuffing, yet after another smearing, I obtain a thick, pliable, but not loose leather in the side and neck. I am of the opinion that frequent handling is very effective in producing good upper leather, and I doubt whether an equally good result can be gained by any shorter process. I put the clean leather into a fresh liquor set in motion by means of a reel. It remains here three days, four in the second liquor, and eight in the third, where it is not stirred. By this process the ordinary disadvantages of handling are avoided, and a thick firm leather is gained.

REYNOLDS' IMPROVED BRAN DUSTER.

We give herewith four engravings—sectional—showing an improved bran duster and bolt for flour mills, patented

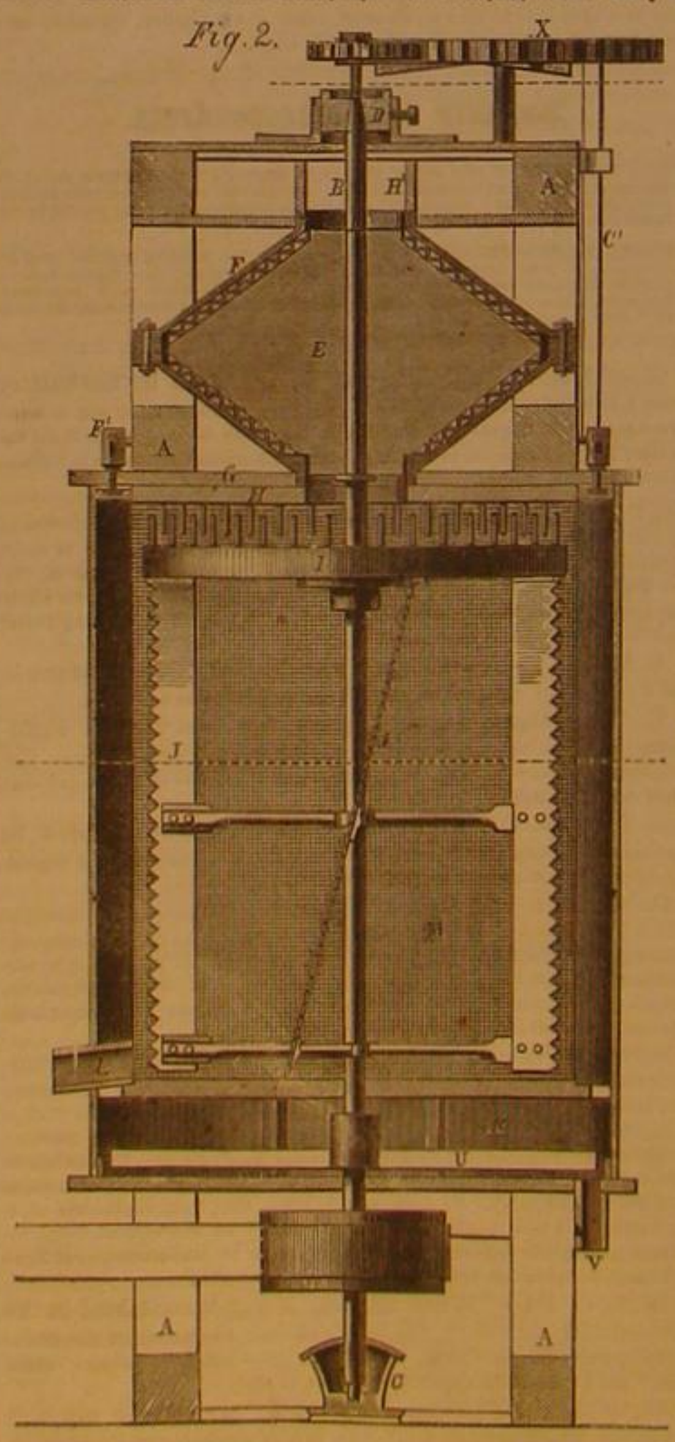
Fig. 1



through the Scientific American Patent Agency Nov. 20, 1866. A reference by letters to the parts, with a synopsis of the specifications, will enable practical millers to understand its construction and operation.

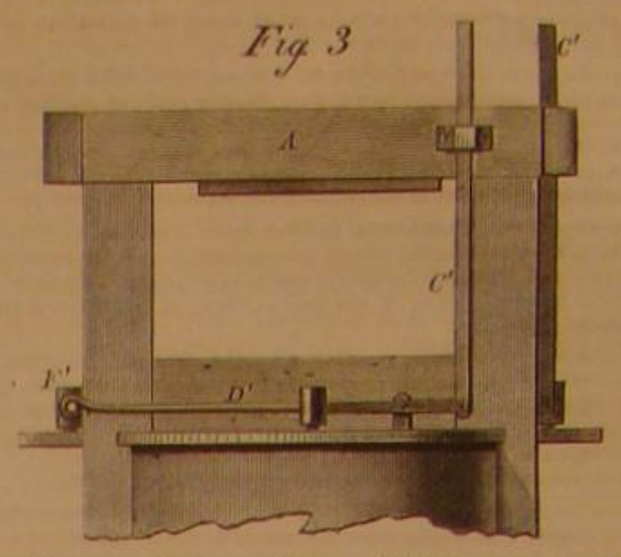
A is the frame of the machine and B the driving shaft, which is vertical and is supported by the step, C, which is cup-shaped and covered to keep out dust. The upper end of the shaft revolves in a bearing, D, which holds a box that is bored to fit the tapering end of the shaft and is secured in place by a set screw. Attached to the shaft, B, is a cone, E, which may be

Fig. 2.



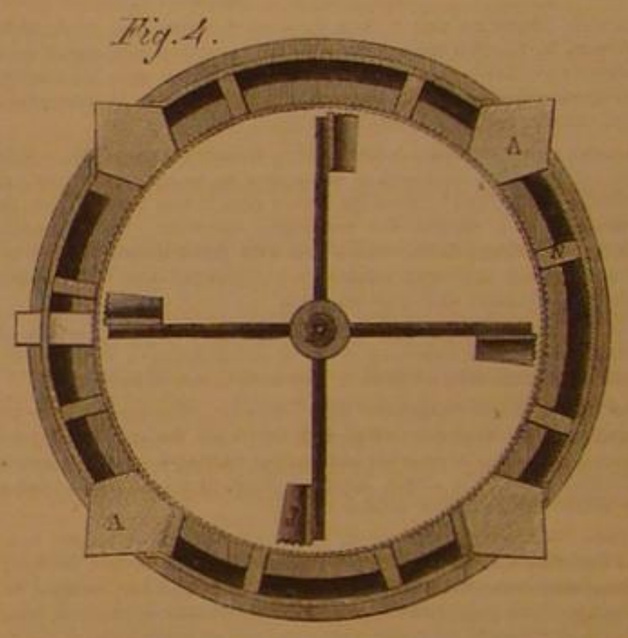
either single or double—in the engraving, Fig. 2, double. Ribs, toothed or notched, as in Figs. 1 and 2, surround the cone and traverse between similar notches on the inner surface of a corresponding fixed matrix cone, F. To the lower side of the platform, G, is attached a fixed head, H, the lower surface of which has downward projecting spikes—see Fig. 2. These are met in their interstices by similar spikes on the upper side of the head, I, which is secured to the shaft B.

Fig 3



There is an annular space all around this head to permit the bran to escape from the cone into the bolt. To the circumference of the head, I, and to radial arms secured to the shaft, B, are secured wings, J, the outer edges being notched and the position of the wings being inclined, as seen in the central one, Fig. 2, so as to uplift the bran while they rotate. L is the delivery spout for the bran. M is a wire bolt cloth secured to a framework of uprights, N, Fig. 4, and to circular heads at the top and bottom. The flour escapes through passages into the receptacle, R, and out of the spout, V, its delivery through the spout being hastened by the arms, U, on the lower end of the shaft, B. The wheel, X, at the upper part of the machine has cams on its lower surface which actuate the uprights, C', and these move levers, D', furnished with weights, F'. These levers and weights engage with pins, which pass through the platform, G, and give a jarring motion to the bolt to keep its meshes clear. The details of this arrangement are seen in Fig. 3. The bran is intro-

Fig. 4.



duced into the hopper, H', and a shaker may be attached to prevent the ingress of nails, cobs, etc.

The inventor says that the use of this improved duster saves from seven to eight pounds of good flour per barrel and gives the best of satisfaction. It is manufactured and sold by I. G. Reynolds & Son, Peoria, Ill., whom address for business particulars.

Limits to the Perception of Sonorous and Luminous Waves.

Almost every one knows that low tones are produced by slow and high tones by rapid vibrations; the limits of perceiving them differ in different individuals: some persons cannot distinguish a tone of less than 30 or 24 vibrations in a second, others of less than 16; very high tones produced by about 10,000 vibrations are not perceived at all by some individuals. A similar peculiarity exists about the perception of light, but in much narrower limits: 450 billion vibrations per second produce red light; 510, orange; 570, yellow; 630, green; 690, blue; 760, indigo; 830, violet, and 900 (the double of 450) a very dark almost invisible violet. Vibrations of less than 450 billions, or more than 900 billions, per second, are invisible to the human eye. The first rays prove their existence by the production of heat, the last by their chemical action on photographic preparations. As our delicate optic nerve in the eye (the retina) would be injured by the admission of heating or chemical acting rays, the transparent liquids in our eyes have been made opaque for these kinds of rays, thus protecting the true organ of visual perception, the retina. This explains at the same time how a light which is darkness to us, may be perceived by some animals with eyes of a different construction. V.

Grand International Lecture Hall.—The various subjects of the Paris Exposition are to be explained in lectures, illustrated with specimens or pictures, in a commodious hall which is being prepared for the purpose. Historical, technical, scientific and patriotic lectures from competent persons, will be provided, and inventors and exhibitors will also have opportunities for publicly exhibiting and explaining objects of importance in which they are interested, as well as for making commercial arrangements privately. The lectures, completed by supplimentary matter such as may be needed, will be printed and published finally as a record of the progress brought to light in the Exposition.

SCIENTIFIC AMERICAN.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents or the SCIENTIFIC AMERICAN.

VOL. XVI., No. 15....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, APRIL 13, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

*Raking Attachment for Harvesters 229
*Improved Car Truck 229
The Aniline Dyes 229
Monkeys in the Cotton Fields 229
The British Postal System 230
Heliography, or Sun Engraving 230
Our Cast Car Wheels 230
How to Buy Meat 230
Editorial Summary 231
Incineration or Burial 232
*Seeman & Catron's Folding Clothes Horse 232
The Steam Indicator—Its Value and Use 232
*The Unit of Heat—Mr. Morley's Fallacy 232
Our Iron Clad Navy 232
Boiler Explosions 233
Treatment of Steel in Hardening 233
Breakage of Chimneys 233
Where the Day Begins 233
Yellow Yain 233
Terrific Explosion of a Spoonfull of Water 233
Adipocere 233
Gleanings from the Polytechnic Association 234
To Silver Glass 234
Recent American and Foreign Patents 234
Inventions Patented in England by Americans 235
Answers to Correspondents 235
*Swann's Safety Valve 236
Artificial Atmosphere 236
Fine Calf Leather 236
*Reynolds' Improved Bran Duster 236
Limits to the Perception of Sonorous and Luminous Waves 236
Centrifugal Force 237
The Care and Use of Files 237
Inventors' Institute 237
City Pavements 237
The Patent Bill Passed 237
The Day Line 237
British Art Schools 237
Patent Claims 238, 239, 240, 241
*Improved Spring Bed Bottom 244
The Alexandra Palace 244
*Badger's Improved Nutmeg Grater 244

CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK Row, and not at No 39.

CENTRIFUGAL FORCE.

There is a power, generated by the revolutions of bodies, known in mechanics as centrifugal force, which is one of the most important products of mechanical movements. In regard to its action we think considerable misapprehension exists. In reply to a correspondent, a short time since, we incidently mentioned the fact that belts running on pulley faces were subject to this influence, and we did not limit the statement by any proviso as to the velocity of the periphery. To this statement we have received several replies, two of which we noticed in No. 13. We think that each of these correspondents assume, either in so many words or by implication, that centrifugal power can only be developed at some certain velocity of rotation. We cannot assent to this opinion, believing that all rotating bodies develope this power in some degree, however slow the velocity of their surfaces. When the revolving motion is so rapid as to entirely overcome the action of gravitation—called for convenience, when exerted on a revolving body, centripetal force—the action of the centrifugal force becomes evident to our senses; as when the water is thrown from the surface of a swiftly revolving grindstone, or the sand is projected from the tire of a carriage wheel. But we have no right to assume that the slow moving grindstone or the sluggish cart wheel does not develope this power because we do not see its results.

The idea that the tendency of a belt to work to the highest portion of a pulley, that furthest from the center, is caused solely by the stretching of one of its edges, does not appear to account for every case; as, if the belt is narrow, a mere string, it will, if it has adhesion to the pulley face, gradually work its way to the upper portion. Now if the belt, however wide, is held while the pulley turns, so that the centrifugal force cannot affect it, it will gradually slide down to the lower edge and slip off. Take the instance of a feed belt on an engine lathe. Its motion is very slow, yet every machinist knows that if he uses a belt (round) rather large for the scores in the pulleys, it will strive continually to ride the side flanges. Put the same round belt on a cone-shaped, smooth surfaced pulley and it will depart greatly from a right line in its efforts to attain the largest diameter of the pulley. It seems, therefore, pretty evident that centrifugal motion has much to do with the running of belts.

This force exhibits itself in many phases on machinery, and is put to many uses in aid of machine work. The copper-cased cartridges, now so generally used, have their heads filled with the fulminate by the utilization of this force. The head has an annular space, forming a collar, which is filled with the fulminate, but the central portion contains none of this percussion powder. The shells are held under a vertical spindle, the end of which is cut into radial scores, and revolving swiftly, throws the fulminate to the outer edge of the annular space.

All the calculations of that useful adjunct to machinery, the fly wheel, are based on the laws of centrifugal motion. The fly wheel by its aid becomes, for a time, actually a reservoir of mechanical power, apparently giving out more than it has received.

The centrifugal drying machine used in laundries is another exemplification of the employment of centrifugal force. It is an upright cylinder inclosing a smaller one, and the annular space between the two is for the reception of the clothes. A perforated bottom allows the moisture expressed from the clothes to run off. A rapid rotation being given the cylinder the clothes are compressed against the surface, so that with a rotary motion of 1,500 turns per minute the clothes are rapidly and perfectly dried.

This force is used in the drying of steel pens after being tempered, in separating ores from adulterations, and has been applied to the granulation of saccharine sirups. Its effect is very beautiful on the buff or emery wheel, where the particles of steel or iron in contact with the flinty particles of the emery take fire and burn brilliantly, being thrown off in a shower at a tangent.

THE CARE AND USE OF FILES.

A correspondent asks us for information relative to "the proper management and care of files." We can offer no facts not already familiar to practiced workmen, but may aid the tyro somewhat by a few directions. While the proper management—the use—of files is to be gained only by practice, there may be verbal suggestions made which will serve to direct the inexperienced in their proper care.

The top of the jaws of the vise should not be higher than the bent elbow of the workman. Our rule for setting a vise is the hight from the floor to the elbow when the arm is bent at right angles. We have, by experience, found this much better than raising it nearer the eye; it allows the forearm to traverse a horizontal plane, which is absolutely necessary to do correct work.

In selecting files those which are warped or sprung should be rejected; the mechanical eye can readily detect them without the use of any instrument, even when, as in the bastard file, the faces are convex. The handle is also another important matter. A chisel handle often used for a file is graceful in form, and, for a chisel handle just the thing, but is entirely unfit for a file handle. We do not prefer handles of beech, birch, maple, or hickory for files. Those are the best which are made of what the country people call "popple"—poplar—softer than the hard woods and harder than pine. Chunks of wood, pieces of broom handles, etc., are not proper handles for files, although often used by workmen who ought to know better.

Never put a new file on a casting until the scale has been removed, nor upon a forging of iron or steel. A very convenient and useful habit is to chalk one side of a new file and preserve that side intact until the other is pretty well worn. New files should be first used on brass, then cast iron, then wrought iron and steel. The scale of cast iron may be removed by grinding on the ordinary grindstone, when its form will permit, or by an old and worn file. The grand first requisite in filing is to learn to draw the file, both point and heel, in a right or straight line. No one can do this at the first trial nor until after long practice, generally. The two hands must be educated and trained to move in unison. Beginners always describe an arc of a circle when first attempting to file. Files are tender tools, especially some of the finer and smaller sorts, and it requires much experience and care to graduate the pressure to the strength of the file. No rule can be laid down for this; it is the result alone of practice.

Draw filing is quite an art and it is very important. It is moving the file transversely across the work. The file is taken in both hands, the handle in the right and the toe in the left, holding the file across the body. The drawing motion must be equal with both hands or the file marks will be "slashed" or diagonal. The proper style of draw filing is also the result only of practice. The beginner's right hand will tend to travel faster than the left. In file finishing and also in draw filing oil is often used on the file, as it produces a much better surface and prevents scratching.

Files are ordinarily cleaned by a piece of card, such as is used in cotton and woolen mills, tacked to a proper handle; but often in filing wrought iron small chips of the iron lodge in the teeth, producing scratches and refusing to be dislodged by the card. A simple implement for this purpose is a stout wire of soft iron, six or seven inches long, with a ring turned at one end for a handle, and the other flattened on the anvil, when cold, to a chisel point. To use it rest the toe of the file on the bench, hold the handle in the left hand, and with the right strike the wire's edge across the file in the direction of the teeth. Sometimes the file becomes clogged with oil and filings and cannot be perfectly cleaned by either of these methods. In that case hold it over the forge fire until pretty well warmed, then card it clean.

Cross-cut files are unfit for cutting the soft metals, as copper, Babbitt, and lead. Only single cut or "float" files are adapted to this work, and they should be quite coarse. As to recut files we do not recommend them. We have rarely seen a recut file which was worth half as much as a new one, and if this were generally the case the diminished cost is more than counterbalanced by the vexation of having a file break in the midst of a job. Better sell your worn-out files and buy new.

Inventors' Institute.

The inventors of Milwaukee County, Wis., have organized an association for mutual protection and scientific advancement, and propose to establish spacious and central rooms in the city for fortnightly meetings of practical and scientific discussion, and also for the collection of models, apparatus, books, etc. This is a movement of the right sort, and capable of great utility. The amount of error commonly cherished in regard to the first principles of mechanical science, and of ignorance as to the teachings of experience in every department of invention, is quite incredible to those who have not by considerable investigation learned how little they naturally know. The first and most valuable result of inventors' meetings would be to supply correct principles and habits of reasoning, and teach the necessity of consulting the experience of predecessors in whatever may be attempted. After these lessons are achieved, the application of truth to practice opens a limitless field for mutual suggestion, correction and assistance. "Union is strength," and intellects united are many times multiplied.

CITY PAVEMENTS.

If there is any one part of a city in which all the people are interested more than in another it is that part on which they travel. The streets belong to all, and their proper condition is a matter of importance even to the visitors whom the transaction of business or the pursuit of pleasure brings within its precincts. The main requisites of a good street pavement are evenness of surface, good foothold for horses, resistance to rolling pressure, and durability. In no one of these requisites are the streets of New York what they should be. Evenness of surface is impossible either with cobble stones or Belgian pavement; neither of them give a secure foothold for horses; they allow stones or blocks to become misplaced—sunk below the surface,—and they are not durable if by that term we consider good condition involved. Now if all these requisites can be attained by some other form and material of pavement there seems to be no adequate reason why it should not be adopted. Is there such a pavement?

From an examination of a compendium of facts now on our table—a pamphlet entitled "The Nicolson Pavement"—and from our own observations we incline to the opinion that there is. The Nicolson pavement has been in use in Chicago over ten years. So well satisfied are the authorities and people of that city with it that no other is laid there. None of it has yet worn to such extent as to need replacing, notwithstanding on some of the streets the heaviest loads are continually passing. On Wells street in that city, laid with this pavement, twenty-five barrels of flour is the ordinary load for a pair of horses, weighing, with the team, over three tuns, and some loads of pork and other merchandise are much greater; yet the pavement appears to have suffered no extraordinary deterioration during the nine or ten years it has been in constant use.

This pavement is much less noisy than the stone pavements, which is a feature of considerable importance in a crowded city. It affords a good foothold for horses, and if its durability, facility for removing and replacing when necessary, and first cost are as satisfactory as is claimed by its advocates, it should be tested on some of our principal streets, as well as on a portion of two or three, more or less removed from the center of vehicular business.

THE PATENT BILL PASSED.

The bill to increase the efficiency of the Patent Office, noticed in our last number as having passed the House, soon after came up for action in the Senate, and was amended by striking out the sections relating to a Solicitor for the Patent Office, Disbursing Clerk, etc. The House promptly adopted the amended bill, and the Commissioner is now clothed with ample authority to increase the examining force of the office. We understand that he intends to fill all new positions by promotions, which is certainly very commendable: therefore the crowds who are daily hanging about the hall in front of the Commissioner's door may as well disperse.

We earnestly hope that the Commissioner will act promptly and energetically in carrying the new measure into effect. The business of the office is suffering very much from the delay which attends the examination of cases, and now that the Commissioner has the power, we hope that he will employ it to infuse new life and vigor into the Department.

THE DAY LINE.

The question of the beginning of the day, which we started in our issue of March 2d, has attracted a great deal of attention. It has been discussed in the newspapers, in debating societies, and at private gatherings all over the land. The question has appeared to be many-sided, for the opinions on it are very far from being harmonious. Some persons have gone so far as to contend that there was nothing in it at all, and even to hint that it was intended on our part as a kind of practical joke aimed at our readers!

But on reviewing the whole subject we find that we and our correspondents have expressed all the facts and opinions about it that seem of importance, and therefore we conclude that it is time to dismiss it from the paper. To the many correspondents whose letters have not been printed we tender our thanks for their kindness, and our regrets that space will not admit a continuation of the discussion.

British Art Schools.

A published government directory gives a list of ninety well established and sustained schools of art in the United Kingdom, which in the year 1865 taught no less than 16,621 pupils. The first of these schools was established in 1842, and already there is not a commercial or manufacturing town in the British isles that is not thus provided. Parliament annually appropriates a large sum of money to this system of schools, with a view to foster British manufactures by giving them the advantage so long possessed by the French, of beauty, finish and taste in design. The whole is a regularly organized department of science and art, of which the Duke of Buckingham is President, with a large staff of secretaries and clerks, and two divisions of professional inspectors, examiners and organizers, to aid in organizing schools, to supervise them while in operation, to test their efficiency, and to judge when they are entitled to aid from the fund in charge of the department. A project is on foot to establish an American University of Art.



ISSUED FROM THE U. S. PATENT OFFICE,

FOR THE WEEK ENDING MARCH 26, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

63,131.—MACHINE FOR MAKING EYELETS.—Samuel W. Adams (assignor to the American Eyelet Company), Providence, R. I. Antedated March 12, 1867.

First, I claim the improved mode of constructing and operating the compound male cutter, 3, former, 2, and punch, 1, as described for the purpose specified.

Second, I claim a pair of reels, C C', for holding and delivering, and for taking up the metal strip in combination with the eyelet-forming instruments for forming eyelets therefrom, substantially as described.

Third, I claim a pair of sliding clamping jaws constructed and operating as described in combination with suitable instruments for forming eyelets from a metal strip, as described for the purpose specified.

Fourth, I claim, in combination with the eyelet-forming instruments, constructed substantially as described, a clipping or trimming mechanism for trimming off the perforated portion of the stock as it passes through the machine substantially as described.

Fifth, I claim the clearing punch, V, in combination with the compound female cutter and forming die, substantially as described for the purpose specified.

Sixth, I claim the clearer, t, substantially as described for the purpose specified.

63,132.—SEWING MACHINE.—Frank Armstrong, Waterbury, Conn.

First, I claim constructing the plate, A, of the attachment with the slot or aperture, B, whereby the said attachment can be readily adjusted and secured upon the machine and removed therefrom, substantially in the manner set forth.

Second, The combination and arrangement of the under spool support with the said attachment so that when secured upon a Wheeler and Wilson sewing machine the under thread spool, Y, will be entirely under the front edge of the cloth plate of the machine, substantially as and for the purpose set forth.

Third, The employment, in combination with the slotted plate, A, of the adjustable slotted plates, E, substantially in the manner and for the purposes described.

Fourth, The employment of the guide, C', in combination with the under thread carrier, tension device and spool, to allow the latter to be arranged under the cloth plate, d, and in the position relatively to said thread carrier and tension device, all substantially in the manner and for the purpose herein set forth.

63,133.—PERMUTATION LOCK.—George B. Atwood (assignor to Alfred A. Oat), Philadelphia, Pa.

First, I claim making the plug, B, cylindrical and with an annular groove, b2, therein, substantially as and for the purposes described.

Second, I claim the employment of the recessed central disk, H, for controlling the bolts, G, the said disk being constructed and arranged to operate substantially as described.

Third, I claim the employment of the surrounding recessed disks, D, for the purpose of locking the central disk, H, the said surrounding disks, D, being constructed and operated substantially as described.

Fourth, I claim moving the slides, A, by means of the respective cams, C, substantially in the manner described.

Fifth, I claim operating the inclosed or invisible disks, D, and cams, C, by means of the exposed or visible indicating disks, E, or equivalents, substantially in the manner described.

Sixth, I also claim the employment of the combination consisting of the recessed disk, H, with the four recessed disks, D, whereby they reciprocate with each other, in the manner and for the purposes described.

63,134.—SHOVEL-PLOW GUARD.—William J. M. Batchelder, Dayton, Ohio.

I claim the shovel-plow guard, E, when constructed substantially as herein described and for the purpose specified.

63,135.—BEE FEEDER.—James M. Beebe, Casadaga, N. Y.

First, I claim the construction of a bee feeder with an apartment for sugar liquid and an apartment for water provided with racks or floats, E, and an apartment for flour or other food, with a central passage way, C, and door, H, all combined substantially as described.

Second, A bee feeder having a central passage way, C, for the entrance of the bees, slide door, H, and glass cover, B, for the purpose substantially as described.

63,136.—COTTON GIN.—John B. Brackett, and Wyman Dearborn, Boston, Mass

First, We claim the rolls, C C', constructed as described, as arranged with the belt, D, in combination with the sliding bearing, J, and levers, J, with their variable fulcra, substantially as and for the purpose described.

Second, The rolls, C C', constructed as described, in combination with the convex pressure bar, E, and endless belt, D, arranged and operating as and for the purpose described.

Third, The arrangement of pressure roll, in combination with belt, D, when arranged as described in connection with rollers, C C', and pressure bar, E, as and for the purpose described.

Fourth, The arrangement of slotted levers, G, in combination with clearer, F, and crank shaft, H, and further combination of said clearer levers and crank shaft with rods, m, as and for the purpose described.

63,137.—STEAM GENERATOR.—W. Buchanan, New York City, and J. M. Toucey, Poughkeepsie, N. Y.

First, We claim the divided fire-box, B C, when constructed and arranged substantially as and for the purposes herein set forth.

Second, We claim the arrangement of the fire box by which we are enabled to readily disconnect, remove, and replace the lower portion, as herein set forth and described.

Third, We claim the hollow ring, H, and its connections protected from the direct radiant heat of the fire and adapted to throw fresh air and steam into the gases rising through the hole, D, or its equivalent, substantially in the manner and for the purpose herein set forth.

Fourth, We claim the steam blow pipe, a1, with its nozzles, m, and connection, N, arranged as represented relatively to the air pipe, H, and nozzles, b, substantially as and for the purpose herein specified.

63,138.—MANUFACTURE OF STONE WARE.—Edgar T. Chapman, Middlebury, Ohio.

I claim a crock, constructed as hereinbefore described, being a new article of manufacture.

63,139.—GRAIN SHOVEL AND HANDLER.—Fayette Clark, Marcellus, N. Y.

I claim the principle of putting the labor of handling grain equally upon both hands, it being in shape like the accompanying drawing or any other shape substantially the same and which will produce the same effect, namely, the placing of the weight of grain equally on both hands.

63,140.—FENDER FOR CORN PLOWS.—Robert Cook, Franklin, Ohio.

I claim, First, The yielding and adjustable fender, D, attached to a plow beam by mechanism, substantially as and for the purpose specified.

Second, The construction of the disks, C and C', for holding the fender, D, operating substantially as and for the purpose described.

Third, The combination of the fender, D, disks, C and C', with the beam plate, A, and spring, B, arranged substantially as and for the purpose described.

63,141.—COMBINED NAME PLATE AND LETTER SLIDE.—J. M. Combs, Boston, Mass.

I claim the combined arrangement as and for the purposes set forth of a name plate pivoted to a flange which has a metallic chute fixed thereunto by which the flange and plate are held to the surface by which the back of said flange is in contact.

Also constructing the metallic chute in two pieces each with an exterior flange and uniting and holding them in their place by means of the spring latch, I.

63,142.—SCAFFOLD.—Charles Crow, Onargo, Ill.

I claim, First, The combination of the jointed rack, H, jointed standards, F, and bars, Y, when constructed to operate the platforms, Z, substantially as set forth.

Second, The combination of the sliding bar, T U V, platforms, L, and frames, A B, substantially as set forth.

63,143.—HAND-POWER LOOM.—J. M. Dean, W. B. Bolding and H. Perry, Dayton, Iowa, assignors to themselves and E. G. Whetstine.

We claim, First, Operating the treadles, H H, by means of the levers, F and G, jointed connecting rod, E, the feed hand, b, and ratchet, c, with the wipers, d, arranged and combined with the batten, B, in the manner and for the purposes set forth.

Second, The levers, L, feed hand, l, shaft, M, and arms, N, in combination with the tumblers, K, picker staffs, I I, and batten, B, substantially as and for the purpose set forth.

63,144.—HOOP FOR SKIRTS.—Thomas B. De Forest, Birmingham, Conn.

I claim hoops for skirts formed by the introduction of elastic metallic warps in the fabrication of the hoop, substantially as described, as a new article of manufacture.

63,145.—HOOP SKIRT.—Thomas B. De Forest, Birmingham, Conn.

I claim securing the hoop and tape by one or more indentations or enlargements of the hoops, substantially as herein set forth.

63,146.—APPARATUS FOR HATCHING EGGS.—Peter Degive, New York City.

I claim the screw, C, and rod, D, or its equivalent in combination with the train of gears, E, the door or damper, G, and hatching box, K, substantially as and for the purposes described and set forth.

63,147.—SEED PLANTER.—James Edge, Acquackanonck, N. J.

I claim, First, The movable throat, s, at the base of the seed hopper, in combination with the seed-measuring disk, o (made changeable), and with the seed tube, d, as and for the purposes specified.

Second, The frame, k, hinged to a frame, a, and detachable as shown in combination with the hopper, r, wheels, l and c, miter wheels, m and n, and seed-measuring disk, o, as and for the purposes set forth.

63,148.—STEAM MOTOR FOR TOYS.—Philip Ely (assignor to J. M. Keep & Co.), New York City.

I claim the revolving boiler, C, provided at the center of its concave bottom with a conical projection, b, which is fitted on the rod, B forming the bearing for the boiler and having its upper end the arms, D, and adapted to bear the strap or band, F, by which motion is communicating to the toy, E, as and for the purpose described.

63,149.—FEEDING MECHANISM FOR SEWING MACHINES.—George A. Fairfield, Hartford, Conn.

I claim the combination of the eccentric, H, operating upon a regulating lever, K, rocking shaft, L, cam, F, and feed bar, N, or their equivalents, to produce a four-motion feed, substantially as described.

I also claim cam, M, having an eccentric surface whereby the feed bar is raised and dropped and hooks or stops for producing horizontal motion in the feed bar.

63,150.—GRATE FOR STOVES.—Moses P. Farnham, Janesville, Wis., assignor to self and Daniel P. Farnham.

I claim, First, The supplemental fire box, A, for stoves and furnaces having a movable bottom or grate, D, that may be placed on different bearings, B, substantially as and for the purposes described.

Second, The general arrangement of a supplemental stove fire-box with grate, D, bearings, B, flue, G, fire grate, E, when the whole are constructed and arranged substantially as and for the purposes described.

63,151.—PLOW.—Joseph Fowler, Hartland, Wis.

First, I claim adjusting the draft vertically by the wedge, n, beneath the cross pin or T-front end of the plow standard in combination with the wedge, l, to clamp the standard in the beam, as set forth.

Second, The screw bolt, l, or its equivalent, fitted as specified in combination with the standard, c, introduced in a mortise of the beam so as to adjust the draft horizontally, as set forth.

63,152.—PUMP.—Andrew Fuller and Francis J. Bray, Buffalo, N. Y.

We claim the elastic strips, A B and B, in combination with the staff, A and sucker, H, substantially as described.

63,153.—BED BOTTOM.—George L. Gerard, New Haven, Conn.

I claim the the combination of the clamp bolt, D, with the slotted spring, A, and the bar, C, constructed so as to operate in the manner described.

63,154.—RAKE.—Benj. F. Gladding, Providence, R. I. Antedated March 10, 1867.

First, I claim constructing the rake head double or of two pieces of metal secured together, substantially in the manner described for the purpose specified.

Second, The combination of a rake head, constructed as described, and a forked shank, the two parts being united, substantially as described.

63,155.—APPARATUS FOR REGULATING THE EXHAUSTER IN GAS WORKS.—Joseph A. Harris, Philadelphia, Pa.

First, I claim the within-described regulator consisting of a vessel inclosing two chambers partly filled with water communicating with each other and one chamber communicating with the main pipes, through which gas is exhausted from the retorts while the other chamber has a float connected to the throttle valve of the steam engine which drives the fan or other exhausting device, all substantially as set forth.

Second, The branch pipe, J, its enlargement, X, and valve, i, arranged in respect to the exhausting main and discharging pipe, substantially as described for the purpose specified.

63,156.—BRIDLE BIT.—William B. Hayden, Columbus, Ohio.

First, I claim a bridle, or harness bit which has its rein rings attached to the mouth piece by passing the check pieces through solid eyes formed on said parts substantially as described.

Second, A bit which is composed of separately formed parts A, B, C and d, put together substantially as described.

63,157.—SASH FASTENER.—Gustave Franz Hedrich, Buffalo, N. Y.

I claim the improved fastener consisting of the combination of the sliding knob H, or its equivalent, pivoted lever C, provided with the bolt g, and spring e, arranged and operating substantially as set forth.

63,158.—ELECTRIC CIRCUIT-BREAKING CLOCK.—Edwin Holmes, New York, N. Y.

I claim the combination as well as the arrangement of the circuit breaker B, its adjuster C, and the spring D, with a clock or time piece A, and an electric or electro magnetic circuit, the whole being substantially as and for the purpose hereinbefore specified.

63,159.—METHOD FOR MAKING DIES FOR FIGURES IN PRESS DYED FABRIC.—John Holt, Lowell, Mass.

I claim the method substantially as herein described of making the impression dies which produce the figures in press dyed fabric.

63,160.—ORE CRUSHER.—Bennet Hotchkiss and S. C. Goodsell, New Haven, Conn.

We claim, First, The shaft F, with double cranks I I straps L and L', hammer C, box O, when constructed and arranged to operate together substantially as described.

Second, The tubes S and T, when constructed as described and used in connection with box O, for the purpose substantially as specified.

Third, Controlling the force and rapidity of the blows of the hammer by means of the treadle m, cord h, spring e, pulley f, and plate d, when operating as and for the purposes set forth.

63,161.—RAILWAY TRACK.—B. B. Hotchkiss, New York, N. Y.

I claim the construction and arrangement of a street railway track in sections consisting of the cast iron cellular base parts in which are inverted blocks of wood fitting therein with the rails arranged upon the outer sides of said track, and held in position as herein set forth.

63,162.—PAVEMENT.—B. B. Hotchkiss, New York, N. Y.

First, I claim fitting wood blocks in cast iron cells or cavities by employing blocks of less size than the cells and driving a packing H into the spaces between the blocks and the sides of the cell, substantially as and for the purpose herein specified.

Second, I claim in connection with the above, the stopping material G, introduced in the bases of the cells opposite the bottoms of the blocks, and adapted to prevent the working of any of the packing under the wood, substantially as herein specified.

63,163.—EXTENSION LADDER.—Geo. L. Johnson, Fairfield, N. Y. Antedated March 15, 1867.

I claim the combination of the hook A, of the slide B, and socket C, all constructed, arranged and operating in the manner and for the purpose specified.

63,164.—NECKTIE.—George A. Keene, (assignor to himself and Jos. E. Manning), Boston, Mass.

I claim fastening wing piece, knob band and tie strip together and attaching the elastic ring by means of the clinch bar, as shown, illustrated and described.

63,165.—MACHINE FOR GRINDING CARDS.—S. G. Ladd and G. W. Crown, Lowell, Mass.

We claim the two central shafts A C, revolving at different velocities, causing the grinding cylinder to revolve by means of the hub d, and to reciprocate longitudinally by means of the hub k, groove g, pin h, slot f, and pin e, in the manner and for the purpose substantially as described.

63,166.—WIRE BALE TIE.—Osborne Macdaniel, New York, N. Y.

I claim the construction of a wire bale tie fastened with hooks and eyes, substantially as herein described.

63,167.—TRUNK.—R. McMurray, Washington, D. C.

I claim the stay A, in combination with a coiling device B, substantially as and for the purposes set forth.

Also, I claim constructing and applying a trunk-stay so that one end shall be drawn into the trunk frame, substantially as and for the purposes set forth.

63,168.—FOUNTAIN PEN.—George R. Melten, St. Louis, Mo., assignor to Horace Baldwin, Painesville, Ohio.

In combination with an air-tight and flexible ink sack, which is applied within the handle or holder of a fountain pen, so as to be free to collapse as the ink flows from it, I claim a tube e, which extends beneath the pen f, and is provided with a valve g, at the point of discharge, so that in the act of writing the ink shall be caused to flow to the pen, with greater or less freedom according to the force and rapidity of the strokes, substantially as specified.

Second, A fountain pen which is provided with a thin, air-tight, flexible sack, applied within the pen handle or holder, by means of a ring c, in combination with a removable pen sheath d, and supply tube e, substantially as described.

Third, In combination with the flexible sack b, and with supply tube e, I claim the conical valve or plug g, acting as a regulator during the act of writing, and serving to close the aperture when there is no pressure applied to the nib of the pen, substantially as described.

63,169.—CURTAIN FIXTURE.—Purches Miles, New York, N. Y. Antedated March 15, 1867.

I claim the cord holder g, in combination with a cord for curtain fixtures, upon which cords are knots or projections substantially as and for the purposes specified.

63,170.—ASH SIFTER.—Charles F. Meyer, Troy, N. Y.

First, In combination with a revolving drum sifter D, and right and left inclined fixed guide plates H and H', I claim the reversing or shifting guide plate E, constructed and arranged substantially as described and operating in manner and for the purpose as set forth.

Second, In combination with a drum sifter D, right and left fixed guide plates H and H', and a shifting guide plate E, I claim the employment of two ash pans or boxes G, and G', arranged in manner and for the purpose as described.

Third, In combination with a revolving drum sifter D, right and left fixed inclined guide plates H and H', and two ash pans or boxes G and G', arranged as shown, I claim placing the journals of the shifting guide plate E, eccentrically, to operate in manner and for the purpose as herein shown.

63,171.—KNIFE AND WATCH KEY COMBINED.—E. Q. Morton, (assignor to himself and Alpheus Patten), Bangor, Maine. Antedated, March, 13th, 1867.

I claim as a new article of manufacture the aggregation of the pen knife blade and watch key in one handle as set forth.

63,172.—CROSS BOW.—Edward C. H. Nye, Ascushnet, Mass.

I claim the combination of the cross bow, the arrow magazine and a mechanism for setting and discharging the cord of the spring of the bow the whole being substantially as hereinbefore described.

63,173.—ROUNDING JACKS FOR TRIMMING BRIMS OF HATS.—Starr Polley, (assignor to Ambrose Hill,) Brooklyn, N. Y.

First, I claim the cutter b, the head b1, adjusting screw C, removable bearings M, and confining means D combined and arranged for joint operation on the sliding block B, of the brim cutting instrument, substantially in the manner and for the purpose herein set forth.

Second, I claim the radial adjusting screw G, arranged to operate relatively to the sliding block B, and adjustable cutter b, in the brim-cutting instrument, substantially in the manner and for the purpose herein set forth.

Third, I claim the shield E, arranged in combination with the brim cutter and adapted to serve relatively to the adjustable cutter b, substantially in the manner and for the purpose herein set forth.

63,174.—PROCESS FOR TREATING INDIAN CORN.—E. F. Prentiss, Philadelphia, Pa., and C. C. Parsons, Boston, Mass.

We claim the process of treating Indian corn in the manner and for the purposes substantially as described.

63,175.—PREPARATION FROM INDIAN CORN.—E. F. Prentiss, Philadelphia, Pa., and C. C. Parsons, Boston, Mass.

We claim the preparation from Indian corn, made substantially in the manner described.

63,176.—COTTON CHOPPER.—Koscinsko Puckett, Parish of Morehouse, La.

I claim the combination of the driving wheel A, the balance wheel G, pinion B, shaft C, and hoe D, with the frame E, and its appurtenances when their several parts are arranged and constructed as described for the purposes set forth.

63,177.—MACHINE FOR EMBOSSING ARTICLES OF WEARING APPAREL.—George W. Ray, Springfield, Mass.

First, I claim the roll c, covered or partially covered with a woven fabric in combination with the roll d, substantially as described, and for the purpose set forth.

Second, The plate p, in combination with the roll c, and roll d, one or more of these parts being covered, all substantially as described and for the purpose set forth.

63,178.—CARPET BAG.—E. A. G. Roulstone, Roxbury, Mass.

I claim in combination with the corners d, made by lapping the metal, the bead e, extending around these corners and along the angle of the frame substantially as set forth.

Also the manner of applying the flexible bag forming material to the frame, by means of the metal strip g, folded over the folded edge of the cloth or leather, and the edge of the frame, and secured to the frame by rivets or other fastening devices, substantially as set forth.

63,179.—CARPET BAG.—E. A. G. Roulstone, Roxbury, Mass.

I claim the manner of connecting the flexible bag material to the frame by means of the strip d, and the frame groove b, the strip and cloth or leather, being first united and then connected to the frame as herein set forth and described.

Also the reinforcement of the corner, by leaving the goring piece g, in the frame, and turning it down against and so as to form part of the wall piece f as herein set forth and described.

63,180.—SIFTER FOR SAND, ETC.—Samuel C. Rundlett, Portland, Maine.

I claim the sieve j, when suspended by the four chains i, and so operated by the means hereinbefore described as to swing from side to side and at each motion to strike the inner side of the frame A, as and for the purposes specified.

63,181.—SCRUBBING BRUSH.—S. C. Rundlett and R. Dodge, (assignor to themselves and John L. Meserve), Portland, Maine.

We claim a scrubbing brush having the arrangement of the jointed handle c, and rubber band f, as and for the purposes set forth.

63,182.—SHAFTING COUPLING.—Silas C. Schofield, Chicago, Ill.

First, I claim providing the coupling forks or heads B, with gudgeons or their equivalents D, substantially as and for the purposes specified.

Second, I claim constructing the ring A, with two chambers a, provided with lateral opening b, substantially in the manner and for the purposes set forth and shown.

Third, I claim the combination of the forks or heads B, provided with the gudgeons D, or their equivalents with the chambered ring A, arranged and operating substantially as specified and for the purposes described.

63,183.—HEMP BRAKES.—Simeon Sherman, Weston, Mo.

I claim the endless chains provided with bars or slats and operating in connection with the reciprocating rotary beaters, substantially as described.

I claim the arrangement of the beaters whereby the upward blow of the lower set of knives and the downward blow of the upper set are made to conjoin their actions upon the interlying hemp substantially as described.

I claim the combination with an endless carrier and reciprocating rotary breaker of a preliminary series of toothed rollers.

63,184.—MEANS FOR PROPELLING CANAL BOATS.—Greenleaf Stackpole, New York, N. Y., assignor to himself and T. Spear, Jersey City, N. J., and Cyrus and Darius Cobb, Boston, Mass. Antedated March 13, 1867.

I claim the wheels g, l, and clamp k, l, in combination with the radius arm b, horizontal driving shaft a, boat A, and rail b, constructed and operating substantially as and for the purpose described.

63,185.—PISTON PACKING.—Theodore Thurber, Auburn, N. Y.

First, I claim the construction of the internal ring plate A, with ring cap B, fitted, leaving a steam chamber or recess a, between them and the metal ring packing c, so that it can be put in its place without opening or expanding substantially as described.

Second, I claim the valves e e, as constructed in combination with the ring plate A, and cap B, operating from both sides or faces of the piston they being supported by the spring d, so that steam, gas or water forced into the chamber a, is not exhausted or liberated at each stroke, the internal force being retained, thereby producing the result substantially as herein specified.

Third, I claim the combination of the skeleton frame and plate b, flange plate A, ring cap B, face plate F, metal packing ring C, valves e e, and spiral spring d, all constructed and arranged to operate substantially as and for the purposes herein set forth.

63,186.—IRONING MACHINE.—William M. Tobey, New London, Conn.

I claim the shirt bosom ironing-machine made substantially as, and to operate as described, viz: of the chambered polisher (to be heated as described) the mechanism to operate or move such polisher, the platform for supporting the work, the mechanism for moving such platform laterally and vertically in manner as specified the whole being applied to a frame and so as to operate substantially as hereinbefore explained.

63,187.—WEATHER STRIP.—L. W. Turner, (assignor to himself and G. S. Wilcox, Yalesville, Conn.

I claim the combination of the lever D, with two sections A B, spring E, when the two sections are arranged so as to be operated simultaneously, substantially in the manner described.

63,188.—EXTENSION LADDER.—Calvin G. Udell, Chicago, Ill.

First, I claim, in combination with a section or sections of an extension ladder, the pivoted catches, D, arranged and operating substantially as and for the purpose specified.

Second, I claim the combination of the sections, A B, the catches, D, and and bar, C, arranged and operating substantially as described.

63,189.—SAND TRAPS FOR WATER PIPES.—Joseph D. West, New York City.

I claim the gauze or perforated diaphragm check, A, or its equivalent, re

celver, C, hollow disk, B, or its equivalent, and induction pipe, D, whether provided with a valve cover or not, when all combined and arranged together so as to operate substantially in the manner and for the purpose described.

63,190.—CAR TRUCK AND SPRINGS.—Levi H. West, Cambridge, Mass.

I claim the combination as well as the arrangement of the additional levers, D" D", their springs, F" F", and supporting rods, c" c", with the platform, A, the wheel boxes, a a, and the levers, D' D', rods, c' c', and springs, F' F', substantially as and for the purpose set forth.

I also claim the combination as well as the arrangement of the springs, f e F', and the suspension rod, c', with the lever, D', the wheel box, a, and the platform, A.

I also claim the combination as well as the arrangement of the hanger, l, and the staple, h, with the platform, A, the wheel box, a, and the supporting levers, D' or D' D", applied to such box and platform.

I also claim the combination as well as the arrangement of the springs, i, with the hanger, l, the box, a, the platform, A, and the supporting levers applied to such platform and the wheel box or boxes, the whole being substantially as hereinbefore specified.

63,191.—MACHINE FOR SHAVING HIDES.—T. F. Weston, Salem, Mass.

I claim the use of the cutting, shaving, or scraping tool, having such motion imparted to it by any suitable arrangement of mechanical devices as to produce a drawing cut upon the surface of the leather, as hereinbefore set forth and for the purpose specified.

63,192.—HARVESTER.—William N. Whitely, Jun., Springfield, Ohio.

First, I claim the rake guide rail, N', and arch, S', when attached to the main frame by a bolt in front of the cutting apparatus, and another bolt behind the said cutting apparatus, and without any connection with the platform, substantially as described and shown.

Second, I claim in combination with the internal gear wheel, J, and its arriving pinion, M, the pitman, K, and rake, Q, substantially as and for the purpose set forth.

Third, The combination and arrangement of the sector plate, C, curved standard, D, and standard, E, substantially as described.

63,193.—FRUIT JAR.—B. B. Wilcox, New Haven, Conn.

I claim the yoke, D, and divided ring, C, in combination with a jar, A, and cover, B, when constructed and arranged so as to operate in the manner herein set forth.

63,194.—TAKE-UP FOR BRAIDING MACHINES—Gilman K. Winchester, Providence, R. I.

I claim the adjustable feed or take-up stand, so constructed as to be readily moved forward and backward to allow a larger or smaller worm wheel to be placed upon the feed-roll shaft to connect with the worm upon the worm shaft, substantially as and for the purpose set forth.

63,195.—COMPOUND FOR THE CURE OF GLANDERS ETC., IN HORSES.—John Althouse, East Cocalico Township, Pa.

I claim the composition of my powder for the cure of glanders and farcy in horses, when combined and administered substantially in the manner specified.

63,196.—STOVE-PIPE DAMPER.—T. K. Anderson, Hornellsville, N. Y.

I claim the pivoted damper, B, stop, D, tube, E, and weighted lever, F, or its equivalent, combined to operate together, and arranged with the stove pipe, A, substantially as described for the purpose specified.

63,197.—MANUFACTURE OF MATCHES.—Emery Andrews and William Tucker, Fiskedale, Mass.

We claim notching and dipping the cards preparatory to cutting the matches therefrom, substantially as and for the purpose specified.

63,198.—COMBINED STEAM AND AIR ENGINE.—John B. Atwater, Chicago, Ill.

First, I claim a desiccating or superheating chamber, E, which is combined with a steam boiler, and adapted for receiving and desiccating steam mixed with air, substantially as described.

Second, The combustion chamber, D, when arranged in a steam boiler and supplied with air, substantially as shown, so as to effect the combustion of the gases, after they have escaped from the fire box or chamber, substantially as described.

Third, The air injector operating upon the principle specified, in combination with a desiccating chamber, E, substantially as described and for the purposes explained.

Fourth, The arrangement of the steam generators, C C', with steam communications, B, leading into generator, C, above the water level therein, with respect to the desiccator, E, substantially as and for the purpose described.

Fifth, The desiccator, E, constructed as described, arranged within the circle of tubes for the purpose set forth.

Sixth, The valve, L, on the end of pipe, Z, in combination with apparatus constructed and operating substantially as described.

Seventh, The combination of an air chamber, G, and cock, P, with an apparatus constructed and operating substantially as described.

63,199.—ROTARY HARROW.—Caleb Bates, Kingston, Mass.

I claim the combination and arrangement of the arms, b, axis, a, perforated rear bars, c, curved bar, E, and swinging blades, F, constructed and operating substantially as described for the purpose specified.

63,200.—TREE DIGGER.—Joseph H. Black, East Windsor, N. J.

I claim the employment of the plate, C, constructed substantially as represented and used in combination with the beams, A A, as and for the purpose set forth.

63,201.—ELECTRO-MAGNETIC APPARATUS FOR REGISTERING VOTES.—John Blackie, New York City.

I claim, First, The combination of a series of hollow magnets for ejecting the balls as described, with the receiving troughs, c, and tubes, B, arranged to operate substantially as shown and described.

Second, In combination with the tubes, B, open at their lower ends, I claim the drawer, D, provided with the stop, n, when arranged to operate as herein described.

63,202.—RAILROAD FROG.—N. P. Bowler, Cleveland, Ohio.

I claim making railroad frogs by the method and in the manner substantially as and for the purpose specified.

63,203.—VENT PEG AND VALVE FOR CASKS.—Stephen Bourne, Headstone Drive Harrow, England.

I claim a valve made of india-rubber or other elastic or suitable material, whether in the form of a disk cone cylinder or any other proper shape, when said valve is provided with one or more perforations, slits, or other openings, in such a manner that by the distension of the valve its perforations will be opened, but closed by its elasticity, substantially as and for the purposes described.

63,204.—DOOR LOCK.—Edward W. Brettell, Newark, N. J.

First, I claim the encasing of a series of self-acting vertical-sliding tumblers, with their operating dog, within an independent detachable case, substantially as herein shown and described.

Second, The dog, d, attached to the lever, B, so as to act independently of both the bolt and the lock case, substantially as herein shown and described.

63,205.—SHEARS FOR BRUSHES.—Charles Brombacher, New York City.

I claim the triangular opening in the bed shear, a, in combination with the swinging blade or shear, b, hinged directly to the shear, a, and acting as a clamp and cutter, as specified.

63,206.—INSULATOR FOR TELEGRAPH WIRES.—David Brooks, Philadelphia, Pa.

I claim the metal casing, A, insulating block, B, and stem, C, arranged and constructed as described, when the same are combined with arms or holders, b b, so arranged that the distance between the holders and the case is less than that between the stem and the case.

63,207.—REST FOR GRINDING TOOLS.—James H. Brown, Berea, Ohio.

I claim the stem, A, adjustable sides, D, pivoted to the arms, C, in combination with the arms, B, hooks, G, and staple, b, provided with screws as and for the purpose set forth.

63,208.—POWDER MIXER.—Jabez Burns, New York City.

I claim the spiral flanges, f f', running in opposite directions, in combination with the movable head, c', drum, A, and standards, B, with band friction rollers, constructed and operating substantially as and for the purpose set forth.

63,209.—AIR PUMP.—Daniel Carpenter, Peekskill, N. Y.

First, I claim the mechanism herein shown and described for operating the valve, E, automatically by the same power which operates the piston, so that the valve is opened and closed and the piston raised and lowered, substantially in the manner herein set forth.

Second, I claim the piston, F, and valve, E, when so constructed that the piston fits perfectly over the valve, so that all the air is completely forced out of the cylinder, A, at each stroke of the piston through the valves, c c, substantially as herein shown and described.

Third, I claim the perforated piston, F, in combination with the ring, d, and conical pings, c c, all made and operating substantially as herein shown and described.

Fourth, I claim the arrangement in the chamber, B, below the valve, E, of the valve operating parts, substantially as and for the purpose herein shown and described.

Fifth, I claim the box, G, when constructed as herein shown and described, and when provided with braces, H I and K, all made as set forth, in combination with the pipe, f, and air pump, A B, the latter being made and operating substantially as herein shown and described.

63,210.—WASHING MACHINE.—C. L. Carter, Union, Ind.

I claim the arrangement of the perforated box, C, and compresser, D K, and the strap, G, constructed and operating in the manner and for the purpose herein specified.

63,211.—BROOM HEAD.—Orlando L. Castle, Upper Alton, Ill.

First, I claim the use and employment of a spring, B, for the purpose and operating substantially after the manner herein set forth.

Second, A combination of the spring, B, the wedge, C, and the nuts, n n, with the sheath, A, arranged and operating substantially as herein described and for the purpose herein set forth.

63,212.—MODE OF ELEVATING HAY FORKS.—John H. Chapman, Utica, N. Y.

First, I claim in a hay-fork elevating apparatus, or the like, the post, A, in combination with the draft rope, G, and ground pulley, H.

Second, The pulley, E, and the casting-off plate, F, constructed and operating in combination substantially as described.

63,213.—WOOD-TURNING LATHE.—James Chase, Rochester, N. Y.

First, I claim the employment of a pattern knife or cutter in wood-turning lathes, rotating upon an axis, arranged at right angles or nearly so to the stick or timber which is being turned, and so geared to the frame of the lathe as to leave its pattern upon the stick, substantially in the manner and for the purposes set forth.

Second, The employment of the pivoted box, M, which constitutes the axial bearing for the knife journal or shaft, N, when the parts are arranged and operate substantially in the manner and for the purposes herein shown and described.

63,214.—DOOR LOCK.—S. L. Chase, New York City.

I claim, First, The circular ward, e, on the disk, b, substantially as and for the purpose described.

Second, The bridge, h, in the circular ward, substantially as and for the purpose set forth.

Third, The partition, l, in the circular ward, as and for the purpose described.

Fourth, The nose, f, on the disk, b, in combination with the key, the pins, c, stops, d, tumblers, B, and with the bolt, all constructed and operating substantially as and for the purpose set forth.

63,215.—APPARATUS FOR CARBURETING AIR, ETC.—William H. Clarke, St. Anthony's Falls, Minn.

I claim, First, The arrangement of the plates, I I, in the cylinder, B, and providing the same with air pipes, b b, supply pipes, M M, discharge pipes, L L, and gas transmitting pipes, J J, substantially as and for the purpose specified.

Second, The combination with the cylinders, A and B, float, C, bellows, T, and tank, O, provided with lime and cotton as and for the purpose specified.

Third, The arrangement of the pipe, H, with the pipe, P, for supplying heat to the machine from its own gas, substantially as specified.

63,216.—CHURN.—Joseph C. Clymer, Galvin, Ohio.

I claim in a churn the cover, F, and its channel, c, arranged and operating as described and set forth, in combination with the stuffing box, G, key, H, stirrups, I, and adjustable lever, E, substantially as and for the purpose set forth.

I claim the channel, c, in a churn cover, arranged and operating as and for the purpose described.

63,217.—BREECH-LOADING FIRE-ARM.—J. W. Cochran, New York City.

I claim, First, The sliding breech piece, A, and swinging brace, B, jointed together at a, and arranged for operation substantially as shown and described.

Second, The arrangement of the elastic packing, D, with or in the movable breech at its forward end, operating not only to hold said breech when closed and make tight its joint in front, but serving without restraining the self-adjustment of the breech piece to prevent concussion of the latter against the gun chamber on closing the breech essentially as specified.

Third, The cartridge shell extractor, F, constructed with its rear end inclined or beveled on its upper and lower sides, as at f h, operating in connection with the inclined recess, l, in the rear end of the receiver, c, substantially as and for the purpose set forth.

Fourth, The sliding rod, H, with its forward lip, n, and rear projection or head k, hung and arranged for operation, in combination with the brace, B, hammer, G, and detonating pin, i, substantially as specified.

63,218.—METHOD OF OPERATING RAILROAD SWITCHES.—Gilbert M. Cole, Folsom City, Cal.

I claim, First, The mechanism herein described for rendering a railroad switch absolutely self-adjusting as the train approaches it on either branch of the double track, in combination with the mechanism herein described, by which the engineer can render the switch self-adjusting as the train approaches in opposite direction.

Second, I claim the levers, b b', the pinion, a", the sector, d, shaft, c, and and crank, c', in combination with the levers, a a', pinion, a, sector, d', and the loose wheel, b", on the shaft of the locomotive truck, all constructed, arranged, and operating substantially as described.

63,219.—CORN PLANTER.—A. M. Corbit, Bethlehem, Iowa.

First, I claim the combination of the plate, K, with the plate, L, and set screw, M, for the purpose of regulating the amount of seed through the holes, c c, all made and operating substantially as herein shown and described.

Second, I claim the cross bars, D T and G, which are so made and provided with holes that the scrapers, E, plates, K, and seed boxes, B, may be moved more or less apart, so as to permit the planting of the corn in rows of suitable distances from each other, substantially as herein shown and described.

63,220.—MACHINE FOR SOLDERING METAL CANS.—Edward T. Covell, Brooklyn, N. Y.

I claim my improved soldering apparatus, consisting of a supporting plate, B, combined with a suitable soldering pan, A, constructed and arranged substantially in the manner and for the purpose herein set forth.

63,221.—AMALGAMATOR.—Francis W. Crosby, New York City.

I claim grinding or triturating pulverized ores when submerged in a bath of quicksilver or molten lead, substantially in the manner and for the purpose herein set forth.

I claim also the combination of one or more grinding plates or surfaces with the bottom of an ore supplying chamber and an enclosing bath of quicksilver or molten lead, substantially in the manner and for the purpose herein specified.

I claim also the combination of a hollow column or pillar, O, with the bottom of an amalagating vessel, B, and an enclosing furnace, H, substantially in the manner and for the purpose herein set forth.

63,222.—COMBINED SHEEP HOLDER AND WOOL TYER.—A. M. Culver, Bedford, Ohio.

I claim the sides of the table, C' L, as arranged in combination with the strap, K', and lever, S, for the purpose and in the manner described.

Second, The arrangement of the sides, C L, and strap, K, in combination with the table, C', buckle, J, bar, H, and lever, I, as and for the purpose herein set forth.

63,223.—CARRIAGE.—John Curtis, Cincinnati, Ohio.

First, I claim the bent strip, B C D E, of elastic timber forming the sills of the body proper and to take the place of the spring bar and body loops, as and for the purpose set forth.

Second, The bent and rebated strip of timber, L L N N', discharging the functions of the double perch and of the upper member of the fifth wheel as set forth.

Third, The arrangement of strap, P, screw, Q, and gland R, to enable the members of a fifth wheel to be set up as they wear, in the manner explained.

Fourth, In the described combination with the elements of claim 3d, I claim the pad or cushion, S, for the purpose stated.

63,224.—ROLLERS FOR PULVERIZING SOIL AND CLODS.—John Cluster, Corsica, Ohio.

I claim the continuous single ring cutters, s s, secured by projections, a a, in grooves, e e, upon the periphery of the rollers, D D, arranged as and for the purposes herein described.

The cleaners or scrapers formed of a corrugated metal plate secured to the cross bar, F, with the corrugations or points, c c, placed between the cutters, s s, in the manner and for the purpose described.

63,225.—SPINNING BOBBINS.—J. Davis and S. W. Foster, Lowell, Mass.

We claim removing a portion of the lower end of the quill and slitting the end as shown at g, thereby forming the annular space, e, and the parts, d d, which act against the surface of the spindle, all substantially as and for the purpose set forth.

63,226.—STEAM GENERATOR.—R. W. Davis and D. Davis, Long Island City, N. Y.

First, We claim the arrangement, over the body of the boiler and within the smoke box, of a series or circle of superheating spheres, G, connected and applied to circulate or pass the steam received from the boiler successively through them, substantially as specified.

Second, The combination with a steam drying chamber or dome, E, of a series or circle of superheating spheres, G, both arranged within the smoke box of a vertical boiler for operation in connection with each other and with a steam generating space or chamber below, essentially as described.

Third, The combination with the smoke box and body of the boiler, of an inner and outer series of smoke tubes and combustion or heating chambers, the inner series having their draft contracted relatively to the outer series, essentially as and for the purposes herein set forth.

Fourth, The combination of the superheating spheres, G, arranged as described, smoke box, D, and outer row or series of smoke tubes, C, arranged relatively to the spheres, substantially as specified.

63,227.—AUTOMATIC BOILER FEEDER.—Henry O. Demarest, New York City.

I claim the oscillating chambers, C C', with apertures c c,* in combination with the seats, B B' apertures, a d', pipes, e g, and injector, h j k, all constructed and operating substantially as and for the purpose described.

63,228.—HAMMER.—Robert Devereaux, Buffalo, N. Y.

I claim attaching a hammer or analogous tool to its handle by means of the plate, A, when said plate is constructed and applied to the handle as described, in combination with the recess, d5, in the eye of the hammer to receive the plate, substantially as set forth.

63,229.—BURNING OIL.—Henry C. Dewitt, St. Louis, Mo.

I claim, First, The mixture formed from and by action of the ingredients, A B C F H and I, substantially as described and as set forth.

Second, The mixture formed from and by the action of the ingredients, A B C D E F G H and I, substantially as set forth.

63,230.—LOCKS.—Walter Dickson, Albany, N. Y.

I claim, First, The arrangement of the tumbler, H, to operate within the hollow spindle, E, substantially as herein specified.

Second, The combination of the tumblers, H, within the hollow spindle and the key inserted into the end of the said spindle and penetrating into the end of the said tumbler, substantially as herein specified.

Third, The stump, G, arranged in connection with the bolt, C, and in relation with the hollow spindle and the tumbler, H, within the spindle, substantially as herein specified.

Fourth, The application to a lock of a key having its body formed of a true spiral twist like that of a screw augur with a matrix corresponding thereto formed within a movable block or blocks, the key passing through said matrix to act on the follower in the manner and for the purpose specified.

63,231.—CLOTHES PIN.—William M. Doty, New York City.

I claim the wire clothes pin, A, having the arm, b, doubled and secured thereto as at b, forming a loop, the arm, a, passing through said loop and resting upon cross piece, b' whereby any lateral movement is prevented, as herein set forth.

63,232.—SAWS.—J. E. Emerson, Trenton, N. J.

First, I claim the springs as shown at B or E, either as a part of the saw plate itself, or made separate and firmly attached and fastened to the saw plate or cutter disk when used for holding the teeth or cutters as herein described.

Second, I claim the combination of the saw plate, and the spring as shown at B or E, when made separate from said plate with the tooth, C, when fitted and arranged substantially as described and for the purposes set forth.

63,233.—HOOP SKIRTS.—August Fellheimer, New York City.

I claim the looped ends to the hoops of the skirt, of that class hereinabove referred to and substantially as and for the purpose specified.

63,234.—HOOP SKIRT.—Lewis Fellheimer, New York City.

I claim the skirt with the lower hoops passing entirely around the skirt and the upper ones secured to the stay, a', and provided with the gathering b', attached to the waist band and having at its rear the trailing device, consisting of the bands, C, strings, d, and band, a', when all parts are combined and arranged in the manner herein represented and described.

63,235.—PUMPS.—Eli Flanegin and A. B. Smith, Pittsburgh, Pa.

We claim the floating weight, P, counter weight, Q, pinion pulley, N, rack bar, M, and balance weight, L, arranged and operating together, substantially as and for the purpose herein specified.

63,236.—MEAT SLICER.—Albert M. Force (assignor to himself and A. H. Vaugn), Norwich, Conn.

First, I claim the outwardly flaring bar, F, secured to the holder, A, operating in combination with the adjustable slotted knife, E, substantially as and for the purpose specified.

Second, The slicer, the parts of which consist of the handle, B, holder, A outwardly flaring bar, F, slotted knife, E, set screw, D, set screws, I, substantially as described.

63,237.—HOT BLAST APPARATUS FOR FURNACE.—Job Froggett, Youngstown, Ohio.

I claim a hot blast arrangement whereby the air is heated by passing through cylinders which are connected together on the outside of the heating chamber, substantially as herein shown and described.

63,238.—EVENER FOR WHIFFLETREE, ETC.—Merritt Gally, Marion, N. Y.

I claim the body of the evener, A, with stops, E E', the projecting levers, C C', and pivoted bars, B B B' B', combined and constructed as herein set forth for the purposes mentioned.

63,239.—CAR COUPLING.—J. B. German, Walnut Hills, Ohio.

First, I claim the self releasing car coupling, composed of the draw head, A, reversely hooked bar, B, formed with shoulders, c c', the spring, D, and coupling pin, E, combined and adapted to operate in the manner set forth.

Second, The combination of the lever, F, hooked bar, B, spring, D, and coupling, pin, E, constructed and arranged to operate, substantially as set forth.

Third, The connecting bar, B, having reversely directed hooks, b b', and shoulders, C C', and capable of instant releasement when in direct line by withdrawal of the coupling pin, E, or by advance of the lever, F, or when out of direct line by the automatic action of the parts in the manner set forth.

63,240.—MELTING AND SMELTING FURNCE.—Jacob Green, Norristown, Pa.

First, I claim subjecting ores to the action of the products of combustion, in a furnace where the gases are confined under pressure, substantially as and for the purpose described.

Second, The combination with a smelting furnace of pipes through which currents of steam and air can be introduced among the products of combustion previous to the latter being brought into contact with the ore for the purpose specified.

Third, A blast pipe so arranged in respect to the hearth and the fireplace of a smelting furnace, as to direct the products of combustion in a blast on to the hearth for the purpose set forth.

Fourth, A chamber or chambers, H, through which the ore is admitted to the furnace, when the skid chambers are arranged in respect to the bed and to the fireplace, substantially as specified.

Fifth, The fireplace, D, bed, F, stack, G, inclined passage, H, with its openings, substantially as and for the purpose set forth.

Sixth, The combination of the two fireplaces, D D, stacks, G G, passages, H H, beds, F F, and basin, E, the whole being constructed and arranged substantially as specified.

63,241.—GLASS FURNACE.—Jacob Green, Norristown, Pa.

First, I claim subjecting the materials of which glass is to be formed, to the action of the products of combustion under air pressure by blasts within a furnace as set forth.

Second, The combination of a glass furnace with pipes so arranged, that the blast of air and steam can be introduced among the products of combustion before the latter are brought into contact with the contents of the pots or crucibles for the purpose specified.

Third, The combination with a glass furnace of a blast pipe and openings so arranged as to direct the products of combustion around the pots, substantially as set forth.

Fourth, The within described furnace consisting of the walls, A A' B B' with their openings, the top, C, siege, a, and fireplace, E, the whole being constructed and arranged as described.

63,242.—LOCK FOR TRUNK, ETC.—Charles Gschwind and Charls Reichardt, Union Hill, N. J.

We claim the application to a lock of the dog, D, and its combination with the notched spring catch, B, and bolt, C, substantially as herein shown and described.

Second, We claim a lock which is so constructed that it can only be opened by reversing the position of the key, in the key hole, substantially as and for the purpose herein shown and described.

63,243.—MACHINERY FOR NICKING SCREWS.—N. B. Hadley Providence, R. I., assignor to The International Screw Company.

I claim uniting the spindle, D, with its driving power by means of the movable latch connection, c, or its equivalent arranged and operating substantially as described for the purpose specified.

63,244.—HORSE HAY FORK.—George W. Heath, Burlington Pa.

I claim in combination with the bars, A D and G, the curved handle, E and points or hakes, C, and F, when the same shall be constructed and operated substantially as shown.

63,245.—PASSENGER REGISTER.—William Helffricht, Philadelphia, Pa.

First, I claim the plates, h and h', arranged within the case respect to rollers, C C', and slit, y, in front of the case, substantially as described.

Second, The combination of the roller, C, with the spring, b, for the purpose described.

Third, The plate, E, with its transverse slot, f, arranged within the case respect to the rollers, C and C', as set forth for the purposes, named.

Fourth, The steadying and guiding pins, l l, secured to one portion of the case and adapted to holes in the other portion as and for the purpose herein set forth.

63,246.—COTTON CULTIVATOR.—Richard B. Henderson, Warren county, N. C.

First, I claim the frame, A, running on wheels, B, and operating in combination with the hoes, substantially as and for the purposes set forth.

Second, The crank, G, in combination with the handles, M, and hoes, N and O, substantially as and for the purposes set forth.

Third, The hoe, N, when constructed and operating substantially as and for the purposes set forth.

Fourth, The hoe, O, when constructed and operating substantially as and for the purposes set forth.

Fifth, The hoe, P, when constructed and operating substantially as and for the purposes set forth.

Sixth, The extension frame, H, when constructed and operating substantially as and for the purposes set forth.

Seventh, The cultivator, Q, in combination with the machine herein set forth.

63,247.—STEAM GANG PLOW.—W. H. Heydrick, Chesnut Hill, Pa.

First, I claim the shaft, k, rotated by the clutch connection or by hand, as desired and operating by means of a spiral series of cams, to elevate the plow consecutively from the ground, substantially as described.

Second, The shaft, o, rotated by the clutch connection or by hand as desired, and operating by a spiral series of cams, to trip the dogs or their equivalent consecutively to lower the plows to the ground, substantially as described.

Third, The combination with the cam shafts, k o, of the levers, g, and spring dog, t, operating substantially as described.

Fourth, The director wheel, b', shaft, a', and bar, z, constructed and operating substantially as described.

Fifth, The bar, c', supporting the cord pulleys and adjustable by devices, substantially as described.

63,248.—ELEVATOR.—Edward Hicks, North Hemstead, N. Y.

First, I claim the application and use of the movable side plates, h i, arranged and operating substantially as and for the purposes set forth.

Second, Supporting one truck of the car, so that it can rise and fall in respect to the car, substantially as and for the purposes set forth.

Third, The arrangement of the cross bar, k, or its equivalent for supporting the end of the car, substantially as and for the purposes set forth.

Fourth, The combination and arrangement of the pulley, f, and block, g, or their equivalent for elevating the bearing wheels, o b, and releasing the car, operating substantially as set forth.

Fifth, The combination and arrangement of the block, g, spool, d, and supporting brace, l', or their equivalents, for holding and releasing the fork and load, and operating substantially as set forth.

63,249.—MANUFACTURE OF LEAD FOIL COATED WITH TIN. Dauphin S. Hines, Brooklyn, N. Y. assignor to John J. Crooke, New York City.

I claim the process substantially as described for making foil of lead coated with tin on both sides by inserting a plug of lead within a pipe made of tin and then rolling the compound ingot thus formed, as set forth.

63,250.—Tool for Cutting off Boiler Tubes.—Peter Hoffman, Jersey City, N. J.

I claim a tool for cutting boiler tubes which is composed of a split or sectional bar, A, provided at one end with a boss, a, and at the opposite end with teeth, c, to operate in combination with a wedge, B, substantially as and for the purpose set forth.

63,251.—Hoisting Apparatus.—George L. and William M. Howland, Topsham, Me.

First, We claim the pawls, G and I, arms, g' and i' and links J and J, in combination with the spring lever, H, bars, A and B, and lever, D, all made and operating substantially as herein shown and described.

Second, The pawl, m, in combination with the pawls, G and I, and with the bar, B, substantially as and for the purpose herein shown and described.

Third, The pin, l, and pawl, m, in combination with the band, n, arm, g, and spring, p, all made and operating substantially as set forth.

63,252.—Carriage Clip.—Elias Hoxir, Montezuma, N. Y.

First, I claim the joint when formed by bending the two external joint pieces, C C, on to the solid stand, D, as above set forth.

Second, In combination with the above, I claim the thill iron, A, when used as and for the purpose above described.

63,253.—Skirt Wire.—George W. Hubbell (assignor to himself, W. E. Houston, and J. R. Lattin), Birmingham, Conn.

I claim a cord or edge formed upon the wire from the same material with which the wire is covered, substantially as herein set sorth.

63,254.—Converting Motion.—Wm. H. Hurlbut, Elgin, Ill.

I claim the spiral flanged cam, B, having its ends constructed as described, in combination with the cross head, A, and pins, a a, of a steam engine, or with an equivalent part of any other motor, and with the shaft, C, the whole being constructed, arranged, and operated substantially in the manner and for the purpose set forth.

63,255.—Non-conducting Composition for Covering Boilers, Ice Houses, etc., to Impede the Passage of Heat.—John Allcock Jones, Middlesboro on Tees, England.

First, I claim the application and use, for the purpose of impeding the passage of heat or caloric, of peat, turf, bog, siltor, or other similar accumulations of vegetable, or partly vegetable and partly earthy matter, either alone or in combination with other ingredients, as hereinbefore described.

Second, The molding of the said material or composition into cakes and bricks, and the subsequent application of the same, in that form, for the purpose specified.

63,256.—Manufacture of Vinegar.—Gerhard Kamps, Pittsburgh, Pa.

I claim the mode of manufacturing vinegar from any vegetable substance containing saccharine or farinaceous qualities, as herein specified.

63,257.—Steam-Engine Lubricator.—Heinrick Kessley Caub City, Duchy of Nassau.

I claim the combination and arrangement of the tube, C, vessel, N, net work in the tube, F, valves, D and E, and the spring, G, substantially in the manner and upon the principle, as herein set forth.

63,258.—Press.—David King, Aberdeen, Ohio.

First, I claim the rack, O, gear wheels, J and K, in combination with the screw shaft, I, and sash, G, substantially as shown and described, and for the purposes set forth.

Second, I claim the nut, P, made in sections, as herein shown and described, in combination with the shaft, I, sash, G, and posts, A and B, substantially as and for the purposes herein set forth.

63,259.—Apparatus for Drying Straw Board, Sheets of Paper, etc.—Robert T. Knight, Philadelphia, Pa.

First, I claim a chamber communicating with a fan or other blowing or exhausting apparatus, and having any desired number of bars, D D', or their equivalents, for the reception of detachable slats, F, or their equivalents.

Second, The construction and arrangement, substantially as described, of the lower slats, G, for the purpose specified.

63,260.—Gang Plow.—H. P. Kynett, Lisbon, Iowa.

I claim the combination of the slotted cross piece, E, side piece, S, bolts, f, pendants, e, adjustable clevises, d, and beams, F, substantially as described for the purpose specified.

63,261.—Machine for Pouncing Hats.—John L. Labiaux, Newark, N. J., assignor to himself, C. Courtois, P. W. Vail, and Wm. C. Griswold, Newark, N. J., and N. B. Day and Julius Sheldon, New York City.

First, I claim the combination of the levers, e e', respectively with the shafts, E E', spiral spring, g g, block, G, or roller, H, substantially as and for the purposes herein shown and described.

Second, I claim the combination of the disks, C or C', and handle, I or I', with the pin, i, and flange, b or b', on the posts, B or B', all made and operating substantially as herein shown and described.

Third, I claim the combination of the metal pouncing roller, H, with the wedge, l, ring, m, and shaft, E', arranged to operate substantially as and for the purposes herein shown and described.

63,262.—Drill Spring for Quarrying Stone, etc.—Ebenezer G. Lamson, Shelburne Falls, Mass.

First, I claim, in combination with stone drilling or quarrying machines, a metal bow spring and metal strap or cord for carrying and sustaining a drill, substantially as described.

Second, I also claim connecting the metal strap or cord of the spring to a central, divided, and adjustable head, substantially as and for the purpose described.

Third, I also claim the combination of the spring, strap, drill stock, and drill, substantially as and for the purpose described.

63,263.—Embossing and Perforating Paper, etc.—Chas. Lang, New York City.

I claim the new mode of manufacturing embossed and perforated goods out of paper linen, cotton-lined paper, paper mixed with cotton threads or linen threads, cotton cloth, linen cloth, or similar material, by means of the machine, substantially as described, the rollers, two of which contain the design, depressed and raised, and the third acting, by its pressure, as perforator, between which said rollers a strip of paper or other material is passed, and is embossed, perforated, and cut during its passage, substantially for the purpose set forth.

63,264.—Water Ejector.—Henry S. Lansdell, New York City.

First, I claim the arrangement of the two or more water inlet pipes or nozzles, m m, in relation with the nozzle, s, of the jet pipe and liquid-receiving chamber, substantially as and for the purpose specified.

Second, The combination with a steam siphon or ejector of an escape valve, p, applied to the jet pipe, G, for operation, substantially in the manner and for the purpose specified.

63,265.—Machine for Making Paper Allumettes.—B. B. Lehman, Lebanon, Pa.

First, I claim the circular saw or cutter, B, having knife-edged teeth operating substantially as and for the purpose herein described.

Second, In combination with the above, I claim the carrier, F, substantially as and for the purpose herein specified.

Third, I claim the creasing or pressing rollers, operating substantially as and for the purpose herein set forth.

Fourth, I claim the felder, D, in combination with the creasing and pressing rollers, substantially as and for the purpose herein set forth.

Fifth, I also claim the inclined plane, H, operating substantially as and for the purpose herein specified.

63,266.—Pulley for Belting.—Moses Lewis and Samuel Miller, Greenville, Conn.

We claim the tapering or conical pulleys, B E, over which the twisted belt, F, circulates, arranged on shafts, A D, at right angles to each other, for the purpose described, in the manner specified.

63,267.—Cheese Box.—Nathaniel and Friend Lewis, Adams, N. Y.

We claim as a new article of manufacture a cheese box constructed of paper provided with a removable head, B', and a head, B, permanently secured to the laps, C, which are made in one piece with the side of the box, and secured between disks, D, substantially as described.

63,268.—Boat-detaching Tackle.—Johann A. Libbertz, Hamburg, Germany.

I claim the vertical shaft, H, provided with the nut, J, lever, I, and the slide, K, having lateral arms, d d, in combination with the arms, G G, pivoted in the ears or lugs, F F, on the plate, E, all arranged to operate in the manner substantially as and for the purposes set forth.

63,269.—Liniment.—John S. Lightner, Westford, Wis.

I claim the liniment compounded as above set forth and described.

63,270.—Wire-pointing Machine.—John Lockwood, Wilton, Conn., assignor to himself and Edwin Gilbert, Redding, Conn.

I claim the improved wire-pointing machine herein described, consisting of the frame, shaft, pulley, cutter head, and cutter, all constructed, arranged, and operating substantially as described.

63,271.—Key.—C. E. Lombard (assignor to himself, A. O. Sinclair, and C. C. Merritt), Springfield, Mass.

I claim as a new article of manufacture a key formed of two parts, A and B, constructed and arranged so that the handle, B, shall close over the opening in the shaft, A, substantially as set forth.

63,272.—Clothes Wringer.—David Lyman, Middlefield, Conn.

First, I claim in clothes wringers the within-described construction and arrangement of the grooves, M N, and intermediate piece, E X Y, combined and arranged relatively to the shafts, B A and D, so as to communicate the motion and withstand the wear, substantially in the manner and for the purpose herein set forth.

Second, I claim the piece, C C', constructed and arranged as represented, to hold both the shafts, A and B, so as to transmit the motion as represented and to maintain the shafts at a uniform distance apart however much the other parts may move relatively thereto, substantially in the manner and for the purpose herein specified.

63,273.—Clothes Wringer.—David Lyman, Middlefield, Conn.

First, I claim in combination with the shafts, c d, cranks, c' d', and connecting rod, G G', or swiveling guide, H, operated so as to retain the central position, closing the greater or less divergence of the shafts, substantially as and for the purpose herein set forth.

Second, I claim in a clothes wringer having diverging jaws, a spring operating on both pairs of jaws and acting as both spring and brace therefor, substantially as herein set forth.

Third, I claim in a clothes wringing machine, substantially as herein described, the gripping arm, L, and spring, k, operating substantially as herein set forth.

63,274.—Table-leaf Support.—John A. MacKinnon, Reading Pa.

I claim the straight levers, A, hinged at one end and notched at the other, when constructed, combined, arranged, and operated by the lever catch, G, spiral spring, H, and button, K, as herein described and for the purposes set forth.

63,275.—Metal Case for Spring Bolts.—Eli J. Manville, Waterbury, Conn., assignor to Turner, Seymour & Judds, Wolcottville, Conn.

I claim the combination of the mandrel, a, and dies, b c d and e, to which movements are communicated in substantially the manner specified for bending up a sheet-metal case with flanges at its ends, as set forth.

63,276.—Plow.—Seth March, Norfolk, Va.

I claim the frame, the mold board, the heel, D, and the weeder, substantially as described.

63,277.—Car Coupling.—Arthur McCarter, Lancaster, Pa.

I claim the combination and arrangement of the slotted casing, A, with its vertical standards, B B', cross arm, d, of pin, C, when operating in a vertical slot, D, with a terminal recess, D', together with a stationary or yielding stand post, F, with its link notch, g, all arranged and operating in the manner and for the purpose specified.

I also claim the cross arm, d, on the pin, C, in combination with the upright standards, B B', when slotted in the manner and for the purpose shown.

I also claim the yielding stand post, F, with its link slot, in combination with the coiled spring, H, constructed and operating in the manner shown, for the purpose described.

I also claim the prolongation or jaws, E', of the flared mouth, E, in combination with the open case, A, when constructed in the manner and for the purpose shown and set forth.

63,278.—Swing.—John A. McClain, Philadelphia, Pa.

First, I claim the vibrating frame, P O O' P, and springs, S S', whether metallic or otherwise, when constructed and combined in the manner and for the purpose above described and set forth.

Second, The combination of upright, A A, and vibrating frame, P O O' P, rope and foot board, R and F, springs, S' S, and suspenders and seat, S P and S, the whole combined and constructed for the purpose in the manner aforesaid described and set forth.

63,279.—Machine for Making Fruit Baskets.—Henry Mellish, Walpole, N. H., assignor to David Lyman, Washington Whitney, and Gilman Waite.

First, I claim the cutter, H, constructed substantially in the manner and for the purpose above specified.

Second, I claim the hollow cylinder, C, in combination with the main cutter, H, arranged to operate substantially in the manner and for the purpose above set forth.

Third, I claim the head cutter, I, when in combination with the main cutter, H, substantially in the manner and for the purpose above described.

Fourth, I claim revolving a log against a cutter or cutters arranged to move gradually in a direction parallel to its axis, for the purpose of cutting a helical coil suitable to be divided into pieces that, when sprung from their helical form to a circular one and properly fastened, they will constitute fruit baskets, pots, or bowls with the bottoms on, substantially in the manner as above described.

63,280.—Machinery for Cutting the Bottom of Fruit Baskets.—Henry Mellish, Walpole, N. H., assignor to David Lyman, Washington Whitney, and Gilman Waite.

First, I claim the grooving cutter, C3, so mounted on the quadrant or plate, C, on the head, B, that it may be moved inward thereon and produce an undercut groove adapted to receive and hold the properly formed material driven therein, substantially in the manner and for the purpose herein set forth.

Second, I claim the rod, E, in combination with the hollow arbor, A, and the surface, D, adapted to operate the plate, C, with its cutters, C1 C2 C3, and move it inward when required, substantially in the manner and for the purpose herein set forth.

63,281.—Steam Engine.—J. V. Merrick, Philadelphia, Pa.

First, The combination of the annular cylinder, A, its piston, E, two or more piston rods, m m, plate, or cross head, k, rods, n n, cross head, G, connecting rod, l, and crank, h, the whole being arranged and operating substantially as and for the purpose herein set forth.

Second, The combination of the above with rods, m' m', for the purpose specified.

63,282.—Churn.—Daniel E. Merrill, South Paris, Me.

First, I claim making the horizontal arm, d', of the standard, D, adjustable so that it may be extended or contracted, substantially as herein shown and described and for the purpose set forth.

Second, The combination of an adjustable slide or socket, J, with the balance wheel, G, for the reception of the end of the arm, K, adjustably attached to the dasher handle, E, substantially as herein shown and described and for the purpose set forth.

Third, Combining an air pump, m, with the churn, A, in such a way that the discharging pipe, m', of said pump may enter the churn through the middle part of its bottom, substantially as herein shown and described.

63,283.—Paint Can.—Hermann Miller, Hoboken, N. J.

I claim a wooden cover, B, which is screwed to the paint can, A, for the purpose of easily opening and reclosing the same, substantially as herein shown and described.

63,284.—Street Crossing and Sewer Inlet.—Joseph A. Miller, New York City.

First, I claim the arrangement of a trough the bottom of which slopes down from its ends toward the middle, in combination with a street crossing made of perforates plates of metal or other suitable material and with a pipe extending from the lowest part of the trough down into the sewer, substantially as and for the purpose described.

Second, The sewer inlets, b, and aprons, c, at the ends of the trough, B, in combination with pipe, C, extending from the lowest portion of the trough down in the the sewer, D, substantially as and for the purpose set forth.

Third, The application of the stench trap, E, in combination with the pipe, C, sewer, D, trough, B, and crossing, A, all constructed and operating substantially as and for the purpose described.

63,285.—Packing for Piston Rods.—Wm. H. Miller, Philadelphia, Pa.

I claim a new manufacture consisting of packing composed of a filling of fibrous or other materials covered with cotton, woolen, or other yarn, saturated with powdered soapstone or equivalent material and wound around the filling, substantially as shown and described.

63,286.—Portable Boiler for Pitch, etc.—Luke S. Mills, Brooklyn, N. Y.

First, I claim a portable boiler formed with an arched fire chamber, and an exterior shell contracted toward the top and for the purposes specified.

Second, I claim a portable boiler formed with sides to set down upon the earth or pavement, an arched fire chamber provided with doors at the ends, a smoke pipe or flue passing off from the top of the fire chamber through the boiler, and a movable cover to give access to the contents of the boiler, substantially as set forth.

Third, In combination with a portable boiler formed as aforesaid, I claim the jacket of felt, and cover, I, as set forth.

63,287.—Heating Stove.—Geo. R. Moore, Lyons, Iowa.

First, I claim the insulation of the tops of heating stoves, substantially in the manner and for the purposes set forth.

Second, The chamber in the front part of the stove between the door, E, and upper part of plate, H, when constructed and arranged as and for the purposes set forth.

Third, The flue from the fire chamber through the front upper chamber to chamber in top of the stove, with the controlling dampers, arranged substantially as and for the purpose set forth.

63,288.—Farm Gate.—D. S. Neal (assignor to himself and J. B. Blood), Lynn, Mass.

I claim a rectangular gate the bars of which are relatively fixed, hung, and operated as described, by supporting it upon a pin, c, and guiding, A, in its vertical swinging movements by means of the vertical slot in the upright, substantially as set forth.

63,289.—Ship's Davit and Winch.—D. P. Nickerson, Cleveland, Ohio.

I claim the adjustable sliding davit, A, pinions, C, as arranged in combination with the adjustable shaft, D, clutch, E, and winch, H, for the purpose and in the manner substantially as set forth.

63,290.—Field Fence.—A. W. Olds, Green Oak, Mich.

I claim the posts or stakes, A A, base, B, in combination with the braces, C C, and tie, E, when arranged in relation to each other and the rails, D, as and for the purpose set forth.

63,291.—Safety Attachment for Pocket Books.—Simon B. Parker, New York City.

I claim a safety attachment for pocket books, composed of a sliding needle, C, arranged and applied substantially in the manner as herein shown and described.

63,292.—Bootjack.—Walter S. Piffer, Carlisle, Pa.

I claim a bootjack with the two parts hinged together at F, and the part, B B, provided with a movable toe piece, D, acted on by any suitable spring, substantially as specified within.

63,293.—Water-tight Iron Tank for the Protection of the Timbers of Steam Boats.—Abraham G. Polhamens, Nyack, N. Y.

I claim the construction of the water-tight iron tanks in which are maintained a constant change and circulation of water as the foundation of boilers and furnaces on steam boats, to protect them against fire, substantially as herein described.

63,294.—Mop Squeezer.—E. P. Porter, Morrisville, Vt.

I claim the jaws, D, lever, H, and treadle, J, arranged and operated as herein described in combination with the movable platform, B, for the purpose set forth.

63,295.—Door Lock.—E. D. Porter and G. W. Hallett, Waterford, N. Y.

First, We claim the spring catches, H, whether more or less in number in combination with the bolt, B when arranged together substantially as and for the purpose described.

Second, The catch, X, in combination with the bolt, B, substantially as and for the purpose specified.

63,296.—Fence.—Aaron W. Pratt, Pultneyville, N. Y.

I claim the sill, E, the posts, A, the cap, d, the pales, b, and the wire strands c, the whole arranged constructed and operating substantially as herein described.

63,297.—Bridle Bit.—Joshua C. Price, New Philadelphia, Ohio.

I claim the movable or sliding levers or sides, B B, when applied substantially as and for the purpose set forth and described.

63,298.—Composition for Destroying Insects.—Daniel R. Prindle, East Bethany, N. Y.

I claim the composition of coal tar and petroleum, in the manner and for the purpose herein specified

63,299.—Hydraulic Paint.—Daniel R. Prindle, East Bethany, N. Y.

I claim a paint composed of pulverized hydraulic lime and skim milk either with or without the addition of chrome, yellow, or other pigment, as herein specified.

In combination with the above I also claim the use of linseed flour, as set forth.

63,300.—Process of Preserving Wood and Timber.—Daniel R. Prindle, East Bethany, N. Y.

I claim the application of coal tar, common tar, or equivalent substance, or the ingredient thereof, to wood and timber successively, substantially as specified, as a new process of preserving the same.

63,301.—Ironing Machine.—P. O'Thayne, New York City.

First, I claim the construction and arrangement upon the frame, A, of the cylindrical revolving smoothing iron, D, hollow shaft, B, having its bearings in the yielding boxes, a, which are provided with the standards, c, adjustable rest, e, forked lever, E, rod, d, and treadle, F, substantially as herein shown and described.

Second, The segmental platform, G, upon the end of the shaft, H, provided with the clamps, g g, flatboard, G', having the toothed rack, i, pinion, J, mounted upon the shaft, I, when all are constructed and arranged upon the frame, A, as and for the purpose specified.

63,302.—Water Gate.—Henry Recher, Liberty, Ohio.

I claim the arrangement and combination of the centrally-hinged gate, F, with the connecting rod, E', lever, C, and float, B, all constructed and operated substantially as described.

63,303.—Breech-loading Fire-arm.—Thomas Restell, London, England, assignor to Charles Pomeroy Button, New York City. Antedated March 13, 1867.

I claim the reciprocating hammer, H, with its curved inclined plane, S, and spring lever, G, in combination with the sleeve, C, and tube, E, for operating the needle, d, substantially as described for the purpose specified.

63,304.—Lemon Squeezer.—August J. T. Reuter, Boston, Mass. Antedated March 18, 1867.

I claim a grooved bulb or knob constructed substantially as above set forth for the purposes herein specified.

63,305.—Safe Lock.—John R. Richards (assignor to himself and A. L. Mennez), Mount Joy, Pa.

First, I claim the twin sand boxes, A A', or their equivalent gravitating force, and regulating key, H, for timing the period that shall intervene before the bolt, D, and bolts, W, can be operated so as to unlock the door by withdrawing or unscrewing them by simply turning the knob, F, substantially in the manner and for the purpose specified.

Second, The socket, screw bolts, W D, operated substantially in the manner and for the purpose specified.

63,306.—Sash Fastener.—Orville M. Ridgway, La Porte, Ind.

I claim the combination of the metallic spring, C, rubber block, D, when constructed and arranged upon each of the sashes, B, as herein set forth, for the purpose specified.

63,307.—Leather Scouring Machine.—A. W. Roberts (assignor to P. Jewell & Sons). Hartford, Conn.

First, I claim the rotating plate, T, sliding plate, T', guide way, T'', or their equivalents, in combination with the table, S', to produce a transverse movement of the table with the guide ways, B'', substantially as described.

Second, In combination with the above I claim the table, S, to produce a universal horizontal movement of said table, substantially as described.

Third, I claim the employment of an oscillating, adjustable tool holder with the arms, H', for altering the angle of the tool, substantially as described.

Fourth, I claim the altering of the angle of the tool, with or without the use of the tool arms, H', by means of the adjustable shaft, H, or its equivalent, substantially as described.

Fifth, I claim the employment of the springs, K, secured to the arms, H', and bearing upon the tool holders, I, extending in an opposite direction from that to which the springs are secured, for the purpose of imparting pressure from one to the other, substantially as shown and described.

Sixth, I claim the alternate action of the springs, K, imparted from one to the other by raising either one of the arms from the table, substantially as described.

Seventh, I claim the arms, G G, in combination with the arms, F' F', arms, E, rock shafts, F F, and their connections, for lifting the tools from the table, substantially as shown and described.

Eighth, I claim arranging the arms, H', upon an independent shaft, H, to more perfectly utilize their action.

Ninth, I claim arranging the shaft, H, in adjustable or sliding boxes, A'', whereby it can be elevated or depressed by screws, c c, or their equivalents, for the purpose as shown and described.

Tenth, I claim the employment of slide dogs, P'', or their equivalents, for holding up the tools from the work while the tool stock, C, is in motion.

Eleventh, I claim the employment of the screw e'', with the arm, D, or their equivalents, for increasing the tension of the spring, k, substantially as described.

63,308.—Tool Handle.—Wm. Runte, New York City.

I claim the combination of the plug, D, and the adjustable ferrule or tube, E, with the tool handle, substantially as and for the purpose herein shown and described.

63,309.—Wagon.—Benj. Ryder, Jr., South Covington, Me.

I claim the frame, G, which supports the reach and allows the wheels to be extended forward, substantially as described.

I claim the rollers, C D, and the chain, h, arranged and operating substantially as shown and described, for the purposes specified, in combination with the wagon body.

63,310.—Tobacco Pipe.—Louis Saarbach, Philadelphia, Pa.

I claim the tube, c, in combination with the cup, D, for the purpose described.

63,311.—Fire-Proof Safe.—Rufus S. Sanborn, Ripon, Wis.

First, I claim introducing water vessels provided with steam valves into a fire-proof safe of any ordinary construction, said vessels being of such size and conformation as to adopt them to the form and dimensions of the safe in which they are placed.

Second, Providing each of such water vessels with a tube, t, reaching from any portion of the edge or perimeter to or toward the mathematical center of the vessel, as and for the purpose specified.

63,312.—Wagon Brake.—B. B. Scofield, Woodhull, Ill.

I claim an improved brake formed by the combination of the revolving cylinder, A, curved shoes, C, and lever, D, with each other, substantially as herein shown and described and for the purpose set forth.

63,313.—Bed Bottom Spring.—H. G. Seekins (assignor to himself Leonard B. Griffing, and Orange S. Frary), Elyria, Ohio.

I claim a compound bed spring consisting of the middle leaves, A H' the upper leaves, B B', and lower leaves, C C', the several springs being supported by the fulcrum blocks, d d', constructed and arranged as and for the purpose specified.

63,314.—Soap Compound for Cleaning and Scouring Wool, Silk, etc.—Daniel Shattuck, Buffalo, N. Y.

I claim a soap formed by the combination of the ingredients above described, substantially in the manner and proportions specified.

63,315.—Folding Seat.—C. W. Sherwood, Chicago, Ill.

I claim the rubber spring, e, or its equivalent, and the lug, d, in combination with the axle, C,' and nave, B', all constructed substantially as and for the purposes specified.

63,316.—Flour Sifter.—J. A. Sinclair (assignor to himself and J. T. Judkins, and W. Hollister, Woodsfield, Ohio.

First, I claim the combination of the two cylinders, H and I, having lines of brushes, M, winding spirally around them in opposite directions with sliding drawers, E, substantially as herein shown and described for the purpose set forth.

Second, The drawer, E, consisting of two hinged parts, e1 and e2, with opening on its upper side, registering with the discharge orifice of the hopper having at its bottom the semi-cylindrical sieve, G, swept by the spiral brushes, M, and a passage at its rear opening into spout, N, and constructed and operating substantially as described for the purpose specified.

Third, The combination of the sliding drawer, E, with the box, A, hopper, B, and spout, N, substantially as herein shown and described.

63,317.—Window Blind Fastening.—Thomas J. Sloan assignor to Ezra Gildersleeve, New York City.

First, I claim the hinge having bevel cogs in combination with the shaft extending to the inside of the window provided with a bevel cog wheel, and the hinge shank constituting the hinge journal on which the blind turns, and the box in which the shaft turns, substantially as and for the purpose described.

Second, The combination of the hinge with its beveled cogs, the shaft with its beveled cog wheel, the spring spur on the knob and the plate or its equivalent, with a recess to receive the spur to lock the blind when either shut or open, substantially as described.

Third, The beveled recesses in the face of the locking plate, or the equivalent thereof, for holding the blind or shutter at any angle desired, in combination with the spring spur, the shaft and hinge connected by bevel gears, substantially as described.

63,318.—SELF-ACTING GATE.—Albert C. Smith, Fort Madison, Iowa.

I claim the combination and arrangement of the gate, A, lever, E, and rods, b d, and operated by the levers, H H', with their cords, r s, rod, g, and pulleys, in the manner substantially as described and for the purposes set forth.

63,319.—DRILLING APPARATUS.—J. T. Smith, Pittsburg, Pa.

First, I claim automatically feeding a drill by means of the sheaves, a and b, having motion imparted to them, substantially as described.

Second, I claim the adjustable sheaves, a, in combination with the non-adjustable sheaves, b, when arranged to operate as set forth, for the purpose of holding the rope, R, and feeding it out as described.

Third, I claim the combination of the shaft, E, provided with the wheel, m, and worm wheels, H, with wheels, D, attached to the journals of sheaves, a, all mounted in the rotating frame, A, and arranged to be operated as set forth.

Fourth, I claim the use of the within-described apparatus for feeding drills whether the same be rotated by the twist imparted to the rope, or by means of the ratchet, I, substantially as described.

63,320.—RICE HULLING MACHINE.—D. H. Southworth, New York City.

I claim the conical drum, D, provided with a series of teeth or pins, g, and elastic plates and rubbers, F F', on its periphery, arranged and operating essentially as specified.

63,321.—LANTERN.—Charles F. Spencer, Rochester, N. Y., assignor to himself and Charles W. Barker.

First, I claim resting the globe, C, with the top, E, attached thereto, loosely in the open-topped guards, B, so as to be raised and dropped at pleasure, as herein set forth.

Second, Constructing the lantern with closed base and open-topped guards, for the insertion of both the lamps and globe through the top, as herein specified.

Third, The enlarged wheel, c, so situated and arranged as to reach above the top of the base to be easily operated by the finger, as herein set forth.

63,322.—RIDING SADDLE.—Samuel S. Spurgin, Jacksonville, Ill.

I claim the arrangement in the saddle of the springs, G G, supported on the side plates, and the elastic straining piece, H, fastened to the springs and to the pommel and cantle respectively, substantially as described.

68,323.—BREAST PROTECTOR.—John Stadermann and Henry Sauerbier, New York City.

We claim the two wire gauze or wire cloth parts, A A, swaged each with a protuberance, a, and in such a form as to admit of being inserted in or attached to the garment, substantially as and for the purpose set forth.

We also claim the connecting of said parts together by hooks and eyes, slides elastic or other fastening, which will admit of said parts, being connected and disconnected with facility, and still keep the parts in proper position, substantially as described.

63,324.—PAVEMENT.—C. W. Stafford, Saybrook, Conn.

I claim connecting and securing the sections of the pavement together by means of the staples or clamps, a, over pins or keys, b, passing through horizontal slots in the vertical flanges, substantially as herein shown and described.

63,325.—RESERVOIR FOR COOLING GRAIN AND FLOUR.—Henry Stanley, St. Johnsbury, Vt.

I claim a reservoir for cooling grain or flour when constructed by placing the posts thereof in zig-zag position, and surrounding them with wire gauze or other porous material, thus forming air recesses, a a, upon the outside of the body of the grain or flour, increasing the surface of the grain exposed to the air, substantially as described and for the purpose specified.

63,326.—APPARATUS FOR CARBURETTING GAS AND AIR.—John S. Stephenson, Cleveland, Ohio.

I claim the combination of the tubes, H and T, with the agitating wheel, A, and fan wheel, N, and funnel pipe, F, constructed as described, and arranged to operate in the manner set forth.

63,327.—DRYING HOUSE AND OVEN.—David Stouter, Dayton, Ohio.

First, I claim the metallic oven, A, when the lower part is constructed with double walls, and the upper part is lined with wood in the manner substantially as described, and for the purpose specified.

Second, The air chamber, O, when arranged with reference to the furnace, F, and oven, A, in the manner substantially as described, and for the purpose specified.

63,328.—VITREOGRAPHY.—C. C. Stremme, Austin, Texas.

I claim the mode of ornamenting glass as herein described, by the application of glue or similar adhesive and contracting matter, and in this manner produce models for casting all and every kind of ornamental glass and glass ware, and for all of which I pray that letters patent may be granted me.

63,329.—RUNNER FOR CHAINS.—W. H. Stroup, Pittsburgh, Pa.

First, I claim an improved runner, having adjustable fastenings attached to its upper edge, substantially as herein shown and described, and for the purpose set forth.

Second, Making one of the fastenings adjustable longitudinally, substantially as herein shown and described, and for the purpose set forth.

63,330.—SPRING FOR VEHICLE.—James B. Stuart, Bunker Hill, Ill.

I claim the constructing of a side spring for wheel vehicles of three parts, D D C, connected together and applied to a spring bar, A, substantially in the manner as shown and described.

I further claim the securing or holding of the leaves of the parts, D D C, in contact, by means of clips or collars, c c', substantially as set forth.

63,331.—APPARATUS FOR PREPARING MASH FOR BREWERS AND DISTILLERS.—Abram S. Swartz (assignor to himself and W. A. Case), Buffalo, N. Y.

First, I claim the combination of the air pump, H, and conducting pipe, F, with the hollow shaft, C, and perforated rake head, E, for the purposes and substantially as described

Second, The combination of the receiver, G, and cooler, M, with the conducting pipe, F, hollow shaft, C, perforated rake head, E, and air pump, H, for the purposes, and substantially as set forth.

Third, In an apparatus for preparing mash for brewing, I claim the combination and arrangement of the receiver, G, steampipe, O, and steam and air pipe, N, for the purposes, and substantially as described.

Fourth, The shifting frame, V, in combination with the clutches, T and U, and bevel wheels, R and S, for the purpose and substantially as described.

63,332.—HAY LOADER.—Eli Sweet, Whitney's Point, N. Y.

I claim the arrangement of the sheave in the sliding tongue, and moving therewith, the rope passing over said sheave, and connected at its respective ends to the fork and to the brake bar on the tongue hounds.

63,333.—BRICK MACHINE.—Porter L. Sword, Adrian, Mich.

First, I claim the adjustable knife when constructed with a cutting edge set opposite to and so near the press plate, H', that there is merely room for the shaving of clay to rise between them, and having a cutting edge and elongated horizontal blade adjustably attached to both ends to and below the bed plate, H, and resting upon the revolving mold wheel, S, so as to perform the double function of cutting off the superfluous clay, and smoothing the upper surface of the brick, substantially as described.

Second, So suspending the rod, O, sustaining the wheel, N and L, that they may be independently adjusted at both ends, substantially as and for the purpose set forth.

Third, The combination of the bed plate, H, and stationary shaft, U, with the rods, M and O, wheels, N and L, collar, Q, bolts, Q, mold wheel, S, substantially as and for the purpose set forth.

Fourth, The arrangement in a brick machine of a stationary shaft, H, mold wheel, S, revolving around the same, and having gearing upon its periphery, and the driving spur pinion, R, substantially as set forth.

63,334.—SPIRIT METER AND SEPARATOR.—Isaac P. Tice, New York City.

First, I claim the receiver, B provided with a locked or sealed transparent cap or cover, C, when used in connection with a branch pipe, H, communicating with the receiver, the worm, A, and air discharge openings, substantially as and for the purpose set forth.

Second, A tilting or partially rotating meter, R, arranged with or applied to a scale frame, Q, to operate substantially in the manner as and for the purpose specified.

Third, A valve, M, connected with and operated by the scale frame, Q, when used in connection with the meter, R, and arranged to work, conjointly therewith, substantially as shown and described.

Fourth, The pin, n, on upright, a, in combination with the notches, m m', in the circular end of the meter, R, for the purpose of holding the meter in position while being filled, as set forth.

Fifth, The pin, k, on upright, a*, in combination with the pins, l l', on the end of the meter, to serve as steps to determine the quarter revolution of the meter as set forth.

Sixth, The many chambered or four way cock, W, arranged in connection with sample chambers, q q, q' q', and operated from the meter, or other movable part of the device, for the purpose specified.

Seventh, The weight or counterpoise, J, applied to the meter, R, in combination with the scale frame, Q, as shown and described.

Eighth, The adjustable spouts, U B*, connected by a bar, E', or its equivalent, so as to be operated simultaneously as shown and described.

Ninth, I claim discharging the air from a still into a receiver, having a sinuous passage, substantially as shown in cover, K, for the egress and ingress of air as set forth.

Tenth, A locked or sealed cock, D', when used in combination with a meter, R, for the purpose specified.

Eleventh, The combination of the pipe or end, A, of the worm, with the receiver, B, and pipe, H, substantially as described.

Twelfth, The wiper or plunger, E, within the transparent cap cover or cylinder, C, arranged substantially as and for the purpose specified.

Thirteenth, The alarm composed of the wheel, I, and the spring or click, J, or their equivalents, when arranged so as to be operated by the air or gaseous vapor or contents of the still, substantially as shown and described.

Fourteenth, A case, C*, constructed with double walls, or in any other manner, when said case is used with or incloses a meter, for the purpose of preventing the freezing of the contents of the same, as set forth.

Fifteenth, A meter in combination with a sealed transparent receiver, substantially as and for the purpose specified.

Sixteenth, The combination of a meter transparent receiver and a locked or sealed cock, for the purpose specified.

Seventeenth, The adjustable spout, U, in combination with the cock, W, substantially as and for the purpose set forth.

63,335.—SPIRIT METER OR SEPARATOR.—Isaac P. Tice, New York City.

First, I claim a revolving or tilting meter, hung or suspended on journals or pivots, l, and divided into two compartments, m m', by a diagonal partition or diaphragm, n, with discharge openings, o, all arranged substantially as herein shown and described.

Second, The floats, N, placed within the compartments, m m', of the meter, and arranged to operate a valve, O, to regulate the supply or flow of whisky to the meter, substantially as set forth.

Third, The placing of the journals or pivots, l, of the meter, within oblong boxes, k, having springs, l, at their ends, substantially as and for the purpose specified.

Fourth, Separating the high from the low grade whisky or spirits, by means of a hydrometer arranged with suitable mechanism in such a manner that the turning or tilting of the meter or other motor will transmit power through the intervention of a wheel stud or other device carried by the hydrometer to suitable mechanism, which will effect a diversion of the flow or discharge of the whisky or spirits into different receivers, according to its grade or strength.

Fifth, The employment or use of indicators or clock movements, in connection with the separating mechanism, substantially as and for the purpose specified.

Sixth, The hand, G, of paper or other material, in connection with a hydrometer, and separating mechanism, substantially as and for the purpose set forth.

Seventh, In spirit meters charging the paper which receives the record with preservative composition, substantially as described.

62,336.—METER ATTACHMENT FOR STILLS.—Isaac P. Tice, New York City.

I claim the combination of a plurality of meters, with a still to operate in the manner substantially as and for the purpose herein set forth.

63,337.—RAILWAY SWITCH.—James Tillinghast, Buffalo, N. Y.

I claim a triple switch for railroads, composed of the rails, D D' E E', connected respectively by the cross bars, a b, with the cross bar, G, applied to the rails, D D', through the medium of the oblong slots, d d, and pivots, a*, and connected to the lower bar, H, by the spring, I, and the bars, c c, connected by the spring, F, and attached to the switch rails, D D', all arranged to operate substantially in the manner as set forth.

63,338.—DRILL FOR WELL.—Washington Tingley, New York City.

I claim in combination, the z-shaped cutting surface, composed of the parts, n l l, and the curved reaming cutters, m, whose edges on alternate sides are made oblique, so as to effect a drawing cut on the sides of the box, substantially as shown.

63,339.—MANUFACTURE OF RAILROAD TIES, BRIDGES, BUILDINGS, WHARVES, FENCES, AND OTHER ARTICLES OF GALVANIZED IRON.—Samuel P. Townsend, New Providence, N. J.

First, I claim a new article of manufacture for railroad ties, sills, foundations, structures in water, fences and buildings, fortifications, steps for stoops, piazzas, galvanizing sheathing for bottoms of vessels, ships, steamers, boats, etc., and the like, made of the materials and in the manner herein described, or any other substantially the same, and also for the galvanizing and preservation of railroad car wheels, axles, and machinery.

Second, The preservation of iron from oxydation or corrosion, by galvanizing it as above described, when used for the purposes herein mentioned.

63,340.—SAW MILL.—James Tracy, Brewer's Village, Maine.

I claim applying the spring, k, to bent lever, K, for the purpose of throwing the friction pulleys out of contact, substantially as described.

63,341.—ENDLESS BELT FOR POLISHING.—Justus A. Trant, New Britain, Conn., assignor to himself and Jeremy W. Bliss, Hartford, Conn.

I claim, as a new improved article of manufacture, an endless fabric rubber polishing belt, substantially as described.

63,342.—PEAT MACHINE.—Thomas J. Wells, St. Anthony, Minn.

I claim the conical grinding plates, F F', rotating at different speeds, and inclosed within a case, G, provided with a discharge spout, H, substantially as and for the purpose set forth.

I further claim the reciprocating mold box, I, provided with the molds, b b, and the plungers, J J, operated substantially as shown in combination with the rotating conical grinding plates, F F, inclosed within the case, G, provided with the spout, H, all arranged substantially as and for the purpose set forth.

63,343.—FAN WHEEL BLOWER.—Amos Westcott, Syracuse, N. Y. Antedated March 15, 1867.

I claim a fan wheel blower, propelled by friction wheels, as shown and inclosed within the parts, A J B, constructed and made adjustable, substantially in the manner described.

63,344.—DEVICE FOR HOLDING HORSES.—James M. Whiting, Providence, R. I.

First, I claim combining with the wheel of a carriage a hitching apparatus arranged in such manner that the winding up or shortening of the reins or other checking device shall take place only during the forward movement of the wheel, the said apparatus being disconnected from the driving gear during the backward movement of the carriage, substantially as shown and set forth.

Second, The combination with the windlass provided with a ratchet wheel as described, of a driving pinion loosely mounted upon said shaft, and carrying a pawl engaging with the said ratchet wheel, under such an arrangement that the said shaft shall be disconnected from the driving gear during the backward movement of the carriage, as set forth.

63,345.—HORSE HAY FORK.—A. F. Wicke and O. Evans, Alliance, Ohio.

We claim the rod, A, foot, B, connecting rod, C, and lever, D, provided with the shoulder, C', when these several parts are constructed and operated as and for the purpose set forth.

63,346.—HEEL SHAVING GUARD.—J. E. Wiggin, and Daniel E. Crosby, Stoneham, Mass.

First, We claim the combination and arrangement of the guard, A, and pin, B, when the two are constructed substantially in the manner described.

Second, We claim the device of the ball and the socket joint when combined with the guard and center of a heel trimming machine.

63,347.—AXLE TREE.—James W. Wilkie, Auburn, N. Y.

First, I claim constructing the axle without a collar, and providing it on the underside of the arm, with an oil chamber, as and for the purpose set forth.

Second, The combination of the axle and box, when both are constructed as and for the purpose described.

63,348.—AXLE TREE.—James W. Wilkie, Auburn, N. Y.

First, I claim the employment of a divided nut as and for the purpose set forth.

Second, The employment of a divided nut in combination with the arm of the axle as constructed, as and for the purpose described.

Third, The box as constructed in combination with a divided nut, substantially as set forth.

63,349.—STEAM PLOW.—George Willard, New York City.

First, I claim in combination in a steam or other plow, as described, of the bars which carry the spades and other mechanism for breaking the ground, with the crank shafts for operating the same, under the arrangement herein specified, so that the said bars, while alternately and successively moved towards and away from the earth, shall at all times maintain their parallelism with the surface passed over by the machine.

Second, The combination in the movable and adjustable plow frame of the coulters, with the vibrating spades and harrow teeth, under the arrangement and for operation as set forth.

Third, The combination with the stationary plow frame, of the movable frame and the cams, and their operative mechanism for adjusting the same frame to different elevations above the ground, the whole being arranged and operating as herein shown and specified.

Fourth, The herein described mechanism for adjusting the movable plow frame, the same consisting of a series of cams arranged and connected with the stationary and movable frame, on each side of the plow as described, and operated by means of a shaft mounted in the stationary frame and provided with a ratchet and pawl so that the movable frame may be elevated and lowered, or held at any desired distance from the ground, substantially as shown and set forth.

Fifth, The method of and means herein described for directing the movement of a steam plow or other like machine, that is to say, mounting the wheels of said machine upon their axles or shafts in such manner that each wheel and its respective axle may revolve together or independently of each other, substantially as and for the purposes set forth.

63,350.—METHOD OF SECURING CUTTER TO SICKLE BAR.—C. S. Williamson, Covert, N. Y.

I claim the cutter bar, having shoulders, resting against the sickle bar, A, with tapering shank, c, fitting in groove, a, of the sickle bar forming a dovetail joint, in the manner described, and for the purpose specified.

63,351.—VALVE FOR STEAM ENGINE.—James A. Woodbury, Boston, Mass.

I claim the valve constructed as desribed, and arranged with reference to the openings in the walled ports upon which it works, substantially as described, which arrangement enables me to regulate the movement of the inductive valves, so as to cut off the steam at any desired part of the stroke of the piston, without reference to exhaust valves.

63,352.—VALVE FOR STEAM ENGINE.—James A. Woodbury, Boston, Mass.

I claim the combination of two or more valves, with intermediate walls, when constructed and operating substantially as and for the purpose set forth.

63,353.—LOOM.—Caspar Zwicki, Chicago, Ill., assignor to James J. Walworth, and Gustavus E. Baschick.

I claim combining with the shuttle race, and with the cranks and connecting rods which actuate it, the links, D', when upheld by spring braces capable of vertical adjustment, and which, acting by their elasticity, ease the movements of the shuttle race substantially as described.

Also, in combination with the shuttle race, the springs, H, at either end, arranged over the top of the shuttle path, and provided with means for vertical adjustment, substantially as described.

And in combination with the picker staff of a loom, the cam, N, when provided with the adjustable piece, o, substantially as described.

RE-ISSUES.

2,524.—COMPOSITION FOR ROOFING.—John P. Cowing, Seneca Falls, N. Y. Patented Feb. 19, 1867.

I claim the simple compound of ground fire clay rock, or slaty clay and coal tar, as specified.

2,525.—PEN AND PENCIL CASE.—Lawrence A. Heely, New York City, by mesne assignments of Frederick W. Cox. Patented June 27, 1865.

I claim, First, extending the longitudinally moving tube, e, with the revolver, b, to such a length into the case, A, that the traveler can be made to move back, below or within the outer end of the tube, e, as set forth, whereby a pencil case is obtained, the tip of which can be moved in and out, and which is capable of carrying long leads.

Second, The circular groove, s, in the revolver, b, in combination with the pin, j, substantially as herein set forth, so that sufficient hold for the said pin is obtained without the necessity of a cap over the tube, e, and at the same time the revolver is prevented from moving in a longitudinal direction.

Third, The collar, o, in combination with the tube, f, and shell b, substantially as and for the purpose specified.

Fourth, The reserve lead chamber, p, extending partially or wholly round the revolver, b, when the same is made with or without a longitudinal motion, when said chamber is situated within the shell, A, substantially as and for the purpose shown and described.

2,526.—WARP-DRESSING FRAME.—Alexander M. Damon, Lowell, Mass. Patented October 9, 1866.

I claim the combination or mechanism for operating one or more raddles in manner as set forth, such consisting of the slotted bar, P, the gear, G, the pins, g p, and mechanism for revolving the said gear, the said bar, P, being constructed and the whole being arranged together, and with the raddle or raddles, substantially as and so as to operate as hereinbefore explained.

2,527.—MACHINE FOR CUTTING AND FINISHING SHOE HEELS.—The McKay Heeling Machine Company, Boston, Mass., assignees by mesne assignments of William F. Edson. Patented Sept. 6, 1859.

I claim, in combination with a cutting, grinding, or polishing device for operating to shape or finish a boot or shoe heel, and where a movement is given to such device or to the heel, relative one to the other, a former or pattern located on the tread of the heel, and operating in connection with a shield against which it abuts, to govern in whole or in part the form of the heel.

Also, in a heel shaping or finishing mechanism, such an arrangement of a shield with reference to the cutting abrading or polishing device, and to the counter of a boot or shoe having a heel to be cut, ground or polished, as will, by the abuttal of the said counter against said shield, govern in whole or in part the form of the heel.

Also, the combination with a heel shaping or with a heel finishing mechanism of a flexible counter protecting band arranged to operate substantially as described.

2,528.—SPELLING BLOCK.—Samuel L. Hill, Williamsburg, N. Y., assignor to himself, Albert Palmer and A. Sidney Doane. Patented Oct. 12, 1858.

First, I claim Placing different letters of the alphabet upon two or more sides of cubical or six-sided blocks, so that by combining the same, words in which the same letters occur more than once may be readily spelled.

Second, I claim placing upon each block its proper numeral for the purpose specified.

2,529.—ENVELOPE MACHINE.—George H. Reay, and Lewis Negbaur, New York City, assignees by mesne assignments of George H. Reay. Patented Aug. 25, 1863.

First, We claim the employment of a movable carrier, E, in combination with the rising and falling lifters, F, constructed and operating in the manner and for the purpose substantially as herein specified.

Second, The arrangement of the table, C, over the conveyer, H, substantially in the manner herein described, so that the blanks are held even and in place by the table, while being carried by the conveyer to the creasing box.

Third, The slotted lifters, F, in combination with the bar, c*, in the table, C, as and for the purpose herein specified.

Fourth, The arms, e**, attached to the table, C, or to any other rtdefixpa of the machine, and operating in combination with the conveyor, H, substantially as and for the purpose set forth.

Fifth, Feeding the blanks under the table or platform, which supports the gum box, instead of over it.

Sixth, The weight, c2, in the front edge of the table, in combination with the conveyor, H, applied and operating substantially as and for the purpose set forth.

Seventh, The balance weight, h3*, in combination with the conveyor, H, applied and operating in the manner and for the purpose herein specified.

Eighth, Arranging the fingers, K, in such relation to the plunger, J, that they hold the flaps of the envelope, which have been creased by being passed through the box, I, until the plunger descends again and completes the envelope, by pressing it as set forth.

Ninth, The arrangement of hinge joints, k3, in the shanks of the folding fingers, K, in the manner and for the purpose substantially as described.

Tenth, The cam, m, and roller, m*, or its equivalent, in combination with the plunger, J, constructed and operating substantially as and for the purpose specified.

Eleventh, Passing the plunger, J, below the lower creasing edge, l*, of the box, in the manner specified, so as to push the finished envelope clear of the box, and leaving the creased envelope below the lower edge of the box, to prevent the same from going back with the plunger.

Twelfth, The ribs or ledges, j4, on the face of the plunger, as and for the purpose described.

2,530.—STEAM PUMP.—Louis C. Rodier and J. R. Gardiner, Springfield, Mass., assignees of Louis C. Rodier. Patented Aug. 14, 1866.

We claim, First, The arrangement of secondary valves, d d', ports, f f, and reservoirs, L L, at or near each end of the cylinder, operating with the piston, B, and valve, D, to reverse the motion of the piston, in the manner set forth.

Second, The arrangement of the water valves of the pump, consisting of hinge valves hung singly or in pairs upon plugs constructed as described.

Third, Constructing the plug through which the water is forced when both valves are attached to it in the manner shown, having a longitudinal and a lateral partition, arranged substantially as set forth.

2,531.—MACHINE FOR ATTACHING AND FINISHING BOOT HEELS.—The McKay Heeling Machine Company, Boston, Mass., assignees by mesne assignments of Herman Saloshinsky. Dated Jan. 31, 1860.

I claim a machine organized so as to operate to drive or force several nails or pegs simultaneously from the inside of a boot or shoe through its sole into the heel thereof, substantially as described.

Also the combination in one machine of means for nailing or pegging the heel of a boot or a shoe to the sole thereof, and means for forming the curviline or outline of the heel by causing a relative turning movement between the heel and a cutting edge, substantially as described.

2,532.—BRICK MACHINE.—Porter L. Sword, Adrian, Mich., assignee by mesne assignments of himself and George S. Tiffany. Patented June 14, 1864.

First, I claim adjustably suspending the mold wheel, C, from the bed plate upon wheels, H, upon which it revolves, substantially as set forth.

Second, The combination of the mold wheel, C, and pug mill, A, with a bed plate, C, having a curved lineal opening under the pug mill and over the molds, substantially as described.

Third, A curved tubular extension, D', leading from the bottom of the pug mill over the rim of the mold wheel through which the clay is fed to the molds, substantially as set forth.

Fourth, The inclined adjustable press plate, E, placed in the tubular extension, D', in combination with the mold wheel, C.

Fifth, The combination of the press plate, E, mold wheel, C, followers, F and wheel, G, substantially as and for the purpose set forth.

Sixth, Adjustably suspending the wheel, G, from the bed plate, D, by rods, G3, substantially as and for the purpose set forth.

Seventh, The combination of the mold wheel, C, bed plate, D, and the adjustable packing rings, I and I', attached thereto, substantially as set forth.

Eighth, The combination of the adjustable press plates and adjustable knife, K, having a horizontal blade, substantially as set forth.

2,533.—BRICK MACHINE.—John Watson, Buffalo, N. Y., assignee by mesne assignments of himself. Patented June 5, 1866.

I claim the combination of an internal or grooved cam, as described, with a connecting rod or the equivalent thereof, operating the sliding mold of a brick machine, for the purpose of giving to the said mold the necessary reciprocating motions.

I also claim the combination of the pin, G, with the cam, E, to operate the above-mentioned reciprocating motion of mold, B, as and for the purposes described.

2,534.—ROLLER TEMPLE FOR LOOMS.—Henry Kayser, New York City, assignee of J. Mathis. Patented April 24, 1866. Antedated March 14, 1861.

I claim, First, A temple provided with a series of wheels set in an oblique direction, substantially as and for the purpose described.

Second, Giving to each of the oblique wheels an independent revolving motion, substantially as and for the purpose set forth.

Third, The eccentric shoulders, e, on the disk, d, which separate the oblique wheels, a, substantially as and for the purpose described.

DESIGNS.

2,606.—PARLOR STOVE.—C. Harris and P. W. Zoiner, Cincinnati, Ohio.

2,607.—PRINTERS' TYPE.—Andrew Little, New York City.

NOTE.—In the above list of patents we recognize the names of persons whose applications were solicited through the Scientific American Patent Agency

Foreign Patents.

American Inventors should bear in mind that, as a general rule, an invention which is valuable to the patentee n this country is worth equally as much in England and some other foreign countries. In England the law does not protect the right of a foreign inventor as against the first introducer of an invention from abroad. For twenty years past the great majority of patents taken out by Americans in foreign countries have been obtained through Munn & Co's agency. Patents are secured with the utmost dispatch in Great Britain, France, Prussia, Belgium, Russia, Austria, Italy, The Netherlands, Spain, Sweden, Australia, and other foreign countries. Models are not required, but the utmost care and experience are necessary in the preparation of applications. Patentees who intend to take out Foreign Patents should send to us for a Pamphlet of full advice. Address

MUNN & Co., No. 37 Park Row, N. Y.

HOW TO OBTAIN PATENTS.

The first inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them; they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

We (MUNN & CO.) have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century*. Many thousands of inventors have had benefit from our counsels. More than one-third of all patents granted are obtained by us.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person, at our office, or to advise them by letter. In all cases they may expect from us an *honest opinion*. For such consultations, opinion, and advice, *we make no charge*. A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential*. Address MUNN & CO., 37 Park Row, New York.

Extensions.—The applicant for an extension must file is petition and pay in the requisite fee at least ninety days prior to the expiration of his patent. There is no power in the Patent Office to renew a patent after it has nce expired. The preliminary business to extend a patent should be commenced at least six months prior to the expiration.

Many valuable patents are annually expiring which might readily be extended, and, if extended, might prove the source of wealth to their fortunate possessors.

All the documents connected with extensions require to be carefully drawn up and attended to, as any failure discrepancy, or untruth in the proceedings or papers is liable to defeat the application.

In case of the decease of the inventor, his administrator may apply for and receive the extension; but no extension can be applied for or granted to an assignee of an inventor. Parties desiring extensions will address MUNN & CO., 37 Park Row, N. Y.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

The general rule is, that whatever is really embraced in the original invention, and so described or shown that it might have been embraced in the original patent, may be the subject of a reissue.

Reissued patents expire at the same time that the original patent would have done. For this reason, applications for reissue will be acted upon immediately after they are completed.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts.

One or more divisions of a reissue may be granted, though other divisions shall have been postponed or rejected.

In all cases of applications for reissues, the original claim is subject to re-examination, and may be revised and restricted in the same manner as in original applications.

But in all such cases, after the action of the Patent Office has been made known to the applicant, if he prefers the patent originally granted to that which will be allowed by the decision of the Office, he has the privilege of abandoning the latter and retaining the old patent.

The documents required for a Reissue are a Statement, Petition, Oath, Specification, Drawings. The official fee is $30. Our charge, in simple cases, is $30 for preparing and attending to the case. Total ordinary expense, $60. Reissues may be applied for by the owners of the patent.

By means of Reissue, a patent may sometimes be divided into several separate patents. Many of the most valuable patents have been several times reissued and subdivided. Where a patent is infringed and the claims are doubtful or defective, it is common to apply for a Reissue with new claims which shall specially meet the infringers.

On making application for Reissue, the old or original patent must be surrendered to the Patent Office, in order that a new patent may be issued in its place. If the original patent has been lost, a certified copy of the patent must be furnished, with affidavit as to the loss. To enable us to prepare a Reissue, the applicant should send to us the original patent, result as stated, and give a clear statement of the points which he wishes to have corrected. We can then immediately proceed with the case. Address MUNN & CO., 37 Park Row, New York. We have had great experience in obtaining Reissues.

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the subject admits. A Caveat consists of the Petition, Oath, Specification, and Drawings. The Government fee for filing a Caveat is $10, and our ordinary charge to prepare the documents and attend to the whole business from $10 to $15. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words, and fees, $25 in full. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

Quick Applications.—When, from any reason, parties are desirous of applying for Patents or Caveats, in GREAT HASTE, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions for them. We can prepare and mail the necessary papers at less than an hour's notice, if required.

Interferences.—When each of two or more persons claims to be the first inventor of the same thing, an "Interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public.

Advertisements.

The value of the Scientific American *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

RATES OF ADVERTISING.

Back Page.....75 *cents a line.*
Back Page, for engravings.....$1.00 *a line.*
Inside Page.....40 *cents a line.*
Inside Page, for engravings.....60 *cents a line.*

BODINE'S JONVAL TURBINE WATER WHEEL, combining great economy in the use of water, simplicity, durability, and general adaptation to all positions in which water can be used as a motive power.



The undersigned manufacturers of the above wheel are prepared to furnish and warrant the same to give more power than any overshot or other turbine wheel made using the same amount of water. These wheels have been tested with all the wheels of note in the country, and have never failed to prove their superiority. We therefore propose to put them in for any responsible party, warranting them to work up to our representations, failing in which we will take them out at our own expense. The attention of millwrights is invited to this wheel. Agents wanted in every county in the United States and Canadas. Send for descriptive circular.

J. H. BODINE & CO.,
2-eow* Mount Morris, New York.

TO RAILROAD MEN, CAPITALISTS AND OTHERS.

For Sale, several valuable Patents in the United States of America, viz:

First, For the manufacture of Railroad Frogs and Filled wing Rails.

Second, For bracing the ends of Railroad Rails with steel and for other purposes.

Third, Reversible Forge Rolling Machine for re-rolling and repairing Rails, and forging all kinds of Malleable metals.

Fourth, A new Railroad track, with nut lock latch, etc.

The value of these Patents has been fully tested by "The Steel, Iron & Railway Works Co.," Toronto, who have purchased the Patent rights for the Province of Canada, at whose works on Strachan Avenue, Toronto, the machinery connected with the working of the Patents can be seen in operation.

Address, JOHN L. BLAIKIE, Esq., Toronto, Canada.

Refference is permitted to

George L. Reid, Esq., Engineer Great Western Railroad of Canada, Hamilton, Canada.

E. P. Hannaford, Esq., Engineer Grand Trunk Railroad, Montreal, C. E.

C. J. Brydges, Esq., General Manager, Grand Trunk Railroad, Montreal, C. E.

Frederick Cumberland, Esq., Manager Northern Railroad of Canada, Toronto, C. W.

Toronto, C. W. March 19, 1867. 14 13

WATER WHEELS.—The Helical Jonval Turbine is manufactured by
15 tf] J. E. STEVENSON, 40 Dey street, New York.

TO SOAP MANUFACTURERS.

Plans of Factories, drawings of apparatus, recipe to prepare every kind of lyes, and the following soaps:—Hard, Soft, Castile, Fancy, Rosin, Family, Wax, Palm and Cocoa, Toilet, Powder, Transparent, Silicated. Assays of alkalies, lyes, limes, acids, greases, oils, soaps.

Address Prof. H. DUSSAUCE, Chemist,
1] New Lebanon, N. Y.

CAN We Think of Two Things at Once? See answer in April No. Phrenological Journal. Only 20 cents, or $2 a year. Newsmen will get it.

$20 PER DAY.—Agents wanted in every State to introduce Purington's Alarm Money Drawer. For terms address
15 15] A. S. TURNER, Willimantic, Ct.

IMPROVED ENGINE LATHES, BORING ENGINES, MILLING MACHINES, Etc., LATHE CHUCKS.

The Largest Variety of Sizes and Styles to be found in New England.

WOOD TURNING LATHES,

With Slide Rests, Turning Rests, Screw Centers, etc. For illustrated circular address L. D. FAY,
15 eow4*] Worcester Mass.

TO MANUFACTURERS OF COTTON SPINNING MACHINERY, and others.—For Sale, the American Patent Right for

HAMER'S Patent SPRING and PLATE,

To be used in Carding, Drawing, and other Cans. It prevents the Silver becoming uneven, stretched, torn, or broken. It causes the Silver to be gradually raised up from the bottom of the can to near the top of the delivery. Offers for State Rights, or Sole Right for the United States to be made to WILLIAM HAMER,
15] Little Lever, near Bolton, Lancashire, England.

PICTORIAL DOUBLE NO.—Prof. Agassiz, the Reverend Drs. Chapin, Sawyer, Osgood, Bellows, Frothingham, Hedge, Collyer, Ryder, Clarke, Emerson, Bartholomew, Ballou, and Hepworth. Also, ex-Gov. Blair and Philo Parsons, of Michigan. Woman's Rights; Shaker Communities and Religion; Aboriginal Legends of North America; Our National Army to-day: Can We Think of Two Things at Once? Pope's Essay on Man; in April number of PHRENOLOGICAL JOURNAL, now ready. Only 20 cents, or $2 a year. Newsmen have it. Address FOWLER & WELLS,
15 2] No. 389 Broadway, New York.

WANTED—A Factory Building.

Important to Capitalists. A factory or building, with or without tools, is wanted immediately for the manufacture of an entirely new machine, never introduced, and of which at least twenty-five thousand will be wanted the first year. Profits five hundred per cent. Work similar to sewing-machine work. The machine bears the same relation to machines in its line that Howe's invention bears to sewing machines, but is more valuable than his invention. Buildings to be put into a new stock company to be formed to buy that and the machine, and part of stock to be taken in place where factory is situated. The invention is not a fiction, but a practical reality, twenty-five full-size machines having already been constructed and thoroughly tested. From fifty to one hundred thousand dollars necessary to be subscribed. Location unimportant; the manufacture will be started where the best inducements are offered. This is really an extraordinary opportunity for any community to secure a business in its midst which will shortly require several hundred workmen. Address, giving full particulars, C. A. S.,
Care of S. R. NILES, Newspaper Advertising Agent,
15 1—N.] Scollay's Building, Boston, Mass

YEAR BOOK OF FACTS, 1866–'67.

—JUST PUBLISHED—

The Annual of Scientific Discovery

FOR 1866 AND 1867;

Or, Year Book of Facts in Science and Art, exhibiting the most important Discoveries and Improvements in Mechanics, Useful Arts, Natural Philosophy, Chemistry, Astronomy, Meteorology, Zoology, Botany, Mineralogy, Geology, Geography, Antiquities, etc., together with a List of Recent Scientific Publications; a Classified List of Patents; Obituaries of Eminent Scientific Men. Edited by Samuel Kneeland, M.D. With a fine likeness of Hon. David A. Wells, U. S. Rev. Com'r, and former editor of this work. 12mo.....$2 00.

In consequence of Mr. Wells' engagement with the U. S. Government, the work for 1866 was delayed until too late to secure its preparation; consequently, the present volume embraces two years—1866, 1867.

VOLUMES OF THE SAME WORK for years 1850 to 1867 (seventeen vols.,) with the Likeness of some distinguished Scientific or Literary man in each.

THE WHOLE SERIES BOUND in uniform style, whith a neat, substantial box.....$30,00;

☞ Each volume is distinct in itself, and contains entirely new matter.

GOULD & LINCOLN,
15 1—E.] 59 Washington street, Boston.

PORTRAIT, Character, and Biography of Prof. Agassiz in April No. Phrenological Journal. 20 cents, or $2 a year. Newsmen have it.



OLD EYES MADE NEW, easily, without doctor or medicines.

Sent, post-paid, on receipt of 10 cts. Address

Dr. E. B. FOOTE,
1130 Broadway, N.Y.



COMFORT and CURE for the RUPTURED.—Sent postpaid on receipt of 10 cents. Address Dr. E. B. FOOTE, author of Medical Common Sense, 1130 Broadway, N. Y. For sale by all Booksellers. Price $1,50.
15 4eow

THE PRACTICAL DRAUGHTSMAN.

THE PRACTICAL DRAUGHTSMAN'S Book of INDUSTRIAL DESIGN, and Machinist's and Engineer's Drawing Companion; forming a complete course of Mechanical Engineering and Architectural Drawing. From the French of M. Armengaud the elder, Prof. of Design in the Conservatoire of Arts and Industry, Paris, and MM. Armengaud the younger, and Amoroux, Civil Engineers. Rewritten and arranged with additional matter and plates, selections from and examples of the most useful and generally employed mechanism of the day. By William Johnson, Assoc. Inst. C. E., Editor of "The Practical Mechanic's Journal." Illustrated by fifty folio steel plates and fifty wood-cuts. A new edition. 4to.....$10 00

[By a Mistake of the Printer, the price of the above Book was advertised in our issue of 30th March (No. 13), as being $1, instead of $10. Persons in want of such a work cannot do better than pay the $10, as it is about the best of its class.—*Pubs. Sci. Am.*]

☞ The above, or any of my books, sent by mail, free of postage, on receipt of price.

☞ My new Catalogue of Practical and Scientific Books sent free of postage to any one who will favor me with his address.

HENRY CAREY BAIRD,
Industrial Publisher,
15 1] 406 Walnut street, Philadelphia.

AMERICAN Army.—For a Statement of its present and prospective condition, see Phrenological Journal for April. 20 cents, $2 a year. Newsmen should have it.

SOLID Emery Wheels—Silicate or Vulcanite. N. Y. Emery Wheel Co., 94 Beekman st., N.Y. 15 10*

THE IMPROVED NUTMEG GRATER—Patented January, 1867. Every person in the country wants one. For State and County Rights address the Patentee. L. V. BADGER,
15 3] Drawer 6140, Post-office, Chicago, Ill.

SCIENTIFIC AMERICAN. FOR SALE. New Series, Vols. 1, 2, 3, 4, 5, and 6, all complete, splendidly bound in Morocco and Marbleized paper, gilt lettered, all for 20 dollars. Address ED. ULLMAN,
15 1*] 37½ Washington Ave., Albany, N. Y.

AMERICAN STEAM BOILER.—Patent Steam Fire Boxes, Water Circulator and Sediment Collector. Patent Pneumatic Ventilator. Combustion, Heat, Ventilation, and Drying. JOS. A. MILLER, C.E. J. E. STEPHENSON, Gen'l Agt., 40 Dey st., N. Y. 15 5*

TO ENGINE BUILDERS.—Ross' Celebrated Patent Oil Cups for Cylinders or Engines, Brass and Iron body, Globe & Check Valves, Gage Cocks, Whistles, etc., on hand and made to order. Price list sent on application. B. E. LEHMAN,
15 tf] Lehigh Valley Brass Works, Bethlehem, Pa.

ENGINES and BOILERS, of all SIZES, on hand. 3,000 feet shafting, new, 10½ cts. per lb. Hangers, Pulleys, Belting, Crushers, Fittings, and Machinery of all descriptions bought and sold at DAVIS' MACHINERY YARD,
15 3*] 120 to 124 Hudson st., Jersey City, near the ferry.

LE COUNT'S IMPROVED HOLLOW LATHE DOG is light, equal in strength to Steel, at one sixth the cost. Set of 12 Dogs, from ⅜ to 4 inches, $17,30. Also, Hollow Machinists' Clamps. Can be had of all dealers. Send for circular.
15 tf] C. W. LE COUNT, South Norwalk, Conn.

INDIA RUBBER CHAIR TIPS—Save 75 per cent of the wear on Carpets and Oil Cloths and render the shifting of chairs perfectly noiseless, besides aading greatly to the durability of the chair. State and County Rights for Sale. Call on or address EDGAR & CAVAN,
1*] 95 Maiden Lane, New York.

FIRE AND POWER PUMPS.—The perfection attained by our celebrated Rotary Power Pumps, made under B. Holly's Patent who also superintends their construction, is illustrated by the fact that a recent fire, in an Oil Refinery, at the city of Auburn, N. Y., was drowned out by the Water Works constructed by the Holly Manufacturing Company, Lockport, N. Y., so that city, the Wheels and Pumps being 3 miles distant from the fire, and the water thrown thence through 1500 feet of hose attached to the nearest hydrant. All villages and cities may be protected as effectually as Auburn by adopting the sure, safe, efficient, and desirable machinery manufactured by the Holly Manufacturing Company, Lockport, N. Y. Send for our new and illustrated catalogue with price list.

T. T. FLAGLER, President.
J. K. McDONALD, Treasurer. 1

STEAM AND THE STEAM ENGINE.

The Marine Steam Engine, by Thomas J. Main, Professor of Mathematics, Royal Naval College, and Thomas Brown, Chief Engineer, R. N: Illustrated by engravings and wood cuts. 8vo., cloth. New edition, $5 00.

☞ The text book of the United States Naval Academy

ABSTRACT OF CONTENTS

INTRODUCTORY CHAPTER. Steam, Water, Caloric, temperature, heat and cold, general effects of heat and cold, expansion by heat, expansion of gases, to ascertain the temperature of any substance, pyrometer, thermometer, method of graduating thermometers, to compare thermometers when differently graduated, the sensations a bad criterion of temperature, radiation, radiating power of bodies—what it depends on; calorimeter, heat generated by mechanical operations, combustion, temperature necessary for combustion, oxidation, effects of galvanic action, temperature of steam, method of obtaining steam, steam distinguished from other elastic fluids, high pressure steam, measure of steam by atmospheres, laws regulating the pressure of steam; pressure, density, and temperature of steam; specific gravity of steam, etc., etc.

CHAP. II. The Boiler—Marine boilers, distinguished from land boilers, gear connected with boilers, the tubular boiler, the number of boilers in each steam vessel, the steam chest, the fire bridge, ash pits, gunboat boilers, feed or donkey engine, boiler hand pumps, the safety valve, etc., etc.

CHAP. III. The Engine—Definition of steam engine, discoveries of Watt, single-acting engine, double-acting engine, high pressure or non-condensing engine, marine steam engine, side lever marine engine, paddle wheels, feathering paddles, reefing the paddles, disconnecting the wheels, methods of disconnecting paddle wheels, immersion of paddle wheels, paddle wheel brakes, the screw propeller, definition—length of screw; definition—angle of screw, pitch of screw, slip of screw, area of screw, thread of screw, diameter of screw, disconnecting the screw, methods of raising the screw, governors in screw ships, etc., etc.

CHAP. IV. Direct action engines, gorgon engines, Fairbairn's engines, Maudslay's double-cylinder engines, Boulton and Watt's direct engines, Messrs. Miller and Ravenhill's direct engines, oscillating engines, engines for working the screw propeller, direct acting screw engines, direct acting geared engines, oscillating horizontal engines, trunk engines, double acting air-pump, Maudslay and Field's return connecting rod engine, Humphrey's engine.

CHAP. V. Getting up the steam—Fully described.

CHAP. VI. Duties to machinery when under steam—Particular directions.

CHAP. VII. Duties to machinery during an action, or after an accident—Full directions, to work engines without cylinder covers.

CHAP. VIII. Duties to engines, etc., on arriving in harbor—Clearly and fully defined.

CHAP. IX. Miscellaneous—Information which no accomplished engineer can afford to be without, with tables on the power, composition and value of coals.

APPENDIX.—To find the circumference of a circle, containing useful rules in mensuration, with numerous useful tables on steam, etc.

ALPHABETICAL INDEX.

Practical Rules for the Proportions of Modern Engines and Boilers, for land and marine purposes. By N. P. Burgh, Engineer. 12mo. $2.

The Slide Valve practically considered. By N P. Burgh. Illustrated. $2.

The Marine Steam Engine. By Thomas J. Main, Professor of Mathematics, Royal Naval College, and Thomas Brown, Chief Engineer, R. N. Illustrated by engravings and wood cuts. 8vo., cloth. $5.

Questions on Subjects connected with the Marine Steam Engine, and Examination Papers; with hints for their solution. By Thomas J. Main, Professor of Mathematics, Royal Naval College, and Thomas Brown, Chief Engineer, R. N. 12mo., cloth. $1 50.

The Indicator and Dynamometer, with their Practical Applications to the Steam Engine. By Thomas J. Main and Thomas Brown. With illustrations. $1 50.

Hand-book for Locomotive Engineers and Machinists. By Septimus Norris, C. E. 12mo. $2,

The Practical Examinator on Steam and the Steam Engine. By William Templeton. 12mo. $1 25.

On Heat and Steam; embracing new views of Vaporization, Condensation, and Expansion. By Charles Wye Williams. With illustrations. 8vo. $3 50.

☞ The above, or any of my Books sent by mail free of postage.

☞ My new Catalogue of Practical and Scientific Books, will be sent free of postage to any one who will favor me with his address.

HENRY CAREY BAIRD,
Industrial Publisher,
1s 1] 406 Walnut street, Philadelphia.

SPRINGS.—BARNES' Patent level tempered Clock Springs, also coiled and small springs of every description, made from the best sheet cast steel by
15 WALLACE BARNES, Bristol, Conn.

REV. Dr. CHAPIN.—See April No. Phrenological Journal for Portrait, Character, and Biography. By first post, 20 cents, or $2 a year. Newsmen have it.

WATER POWER AND MANUFACTURING SITES.

The Holly Manufacturing Company of Lockport, N. Y., will rent water power, and lease or sell two sites adjacent to their own works, for manufacturing purposes. The water power offered is abundant, having 60 foot fall, and is not subject to variations by freshet or drought, being supplied from Lake Erie and the great chain of lakes connected therewith, thus providing a never-failing supply of water. The building sites offered are in the heart of the city of Lockport, having the Erie Canal on one side and the New York Central Railroad on the other, and are large enough for an extensive manufacturing business.

Full information as to this rare opportunity for parties who desire to engage in manufacturing will be given on application by letter or in person, the latter recommended. Lockport, April 3, 1867.

NINE FOOT BORING MILL.—WE have in the hands of the workmen two of these most substantial tools which will weigh from 18,000 to 19,000 lbs., one of which is sold to the Messrs. Roots, of Connersville, Ind., to whom we refer any person who may wish to purchase that kind of tool, or any other for the machinist's use. For further particulars address STEPTOE, McFARLAN & CO., Cincinnati, Ohio, manufacturers of machinists tools and wood-working machinery. 15 4

THE "McGOWAN" AND "BUCKEYE" Patterns Double-acting Hand and Power Pumps. Patented 1863. For railroads, factories, mills, etc. Manufactured by McGOWAN BROTHERS, 94 and 96 Elm St., Cincinnati, Ohio. Send for circular. 15 13

MACHINE BELTING.—Superior Oak-tanned Leather Belting, all sizes, on hand and for sale cheap. ALBERT POTTS,
15 5*] N. E. cor. Third and Willow sts., Philadelphia.

WOODWORTH PLANERS A SPECIALTY.—New paterns, with the very best improvements. The largest mills are adopting them. Government prefers them to all others. Send for cuts.
E. C TAINTER, Worcester, Mass.

I bought the letters and orders of our late firm, J. A. FAY & CO, Worcester, Mass., and am prepared with better facilities than ever to fill your orders promptly.
Central, corner of Union street, Worcester, Mass. 15 3*

FOR SALE—ONE BLOWING ENGINE, complete without boiler; Steam Cylinder, 11 in. dia. by 4 ft. stroke; Blowing do., 42 in. dia. by 4 ft. stroke; Fly Wheel, 14 ft. dia.; one Air Receiver, 6 ft. dia. by 8 ft. long—this engine would be suitable for a small blast furnace blowing about 8 lbs. pressure to the square inch. Apply at the office of West Point Foundery, 30 Broadway. 1

LAKE SUPERIOR MINER—Established in 1845. The oldest and most reliable Copper Mining Paper on the Lake. Terms $2.50 per annum. Published at Ontonagon, Mich. 15 3

AMES' Celebrated Portable and Stationary STEAM ENGINES,
All Sizes, and Superior to all others. Also, PAYES' PATENT TRIP HAMMER.
Write for Circular. [15 12*] H. M. AMES, Oswego, N. Y.

PARTNER WANTED—FOR THE GEORGIA COTTON PLANTER.
To take charge of the manufacture of the above labor-saving machine which is in great demand, for the whole Southern Coast; the other portions of the Cotton States are being supplied. Capital required about $3,000; or, in lieu of capital, an Agricultural Manufacturing firm preferred. One half of the Patent Right for sale for $10,000. Apply to [15 2] A. PACKHAM, Carroll county, Ky.

MODE of Creation, Atlantic Gold Fields, Giving while Living, Fishes in Convention, Carboniferous and Glacial Periods, Signs of Health, in April No. Phrenological Journal; 20 cents, $2 a year. Ask your News man for it.

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports, etc., on the useful arts. 1 tf

BEET SUGAR MAKING.—AN EXPERience of twenty-five years as makers of the most improved cane sugar machinery and refining machinery, as well as the possession of complete drawings of the MOST SUCCESSFUL EUROPEAN BEET-SUGAR FACTORIES, with details of the machinery and processes employed, enable the undersigned to give correct estimates and to execute orders for such work with fidelity and promptness MERRICK & SONS,
13 10s 3ts] Southwark Foundery, Philadelphia.

PETROLEUM,
Professor Dussauce is ready to furnish plans of oil factories, drawings of apparatus, with complete processes to manufacture, refine, deodorize, and discolorize petroleum. Also processes to prepare lubricating oils and greases. By particular processes, benzine, aniline and colors of coal tar have been obtained from petroleum; he can indicate their preparation. Every kind of information desired on the subject will be noticed and immediately answered. Address
Prof. H. DUSSAUCE, Chemist,
1*] New Lebanon, N. Y.

PETELER'S PORTABLE RAILROAD.—The object of this Portable Railroad is manifold, and its application almost unlimited. It can be easy laid on common roads, rugged or marshy places, for building railroad beds, common roads, excavations, improving and cultivating land, etc., etc., by its use a great deal of time and money will be saved. For circulars apply to the Patentee. A. PETELER,
14 2*] New Brighton, Richmond Co., N. Y.

FABRICATION OF VINEGAR.
Prof. H. DUSSAUCE, Chemist, is ready to furnish the most recent methods of manufacturing Vinegar by the slow and quick processes, with and without alcohol, directly from corn. Also, process to manufacture vinegar and acetic acid by distillation of wood. Methods of assaying vinegars. Address
1*] New Lebanon, N. Y.

AIR SPRING FORGE HAMMERS ARE made by CHAS. MERRILL & SONS, 556 Grand street, New York. They will do more and better work, with less power and repairs, than any other Hammer. Send for a circular. 4 tf

LENOIR GAS ENGINES—Without Boiler or Fire. From ½ to 4-horse, for hoisting, pumping, etc. For sale at the Co.'s Works, 435 East 10th st., N. Y. 14 8*

FOR SALE OR LICENCE ON ROYALty. A new wrench; Munn & Co. say "'tis the best we have seen." Patent just ordered to issue. Address S. S. BARNABY, Macon, Ga. 13 3*

FOR SALE—One 24-foot Hadley Falls Lathe, 30 in. swing, with extension to swing 40 in. Back and follower rests, gibbed without screw. Also, one 7-foot pulley, 20-in. face, 6⅞ bore. Address
13 3*] THOMAS MANF'G. CO., Thomaston, Conn.

TO INVENTORS AND OTHERS.
Notice is hereby given that the members of a Commission, acting under the authority of the Secretary of the Treasury, will meet in the city of New York at the Office of the Supervising Inspector of Steamboats, No. 23 Pine street, on the SECOND MONDAY in April proximo, for the purpose of examining and testing the merits of such Inventions of a life-saving character as may be brought before them.
Said Inventions will embrace Boilers of Steam-engines, Anti-incrustators, Safety-valves, Steam-gauges, Water-gauges, Steering Apparatus, Life-boats, with detaching apparatus, &c., &c., &c.
Inventors may appear in person before the Commission, for the purpose of explaining their inventions; but no expenses will be allowed under any circumstances.
H. McCULLOCH,
Secretary of the Treasury.
WASHINGTON, D. C., March 13, 1867. 13 3*

THE BISHOP GUTTA PERCHA COMPANY—The original and only manufacturers in the United States of pure Gutta Percha Goods, Gutta Percha Insulated Submarine Telegraph Cables, Insulated Telegraph Wire, Water, Beer and Soda Pipe, Chemical Vessels, Tissue Sheet for hatters, Artificial Flower Makers, etc. Factory, Nos. 208, 210 and 212 East 25th street. Office and salesroom, No. 113 Liberty street (west of Broadway), New York. SAMUEL C. BISHOP,
13 4*] General Agent.

TURBINE WATER WHEEL, VALENTINE & CO., Ft. Edward, N. Y. This is thoroughly proved a first-class wheel. New Improvements, prices moderate. Agents wanted in every Co. Circulars gratis. 13 4*

JOSEPH C. CLAYTON,
COUNSELLOR-AT-LAW,
ADVOCATE IN PATENT CAUSES,
Intelligencer Building, Washington City, D. C. 13 10*

CARPENTERS & BUILDERS.

SEND for Catalogue of New Architectural Works inclosing stamp.
13 tf] A. J BICKNELL, 282 River st., Troy, N. Y.

HUTCHINSON & LAURENCE, 8 Dey st., Have on hand, and furnish to order, Steam Engines and Boilers, Circular-saw Mills, Cotton Gins, Iron & Wood-working Machinery, Shafting Belting, etc. 12 4

IMPORTANT to EVERY HOUSEKEEPER—Read advertisement, No More Poor Bread, in No. 11 Scientific American. 12 4

MILL-STONE DRESSING DIAMONDS Set in Patent Protector and Guide. Sold by JOHN DICKINSON, Patentee and Sole Manufacturer, and Importer of Diamonds for all mechanical purposes; also, Manufacturer of GLAZIERS' DIAMONDS, No. 61 Nassau street, New York City. Old diamonds reset. N. B.—Send postage stamp for descriptive circular of the Dresser. 9 12*

PATENT SHINGLE, STAVE, AND Barrel Machinery, Comprising Shingle Mills, Heading Mills, Stave Cutters, Stave Jointers, Shingle and Heading Jointers, Heading Rounders and Planers, Equalizing and Cut-off Saws. Send for Illustrated List. FULLER & FORD,
9 8* tf—C.] 282 and 284 Madison street, Chicago, Ill

A MESSIEURS LES INVENTEURS—Avis important. Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Francais peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications recived in confidence.
MUNN & CO.,
Scientific American Office, No. 37 Park Row, New York.

500 AGENTS Wanted in a new business.
11 13* N.] H. B. SHAW, Alfred, Me.

$25 A DAY! Fifteen new articles for Agents. [11 13*N.] O. T. GAREY, Biddeford, Me.

ROLLING MILL ENGINES—WITH Sault's patent Frictionless Slide Valve, link motion reverse gear, shafting, hangers, mill gear, etc. Address
11 23* tf] M. & T. SAULT, New Haven, Conn.

PATENTEES TAKE NOTICE.
Having made large additions to our works, we can add one or two machines to our list of manufactures. The machines must be strictly first class, and well protected. BLYMYER, DAY & CO., Manufacturers of Agricultural Machines and Tools Mansfield, Ohio. 9 tf

THE CELEBRATED "SCHENCK" WOODWORTH PLANERS, WITH NEW AND IMPORTANT IMPROVEMENTS, Manufactured by the SCHENCK MACHINE CO., MATTEAWAN, N. Y.
JOHN B. SCHENCK, President.
T. J. B. SCHENCK, Treas. 11 tf

1866.—TOPLIFF'S PATENT PERPETUAL LAMP WICK, received First Premium at N. Y. State Fair, and special premium, Book of Transactions. Needs no trimming. Rare inducements to Agents. Sample sent for 20 cents; two for 30 cents. MURPHY & COLE, 81 Newark ave., Jersey City. 5 tf 6

HARRISON STEAM BOILER.
NO MORE DESTRUCTION OF LIFE AND PROPERTY BY STEAM BOILER EXPLOSIONS.
GREAT REDUCTION IN PRICE.
From the rapid manner in which the HARRISON STEAM BOILER is coming into use, but little need be said of its conceded merits.
They may be summed up briefly as follows:—
Absolute safety from explosion, as it cannot be burst under any practicable steam pressure.
Less first cost.
Economy in fuel equal to the best in use.
Facility of transportation.
It occupies but about one third the ground area of ordinary boilers, with no increase in hight.
In consequence of recent improvements in its manufacture, this Boiler can be furnished to the public AT LESS COST than heretofore, and is now much the cheapest article in the market.
For Price and Circular apply to JOSEPH HARRISON, Jr., Harrison Boiler Works,
5 12*] Gray's Ferry Road, Philadelphia.
Branch Office, 119 Broadway, New York, Rooms 9 and 10 I. B. HYDE Agent

R. BALL & CO.,
SCHOOL STREET, WORCESTER, MASS.,
Manufacturers of Woodworth's, Daniell's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood.
Send for our Illustrated Catalogue. 1 25*

WOOD, LIGHT & CO.—MANUFACturers of Machinists' Tools and Naysmyth Hammers, Lathes from 4 to 30 feet long, and from 15 to 100 inches swing. Planers from 24 to 60 inches wide and from 4 to 46 feet long. Upright Drills. Milling and Index Milling Machines. Profile or Edging Machines. Gun Barrel Machines Shafting, Mill Gearing, Pulleys and Hangers, with Patent Self-oiling Boxes.
Works, Junction Shop, Worcester, Mass.
Warehouse at 107 Liberty street, New York. 10 tf

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address
J. C. HOADLEY & Co., Lawrence, Mass. 1 tf

SPOKE AND HANDLE MACHINE.—For turning Spokes, Yankee Ax, Plow, Pick, Adze, and Hammer Handles, Whiffletrees, and irregular forms generally. Capacity 180 Spokes and 200 Hammer Handles per hour. For cut and description, address the Subscriber, Manufacturer and Patentee, at Warren, Trumbull county, Ohio. [7 10*] E. R. WISELL.

RICHARDSON, MERIAM & CO.,
Manufacturer and Dealers in DANIELS'S AND WOODWORTH PLANERS,
Boring, Matching, Molding, Mortising and Tenoning Machines, Scroll, Cut-off, and Slitting Saws, Saw Mills, Saw Arbors, Spoke and Wood-turning Lathes, and other wood-working Machinery. Warehouse, 107 Liberty street, New York. Manufactory, Worcester, Mass. 10 tf

THE EUROPEAN INVENTOR'S AGENCY CO., 96, Newgate street, London, E. C.
MR. T. BROWN, C. E., Manager.
This Company undertake the purchase, sale, or licensing of Patents in any part of the World, on Commission only.
No business as Agents for procuring Letters Patent undertaken.
Information for Inventors or Owners of Patents, or for those desirous of purchasing Patents, will be freely given.
The Offices of the Company are at the disposal of Inventors and those interested in Inventions; also, for the convenience of those having no London address their letters can be addressed to the offices.
Further particulars on application. 1 18*

GRIST MILL AND FACTORY SITE near New York, for sale cheap. Address
15 3] H. D. BEACH, Tom's River, N. J.

PRESSURE BLOWERS—Equal in Force to Piston Blowers, and a perfect substitute for both Fan and Pistons—running more easily than either. Adapted for Blast, and Cupola, and Heating Purposes, Forges, Steamships, Boilers, Ventilation, etc., etc. Prices according to sizes, ranging from $25 to $1,500. Address, for Circular B. F. STURTEVANT,
13 tf] 72 Sudbury street, Boston, Mass.

ESTABLISHED
1842. HARDWARE AND TOOLS. A. J. WILKINSON & CO., **1842.**
No. 2 Washington street, Boston, Mass.,
Offer a superior Stock of Tools, in which may be found Bangor Squares; Center and Universal Squares; U. S. Scales; Protractors; Vernier Callipers; Thread Gages; Surface and combination Gages; Stubbs' Fine Tools, Files, Drill Wire, and Cast Steel; Morses' Twist Drills, Sockets, and Chucks; Lathes—20, 28, and 36-in. beds, with or without foot motion; Hand Tools for turning; Addis Carving Tools; Monk's Molders' Tools; Pond's Carriage Tools; Bailey's Iron Planes; Wilkinson's Polished Planes (unequaled); John Martin's Files. Agents for Horton's, Chushman's, and Beache's Chucks; Pattern Letters; Rolled Brass, German Silver, and Wires; Wellington Mills Emery, Emery Cloth, Emery Wheels; Chests of Tools, all sizes, etc., etc.
Their reputation for a full assortment, superior quality, and all the new inventions, will be fully sustained. Orders promptly filled. 13 6eow

RICHMOND'S Empire Conical Bran Duster and Bolt. Adjustable while running. Warranted the best in use or no sale. For Circular and Price List, address [13 6eow*] JAS. RICHMOND, Lockport, N. Y.

HYDRAULIC JACKS and HYDRAULIC Punches manufactured by E. LYON, 470 Grand street. Send for a Circular. 1 13* eow

MACHINERY.—S. C. HILLS, No. 12 Platt street, New York, dealer in Steam Engines, Boilers, Planes; Lathe, Chucks, Drills, Pumps; Mortising, Tenoning and Sash Machines, Woodworth's and Daniels's Planers, Dick's Punches, Presses and Shears; Cob and Corn Mills; Harrison's Grist Mills, Johnson's Shingle Mills; Belting, Oil, &c. c

FOR SALE.—
The most complete set of Machinery in the United States for the manufacture of Wood, Pocket, and Dressing Combs. There are no goods of this kind in the market, and there is great call for them.
The parties owning the machinery being engaged in other business is the reason for selling the machinery. Enquire at 92 Church street, N. Y., or at the Carpetbag Factory, Middletown, Orange County, N. Y.
Also, Button-mold Machinery, unequaled by any others; there is great call for these goods, also.
14 4*] MATTHEWS BROTHERS.

FURNACE FOR SALE.—
The Subscriber offers for sale a valuable Furnace Property, called Bath Furnace, situated in Rockbridge County, Virginia, containing about 7000 acres. There is a fine and permanent water power, abundance of the best ores, good wood, and manganese. The buildings are of no value, but its ores, etc., and its convenience of transportation—being within two miles of Goshen, on the Virginia Central Railroad—renders it a truly desirable and valuable investment. A map and description of the property can be seen at the office of R. W. Templeman & Co., Baltimore, or by addressing me at Buffalo Forge, Rockbridge County, Va. [14 4] D. C. E. BRADY.

CUTLERY MACHINERY Made at the Thomas Iron Works, Worcester, Mass. 14 6*

A MACHINE SHOP IN A VERY DEsirable and central location in the city of Chicago, doing a good business, with a steady growing demand for its manufacture, is offered for sale; capital required from $20,000 to $30,000. For further particulars and reasons selling, address Post Office Box 1,129, Chicago, Ill. 14 4*

STEAM ENGINES.—COOK, RYMES & Co.'s celebrated first-class stationary, portable and hoisting engines constantly on hand, at their warerooms, 107 Liberty street, New York. 14 8

THE "McGOWAN" AND "BUCKEYE" Double-acting Hand and Power Pumps, for railroads, factories, mills, etc. Manufactured by McGOWAN BROTHERS, 94 and 96 Elm street, Cincinnati, Ohio.
☞ Send for circular. 12 4*



CHASE'S IMPROVED Dollar Microscope, illustrated full size in Scientific American, Jan. 26. Most valuable, amusing, interesting, instructive, and useful thing in the world for old and young, adapted to counterfeit money, cloth, flowers, pictures, living insects, etc., etc. Sent by mail on receipt of $1, with directions, etc. Agents wanted. Address O. N. CHASE
9 La Grange street, Boston, or,
15 tf] FOWLER & WELLS, New York.

MALLEABLE IRON CASTINGS of every description made to order. Address
14 20*] OLNHAUSEN & CRAWFORD, Pittsburgh, Pa.

FOR ENGINE BUILDERS' AND STEAM Fitters' Brass Work, address F. LUNKENHEIMER,
10 26*] Cincinnati Brass Works.

SPOKE-LATHES, TENONING AND Spoke-Polishing Machinery of approved Patterns manufactured by J. GLEASON,
10 10*] 1069 Germantown Avenue, Philadelphia, Pa.

NITRO-GLYCERIN.—
UNITED STATES BLASTING OIL CO.—We are now prepared to fill all orders for Nitro-Glycerin, and respectfully invite the attention of Contractors, Miners and Quarrymen to the immense economy in the use of the same. Address orders to JAMES DEVEAU, Sec.,
2 52*] 32 Pine street, New York

GOULD MACHINE COMPANY,
Of Newark, N. J., and 102 Liberty street, New York.
IRON AND WOOD-WORKING MACHINERY,
STEAM ENGINES, BOILERS, SAW MILLS, ETC. 14 tf

ANDREWS'S PATENT PUMPS, ENGINES, etc.—
CENTRIFUGAL PUMPS, from 90 Gals. to 40,000 Gals. per minute, capacity.
OSCILLATING ENGINES (Double and Single), from 2 to 250 horse-power.
TUBULAR BOILERS, from 2 to 50 horse-power, consume all smoke.
STEAM HOISTERS to raise from ½ to 6 tuns.
PORTABLE ENGINES, 2 to 20 horse-power.
These machines are all first-class, and are unsurpassed for compactness, simplicity, durability, and economy of working. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO.,
1 tf No. 414 Water street N. Y

WHEELER & WILSON, 625 BROADway, N. Y.—Lock-stitch Sewing Machine and Buttonhole do. 1t

FIRST-CLASS MACHINISTS' TOOLS.
PRATT, WHITNEY & CO.,
Flower street, Hartford, Conn.,
Manufacturers of Engine Lathes, (15) fifteen inches to (8) eight ft. swing; Power Planers, (16) sixteen inches to (5) five feet wide, and of any length desired, and special machinery. Also only makers of Engine Lathes with Slate's Patent Taper Attachment, conceded by all who have used it to be most perfect and simple in its construction and almost indispensable for good workmanship.
For a circular and price list address as above. 3 26*

SHAW & JUSTICE'S POWER HAMMER Is Moderate in Price, is driven with one-tenth the power used by other Hammers, and will not cost the one-hundredth part of what is usually spent in repairs. Its power is far in excess of any Hammer known. Manufactured by PHILIP S. JUSTICE,
14 North 5th street, Phila., and 42 Cliff-st., New York.
Shops 17th and Coates-sts., Philadelphia. 8 8* tf

JUST PUBLISHED—THE INVENTOR'S and MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 198 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO. 37 Park Row, N. Y.

PATENT POWER AND FOOT-PUNCHING PRESSES, the best in market, manufactured by N. C. STILES & CO., West Meriden, Conn. Cutting and Stamping Dies made to order. Send for Circulars. [14] tf

MODELS, PATTERNS, EXPERIMENTAL and other Machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos. 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN Office. 1 tf

MASON'S PATENT FRICTION CLUTCHES, for starting Machinery, especially Heavy Machinery, without sudden shock or jar, are manufactured by VOLNEY W. MASON,
14 tf] Providence, R. I.

SETS, VOLUMES AND NUMBERS.
Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

WROUGHT-IRON WELDED TUBE of all sizes, for Steam, Gas, or Water purposes. Brass work and Iron Fittings of every kind to suit the same; also, PEACE'S Improved Gas-Pipe Screwing and Cutting off Machines, for both Hand and Steam power, to screw and cut off from ⅛ to 4-in. pipe, and all other tools used by Steam and Gas-Fitters. Manufactured and for sale by CAMDEN TUBE WORKS, Second and Stevens streets, Camden, N. J. 6 13*

STEAM ENGINES—OF ANY POWER desired for manufactories, of superior construction, with patent frictionless slide valve and variable expansion. Address M. & T. SAULT, New Haven, Conn. 11 23*tf

VAN DE WATER CELEBRATED WATER WHEEL.—For Sale at the Eagle Iron Works, Buffalo, N. Y. [5 11*] DUNBAR & HOWELL.

LATHE CHUCKS—HORTON'S PATENT—from 4 to 24 inches. Manufacturer's address, E. HORTON & SON, Windsor Locks, Conn. 5 25*.

ERICSSON CALORIC ENGINES OF GREATLY IMPROVED CONSTRUCTION.—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton Gins' Air Pumps, Shafting, Pulleys, Gearing Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON,
1 tf—D] 164 Duane street, cor. Hudson, New York.

TO STOVE FOUNDERIES—Valuable Patent for sale. Wilson's combined funnel elbow and damper. See Scientific American of March 9, 1867. Address WILSON & WOOD,
12 5*] Wilmington, Del.

TAYLOR'S PATENT GROOVERS—These groovers will cut a perfect groove, across and with the grain, ¼ to 1¼ inch wide and ⅛ deep—price $35. Sold only by S. C. HILLS, 12 Platt street, N. Y., who has for sale all kinds of machinery 12 4*

FOR SALE.—
Foundery, Machine Shop and Planing Mill, at Waukegan, Ill., thirty-five miles north of Chicago, on the Lake Shore, with a good supply of patterns suited to the times, including patterns for four sizes Stationary Engines, Shop-right Patterns and Flasks for Leonard's Seamless Thimble Skeins, suitable Machinery for Finishing and for Sash, Blinds, and Doors, Planing and Resawing Lumber, with sufficient Power. Will be sold low to a cash customer.
Apply to the subscribers, TIFFANY & LUCAS.
12 5*] Waukegan, Ill.

$200 A MONTH IS BEING MADE with our IMPROVED STENCIL DIES, by Ladies and Gentlemen. Send for our free Catalogue containing Samples and Prices. Address
14 tf—R.] S. M. SPENCER & CO., Brattleboro, Vt.

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, N. Y. 1 tf

WOOD & MANN STEAM ENGINE CO.'S CELEBRATED PORTABLE AND STATIONARY STEAM ENGINES AND BOILERS, from 4 to 85 horse-power. Also, PORTABLE SAW MILLS.
We have the oldest, largest, and most complete works in the United States, devoted exclusively to the manufacture of Portable Engines and Saw Mills, which, for simplicity, compactness, power, and economy of fuel, are conceded by experts to be superior to any ever offered to the public.
The great amount of boiler room, fire surface, and cylinder area, which we give to the rated horse-power, make our Engines the most powerful and cheapest in use; and they are adapted to every purpose where power is required.
All sizes constantly on hand, or furnished on short notice. Descriptive circulars, with price list, sent on application. WOOD & MANN STEAM ENGINE CO.
Utica, N. Y. Branch office 96 Maiden Lane N. Y. City.
1 32*

STATIONARY ENGINES
Built under the BABCOCK & WILCOX PATENTS.
An entirely novel arrangement of valve gear, guaranteed to give a more regular speed, and to consume less fuel per horse-power than any engine in use Call or send for a circular.
HOWARD ROGERS,
1 20*] 59 Vesey street, New York.

PORTABLE AND STATIONARY Steam Engines and Boilers, Circular Saw Mills, Mill Work, Cotton Gins and Cotton Gin Materials, manufactured by the ALBERTSON & DOUGLASS MACHINE CO., New London, Conn. 1 tf

BARNES' Patent SHINGLE MACHINE.—State and county Rights of this unsurpassed machine for sale. It will cut shingles, box stuff, veneering, staves, laths, etc., more rapidly than any other machine, with less power, and can be changed from one to the other instantly. Address H. D. BARNES & CO.,
11 8*] Fair Haven, Conn., for machines or information.

SHEET AND ROLL BRASS.
German Silver, Brass, and Copper Wire, etc. Especia attention to particular sizes and widths for Machinists and Type Founders.
Manufactured by the THOMAS MANUFACTURING COMPANY, Thomaston, Conn. 1 34*

TAYLOR, BROTHERS & CO.'S BEST YORKSHIRE IRON.—This Iron is of a Superior Quality or locomotive and gun parts, cotton and other machinery, and is capable of receiving the highest finish. A good assortment of bars in stock and for sale by JOHN B. TAFT, sole agent for the United States and Canadas, No. 18 Batterymarch-st., Boston. 1 40*—B.

THE BEST POWER HAMMER MADE is the Dead Stroke Hammer of Shaw & Justice. Sizes suited for manufacturing awl blades or engine shafts; consume but little space, and require but little power. Manufactured by PHILIP S. JUSTICE,
14 North 5th street, Phila., and 42 Cliff-st., New York.
Shops 17th and Coates-sts., Philadelphia. 8 8* tf

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven, Ct. 14 tf

CAN I OBTAIN A PATENT?—For Advice and instructions address MUNN & CO., 37 Park Row, New York for TWENTY YEARS Attorneys for American and Foreign Patents. Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN $3 a year; 30,000 Patent cases have been prepared by M. & Co.

IMPORTANT.
MOST VALUABLE MACHINE for all kinds of irregular and straight work in wood, called the Variety Molding and Planing Machine, indispensable to competition in all branches of wood-working. Our improved guards make it safe to operate. Combination collars for cutters, saving 100 per cent, and feed table and connection, for waved moldings and planing, place it above all others. Evidence of the superiority of these machines is the large numbers we sell, in the different states, and parties laying aside others and purchasing ours, for cutting and shaping irregular forms, sash work, etc.
We hear there are manufacturers infringing on some one or more of our nine patents in this machine. We caution the public from purchasing such.
All communications must be addressed "Combination Molding and Planing Machine Company, cor. 1st ave. and 24th-st., New York, where all our machines are manufactured, tested before delivery, and warranted.
Send for descriptive pamphlet. Agents solicited. [14 tf

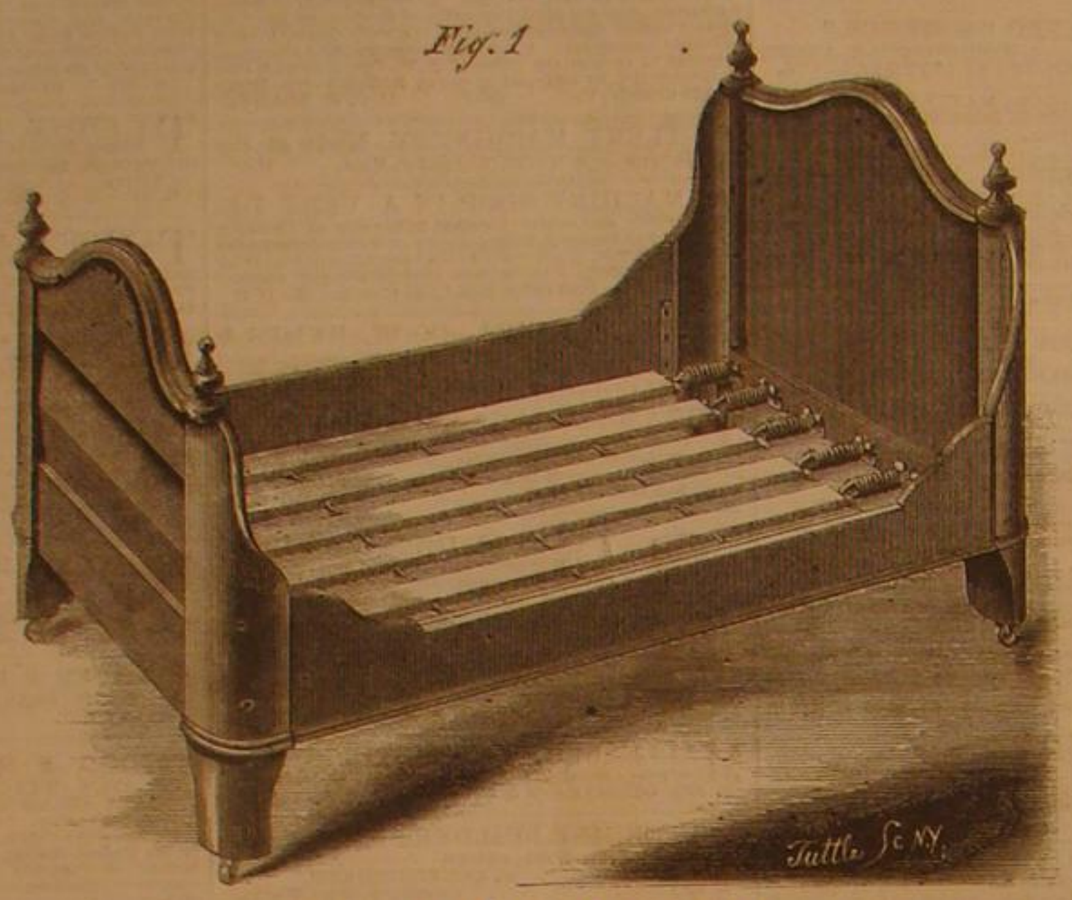
OIL! OIL!! OIL!!!
For Railroads, Steamers, and for machinery and Burning. PEASE'S Improved Engine Signal, and Car Oils, indorsed and recommended by the highest authority in the United States and Europe. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American", after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No 61 and 63 Main street, Buffalo N. Y.
N. B.—Reliable orders filled for any part of the world. 1 tf

Improved Spring Bed Bottom.

The spring beds now so generally in use would have been regarded by our hardy ancestors as evidences of enervating luxury not to be tolerated; but there is a sense of genuine comfort in the use of a gently yielding couch, which is stronger than our respect for the sterner virtues. We have these beds of all styles, their elasticity insured by rubber and metallic springs, of all forms. The one herewith presented differs in some important respects from others.

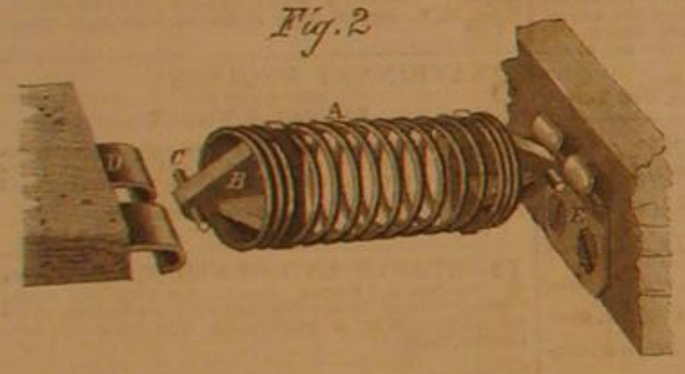
Fig. 1 is a perspective view of a bedstead with the spring slats in. Fig. 2 is a view of one of the springs with a section of a slat and bed rail. The object of the improvement is a bed bottom so constructed and arranged that the weight upon any one slat will be distributed to the contiguous ones, and to allow any slat to be detached from the others and removed from the bedstead without the disturbance of other parts. The springs, A, Fig. 2, at each end of the slats are spiral springs of steel wire. A double T-shaped piece of metal, B, with projecting snugs to engage with the coil is inserted at each end of the spring, having on its outer end a pin, C, which engages with the curved loop, D, on the slat, and at the other end with a reversed curved loop, E, on the bed rail. At proper distances on the slats are placed hooks and staples, seen in Fig. 1, which connect all the slats together, thus distributing the pressure placed upon any one of the slats. The seats of chairs, sofas, and settees may be constructed in the same manner. If properly tempered, the steel springs are indestructible.

Fig. 1



CROSS' SPRING BED BOTTOM.

Fig. 2



This arrangement is the subject of a patent issued through the Scientific American Office, January 8, 1867. For further information address E. S. Cross, of Lime Rock, Conn., who will furnish information relative to the sale of rights, etc.

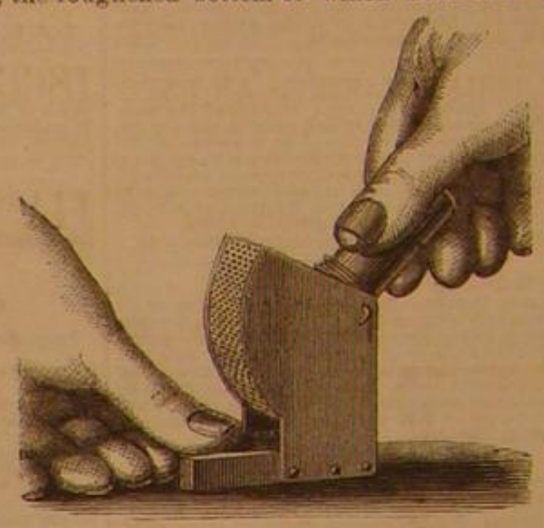
The Alexandra Palace.

This is the name of a magnificent structure now being erected by a limited company, on Muswell-hill, near London, for monster concerts, exhibitions, and other entertainments on the large scale. It consists of a nave 900x85 feet, crossed by three transepts, a central one 430x85 feet, and two near the ends, each 320x85 feet. A great dome rises over the intersection of the nave and central transept, 170 feet in diameter and 220 feet high. Externally, the whole outline of the nave and transepts is covered by a brick structure fifty feet deep, in a handsome Italian style, in two colors of brick, white ground and red arches, with facings of Portland stone. The grand orchestra, nearly under the dome, will accommodate 3,000 performers, and the auditorium space adjoining will accommodate 20,000 persons without crowding. There will also be smaller concert rooms and a theater within the building. A large variety of refreshment and dining rooms are also provided.

Handsome terraces, shaded with trees and adorned with turf and flowers, walks and arbors, surround the palace, and one of them, 1,000x160 feet, covers a railway station into which all the London railways will run their trains. The palace will not be opened until next year.

BADGER'S IMPROVED NUTMEG GRATER.

The little implement shown in the engraving will commend itself for simplicity and efficiency to the cook and housekeeper. It is a quadrant of tin secured to a little platform of wood, the face of the segment being perforated to form a grater. Inside is a tube large enough in diameter to receive a nutmeg. It is a double tube, the outside case being half as long as the inside, and pivoted at the top to the angle of the quadrant so as to swing its other end around the segment. This outer tube is open at both ends and receives a longer one the bottom of which is roughened by perforations. The nutmeg is dropped into the bottomless outer case thus coming in contact with the segmental grater, when the inner tube is inserted, the roughened bottom of which holds it firmly while



the hand swings the tube back and forth, at the same time pressing the inner tube down. The method of holding and operating is seen by the position of the hands in the engraving. One advantage of this grater is that the nutmeg can be powdered so long as any of its substance remains; and another that there can be no abrasion of the fingers in the operation of grating. The tube is long enough to receive a number of nutmegs at once.

This device was patented through the Scientific American Patent Agency, January 8, 1867, by L. V. Badger, whom address, Drawer 6140, Chicago, Ill. [See advertisement on another page.]

The Chemical Force of the Solar Light (actinism), upon which organic nature depends so largely for life and health, varies very much under different conditions: so much so that within the tropics it is said to be very difficult to obtain good photograms. The apparatus for determining it relatively has lately been inproved by Bunsen and Roscoe, in a manner analogous to that for measuring ozone. After many experiments they have succeeded in preparing paper of a standard sensitiveness, in which the tint produced in a given number of seconds varies in exact proportion to the intensity of chemical force in the light employed. It was found in that climate (France) that the actinic intensity varied from 1 to 20 between December and June. The vitality of plants and animals is very much assisted or retarded by this variation. Physiologists are begining to set a high value upon light as a preservative and restorative of health.

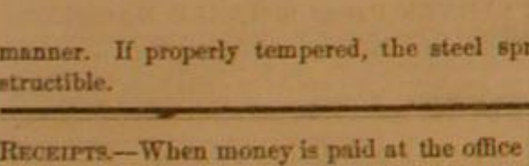
Receipts.—When money is paid at the office for subscriptions, a receipt for it will be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona- cknowledgment of their funds.

City Subscribers.—The Scientific American will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

Advertisements.

A limited number of advertisements will be admitted in this page on the following terms:— Seventy-five cents a line, each insertion, for solid matter; one dollar a line for space occupied by engravings.

GOOD CHANCES TO MAKE MOMEY.—Several New and Valuable Patent Rights on Articles used in every family, for sale by States or Counties. Call on or address EDGAR & CAVAN, 15 oct*] 99 Malden Lane, New York.



BLANDYS' PORTABLE STEAM ENGINES AND SAW MILLS. The best in the World. Will saw from 6,000 to 15,000 feet per day. For illustrated circulars, with descriptions, prices, and reports of operators, address the manufacturers. H. & F. BLANDY, 11 oc eow 8] Zanesville, O.

BARTLETT'S TRADE MARK REVERSIBLE SEWING MACHINES.

Now acknowledged to be THE CHEAPEST GOOD SEWING MACHINES. J. W. BARTLETT.....Depot 569 Broadway, New York. ☞ A NEW STYLE, for use by Hand or Foot, at $25. 14

CIRCULAR SAWS,

WITH

EMERSON'S PATENT MOVABLE TEETH.

These Saws cut More and Better Lumber in the same time, and with Less Power, than any other Saw in the world, with Less Expenditure of Labor and Files to keep in order, and never Wear Smaller. Also,

EMERSON'S PATENT GAUGING AND SHARPENING SWAGE,

For Spreading the Points of Saw Teeth. Send for New Descriptive Pamphlet, with Price List.

AMERICAN SAW COMPANY,

2 Jacob street, near Ferry street, New York.

"Nothing Succeeds Like Success."

AMERICAN POPULAR LIFE INSURANCE CO., NOS. 419 AND 421 BROADWAY, N. Y.

Best Lives Taken at Lowest Rates!

Of this Company, Mr. Erastus Brooks, one of its Stockholders and Directors, writes in the Express, of which he is one of the editors:

"The American Popular Life Insurance Company held its first annual meeting a few days since. The business of the first six months has been very successful, and has been conducted upon the safest and most economical business principles, alike for the stockholders and parties insured. There are some plans in the organization of this Company popular in their character, which make it well worth general investigation, and which the officers specially invite.

Extra Lives are Rated Down, and Save Money in this Company.

Send or call for NEW CIRCULAR, explaining the features of the Company. ☞ Agents wanted in City and Country. 14 2os

TURBINE WATER WHEELS.



The REYNOLDS PATENT embodies the progressive spirit of the age. Simplicity, Economy, Durability, Accessibility all combined. The only Turbine that excels Overshots. Awarded the Gold Medal by American Institute.

Shafting, Gearing and Pulleys furnished for all kinds of Mills, made on Mechanical Principles, under my personal supervision, having had long experience. Circulars sent free.

GEORGE TALLCOT,

4 oc 13* tf—R] No. 96 LIBERTY STREET, NEW YORK.

EUROPEAN AGENCY for the Exhibition and Sale of American Patents and Manufactures. BLANCHARD & McKEAN. No. 82 Boulevard de Sebastopol, Paris, France. GEO. A. BLANCHARD.] 19 oct7* [J. A. McKEAN.

MACHINERY.— We are prepared to furnish FIRST-CLASS MACHINISTS' TOOLS OF EVERY DESCRIPTION, ON SHORT NOTICE AND REASONABLE PRICES.

SAMPLES of the TOOLS manufactured by us may be seen at our Wareroom, and we invite an inspection of their Workmanship and Design by those in want of superior Machinery.

NEW YORK STEAM-ENGINE CO. Office and Wareroom 7 os 13* 222 Pearl street, New York.

W. A. ELLIS, Manufacturer of Plow and Cultivator Handles, 14*2 Ashtabula, Ohio.

Zur Beachtung für deutsche Erfinder.

Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder, mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten.

Erkundigungen über die, zur Erlangung von Patenten nöthigen Schritte, können in deutscher Sprache schriftlich an uns gerichtet werden und Erfinder, welche persönlich nach unserer Office kommen, werden von Deutschen prompt bedient werden.

Die Patentgesetze der Vereinigten Staaten, nebst den Regeln und der Geschäftsordnung der Patentoffice, und Anleitungen für die Erfinder um sich Patente zu sichern, sind in Buch-Format von uns in deutscher Sprache herausgegeben, und werden gratis an alle versandt, welche darum mündlich oder schriftlich einkommen.

Man adressire:

MUNN & CO. 37 Park Row, New York.

DRAWING INSTRUMENTS OF EVERY DESCRIPTION— Swiss, German Silver, and French TRANSITS, LEVELS, SURVEYOR'S COMPASSES, etc. DRAWING PAPER, WATER COLORS, etc., And all supplies for Engineers, Architects, and Machinists. Sets of Instruments furnished for schools, and cases made to order. A Priced and Illustrated Catalogue sent free by mail on application. WILLIAM Y. McALLISTER, 8 8* os] 728 Chestnut street, Philadelphia, Pa.

PATTERN LETTERS To put on Patterns, for castings. KNIGHT BROS., Seneca Falls, N. Y. 12 6*

Scientific American.

ENLARGED FOR 1867.

This is the oldest, the largest and most widely circulated journal of its class now published. It is the constant aim of the Editors to discuss all subjects relating to the industrial arts and sciences, in a plain, practical, and attractive manner.

All the latest and best Inventions of the day are described and illustrated by Splendid Engravings prepared expressly for its columns by the first Mechanical Engravers in the country.

It would be impossible within the limits of this Prospectus, to enumerate the great variety of subjects discussed and illustrated. A few only can be indicated, such as Steam and Mechanical Engineering, Fire-arms, Mechanics' Tools, Manufacturing Machines, Farm Implements, Hydraulic Engines, Wood-working Machines, Chemical Apparatus, Household Utensils, Curious Inventions, beside all the varied articles designed to lighten the labors of man in the Shop, Factory, Warehouse, and Household

The Scientific American has always been the Advocate of the Rights of American Inventors. Each number contains a weekly list of Claims of Patents, furnished expressly for it by the Patent Office, together with notes descriptive of American and European Patented Inventions.

Patent Law Decisions, and questions arising under these laws, are fully and freely discussed by an able writer on Patent Law.

Correspondents frequently write that a single recipe will repay them the whole cost of a year's subscription.

With such advantages and facilities, the columns of the Scientific American are of special value to all who desire to be well informed about the progress of Art, Science Invention, and Discovery.

Published Weekly, two volumes each year, commencing January and July.

Per annum	$2 00
Six months	1 00
Ten copies for One Year	25 00

Canada subscriptions, 25 cents extra. Specimen copies sent free Address

MUNN & CO., Publishers, No. 37 Park Row, New York City

SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVI.—No. 16. [NEW SERIES.]

NEW YORK, APRIL 20, 1867

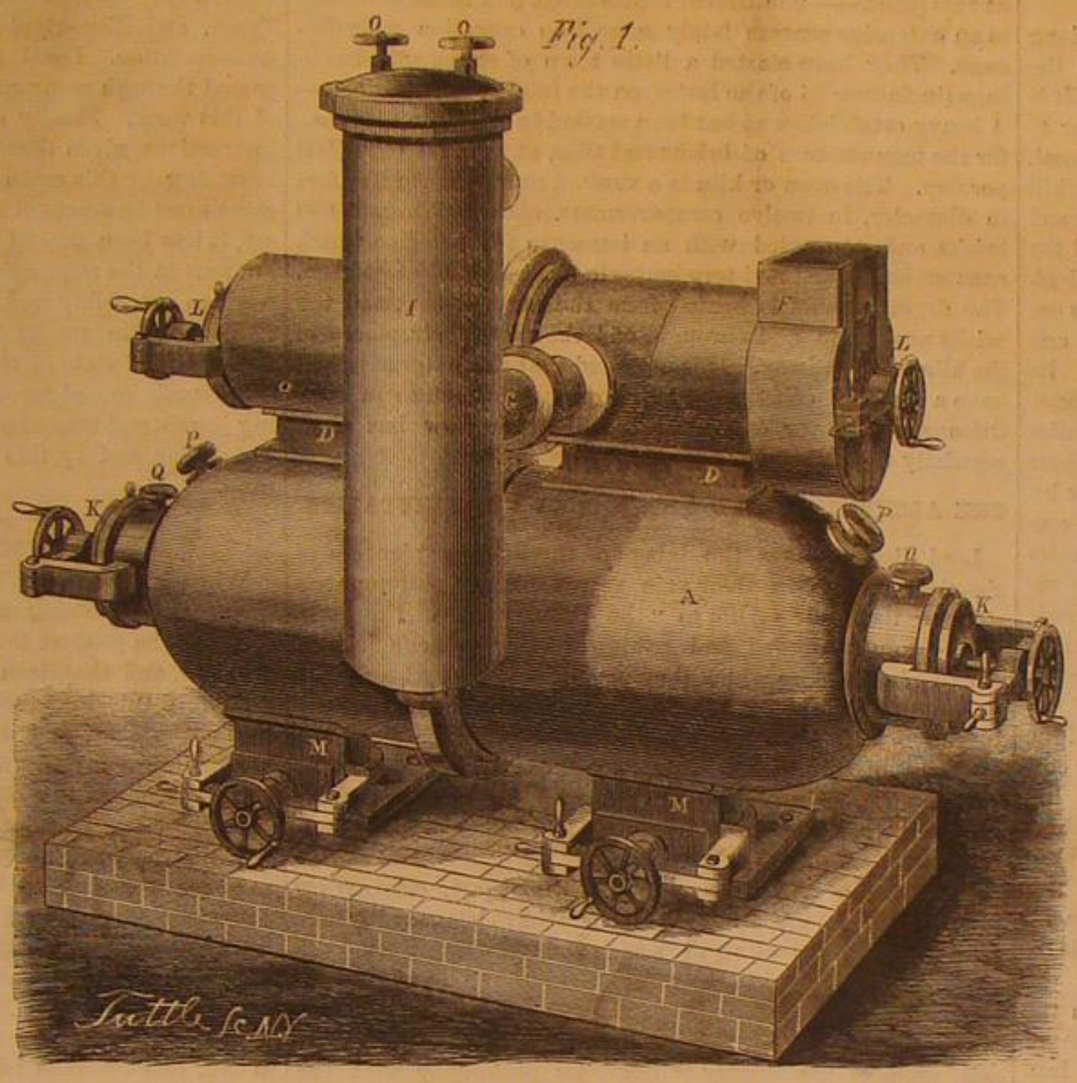
$2 per Annum. [IN ADVANCE.]

Air-Tight Steam Generator.

Attempts have been made for years past to utilize all the heat generated by steam boiler furnaces by burning the fuel under pressure in air-tight furnaces. We believe the principle is successfully used in caloric engines where the products of combustion themselves are used as the motor of the machine. In other instances where the attempt was made we think the failure could not fairly be chargeable to defects inherent in the principle, but in the methods by which it was attempted to reduce it to practice. It can hardly be denied that this method of burning fuel insures the most per fect combustion, and it would seem possible to gain a larger percentage of the heat power for the raising of steam than by the ordinary method. The plan intended to accomplish this result which is represented in the engravings is the invention of George Sill, of Wilkins P. O., Alleghany Co., Pa.

Fig. 1 is a perspective view of the apparatus; Fig 2 is a longitudinal vertical section, through the center of the two horizontal cylinders, and Fig. 3, a similar section through a portion of the upright cylinder. Similar letters of reference indicate like parts in each figure. A designates the main boiler and B the combustion chambers, contained in a shell inside the main boiler. C are the grates, the bars of which are tubular and filled with water to prevent too rapid oxidation and their consequent destruction. The tubes, D, permit the products of combustion to pass into the shells, E, and thence out through the smoke stacks, F, or through the pipes, G—Figs. 1 and 3—into the smoke chamber, H—Fig. 3—in the auxiliary boiler, I. A check valve, J, at the top of the smoke chamber permits the gases of combustion to expand into the auxiliary boiler, I, and also prevents the water from passing into the smoke chamber. The furnace doors, K, have a lining of fire brick and are suspended on hinged yokes through which pass screws worked by hand wheels to set them up snug. Similar doors mounted in the same manner are seen at L, which can be opened to allow the escape of the smoke, etc., into the smoke stacks upon starting the fires and until steam is raised. The ash pits, M, are similarly secured. The pipe at N—Fig. 3—is for blowing out ashes and dirt, and there is a valve for that purpose in the ash pits M. The apertures in the pipes, G, which connect the smoke chamber, are closed by valves, hollow to allow water to circulate through them in order to prevent them from becoming too much heated. They are operated, either singly or together, by the hand-wheels, O, on the top of the vertical boiler. The air necessary for combustion is forced under the grate by a pump or pumps through suitable apertures in the ash pits, and over the grate through the pipes, P. The water is introduced at Q.

Fig. 1.

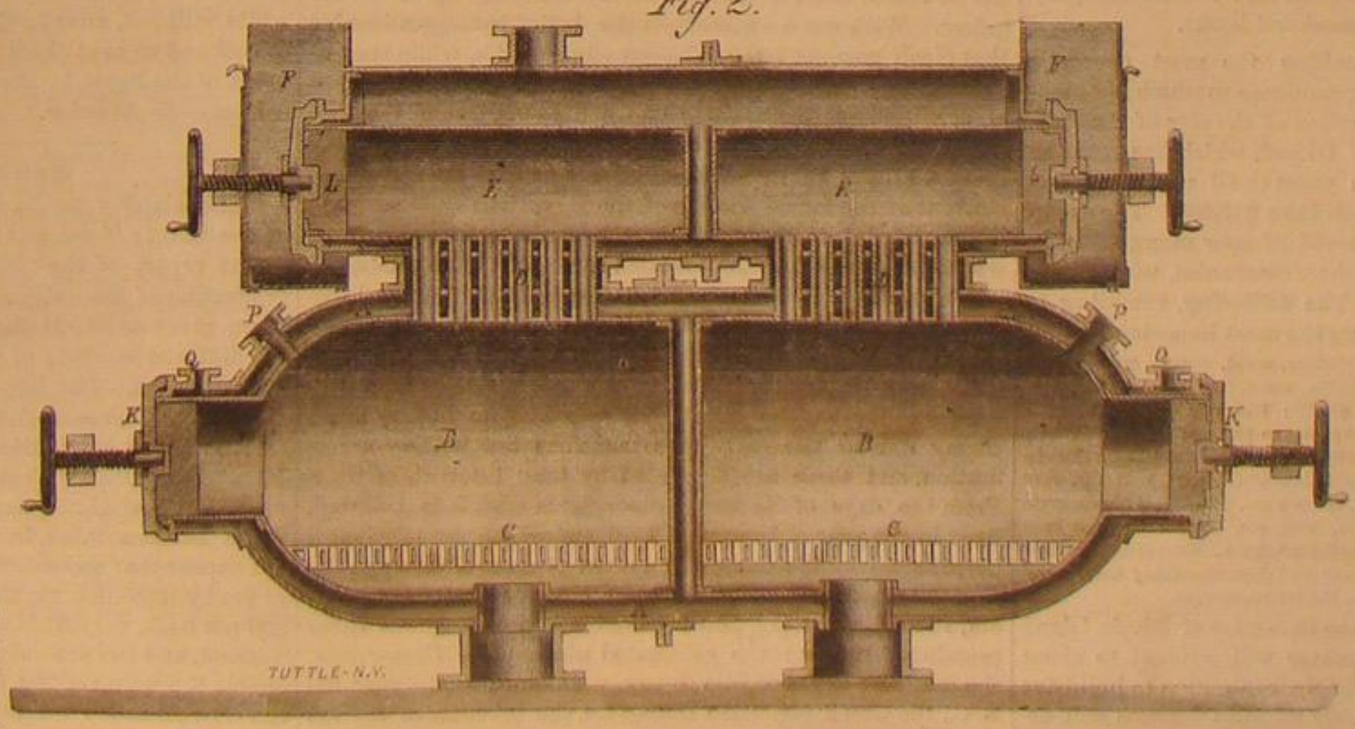


SILL'S AIR-TIGHT STEAM GENERATOR.

Fig. 3.



Fig. 2.



The operation of the apparatus is as follows: The doors, K and L, are opened and also those in the ash pit, M, when the boiler is fired in the ordinary manner, the smoke escaping through the smoke-stacks, until the steam is up sufficiently to run the engine. These apertures are closed after the furnace is well charged, and the air is forced through the apertures under and over the grate, the products of combustion being forced by expansion through the pipes, G, into the smoke chamber, H, and thence up through the check valve, J, into the boiler, I, where they rise through the water and pass with the steam from the main boiler to the engine.

The inventor thinks that the most economical use of this generator would be to employ two engines, one condensing and the other non-condensing, and not allowing the products of combustion to mingle with the pure steam but to use the latter in the condensing engine expansively and the former in the non-condensing engine to be exhausted into the atmosphere. In using large boilers he suggests the employment of a small engine to force the air into the furnace when the main engine is stopped.

We can see no reason why this principle may not be economically applied, although, perhaps, improvements may be made on the device herewith presented.

A patent for this improvement were procured through the Scientific American Patent Agency Sept. 26, 1865. For further information address George Sill, Wilkins, Alleghany county, Pa.

Locomotive Engineer Strike in England.

Great excitement prevailed in England at our last advices in relation to the general notification from the locomotive engineers and firemen that they would leave their work at a date specified unless the following demands were conceded: Ten hours, or 150 miles run, to constitute a day's work: wages of drivers to be for the first six months 6s. per day, for the second six months, 6s. 6d., and thereafter 7s. 6d. (7s. in the country); firemen to rate, as above, at 3s. 6d., 4s., and 4s. 6d. (country firemen 4s. 6d. after 3 years service): firemen to be promoted to drivers exclusively according to seniority in service, thus ignoring merit of every kind; and Sunday work to be paid one price and a half. The proportions of wages and principle of promotion demanded both indicate a desire to establish a uniform standard of wages and as nearly as possible an agrarian equality.

SCIENCE AS THE LATEST PARISIAN FASHION.

The Emperor and Empress of France and the whole imperial court are now setting a good example, which will be followed by all Paris, and consequently by all the fashionable world, namely to take an interest in scientific lectures and experiments. Hitherto science had only been popularized, but not made fashionable, and any move to interest the self-styled "cream of society" in it, and prove to them that there is more enjoyment in natural philosophy, chemistry, etc., than in balls, parties, etc., is a move in the right direction, because of the necessary influence exerted on society by the wealthy. To give our readers an idea of what is going on in this respect in Paris, we subjoin an abbreviated translation of an accoun found in one of the latest Parisian journals, about the doings of the French court:—

"It is nine o'clock P. M. There is no reception, ball, or any other brilliant party at the palace of the Tuileries; the Emperor has beside his court only a limited number of guests. The passers by, looking at the dark edifice, wonder what is going on now. Well, the imperial court attends the scientific lectures. A few evenings ago M. Leverrier lectured on astronomy; to-night M. Moigno lectures on electricity. During day batteries, coils, electric and magnetic machines were brought to the palace; the guards looked with surprise at them, but science is penetrating everywhere. In the yard Mr. Duboscq had arranged a battery of fifty Bunsen's elements, of which the wires were attached to the machines placed in the *salle du trone*. The usual lights were extinguished, and only the electric lamp shone brightly. M. Moigno, surrounded by an illustrious staff of all the celebrated electricians of Paris, threw a ray of light on a screen, and after some general explanations, decomposed it into the colors of the rainbow, and then made to appear in these rays the peculiar lines lately discovered by Bunsen, produced by the combustion of different metals: the three green lines of copper, the two brilliant green lines of silver, the red and violet lines of zinc, etc.

"Then the most powerful electric machine in the world, constructed by Keppel, was put in operation. In a few turns of the disk the enormous brass globes serving as conductors were charged, and torrents of flashes of lightning went zigzag through the air to a distance of more than two feet.

"The new electric machine of Holz, perfected by Bertsch, was put in operation by the last named. The attention of the Emperor was strongly attracted by this instrument; he came nearer to speak to the inventor; the young prince followed him, and soon the whole court was mixed with the operators, somewhat frightening the Empress when her little son handled the coils and Leyden jars, and received an unexpected shock. [Served him right.]

"Mr. Achard then explained the action of his electric warning signal for railroads, one of the best among the two thousand thus far invented. Mr. Poitevin put his electro-magnetic motor in operation. The Geissler's tubes were exhibited, which become luminous by electric currents, and exhibit different colors, according to the chemical composition of the glass and the rarefied vapors contained in them. The name of Napoleon III. appeared in this way in streaks of colored fire and by turning a disk to which a set of such tubes was attached, a most beautiful pyrotechnic sun was obtained, called the star of Gassiot. After some other experiments, the ladies of the court desired to take the shock; they joined hands, formed a circle, and half crying and half laughing, they bravely took the discharge of some minor electric apparatus."

BUSINESS AND MANUFACTURING ITEMS.

Wool.—The largest woolen mill in the country is slowly approaching completion, in Woonsocket, R. I., for E. Harris, the manufacturer of a leading quality of cassimeres, etc. It will contain 35 sets of machinery. Not more than half the existing woolen machinery in the state is now running.——A new five-story stone mill, 140 feet long, has recently been erected for the Mohawk Woolen Mills Company at Little Falls, N. Y ——The Andover (N. Y.) Woolen Mill will begin operations about the first of April with an investment of about $40,000. ——A new woolen mill is building at Lawrence, Kansas.—— A woolen mill is about to be erected at Locke's Mills, Greenwood, Me.——Woolen companies have been lately started at Flint, Mich., and at Kent, Ohio.——There are six woolen mills in Oregon, and another soon to be built in Rogue River Valley.

Cotton.—The Hamlet Mills, Woonsocket, R. I., are about to add 7,000 spindles and 130 looms to their present establishment for fine cottons.——The Social Manufacturing Company has recently doubled its capacity, now running 40,000 spindles and 800 looms, on sheetings and silesias.——The new Durfee printing cloth mill at Fall River, just started, contains 40,320 spindles and 960 looms, employing 600 hands and producing 36,000 yards daily.——It is announced that there are now thirteen cotton factories in operation in Tennessee.

Iron.—The black band iron ore of Pennsylvania, not long ago discovered, is alleged to be much richer in iron than the Welsh black band, and three times as thick in the vein. It is a union of coal and iron, containing enough of the former to reduce the latter with the aid of a small amount of other coal. "Why," says the Pottsville *Standard*, "should not Schuylkill county blaze with long lines of furnaces and rolling mills and workshops of every description? Why should it not rival the population, the industry and the wealth of the same geological belts in England, Scotland and Wales? In Wales this ore had for many years been thrown away as earthy slates, and large piles of it had accumulated around the mine pits. Its ferruginous qualities were finally detected, and almost immediately furnaces sprung up in long lines for miles and miles through the coal field where the black band existed. There is one little narrow basin in South Wales which produces between 25,000 and 30,000 tuns of pig metal per week, and consumes more coal than all the iron works in the United States combined. In that small patch it is no unusual thing to see fifteen and twenty furnaces side by side, and the whole scene for over twenty miles includes nothing but furnaces, roasting kilns, rolling mills, coal and iron mines, and the usual clamor of machinery and of bituminous fires from thousands of tall chimneys."——The coal deposits of Illinois, according to Prof. Waterhouse, exceed those of Great Britain. The Chester coal bed is located in Randolph, Jackson and Perry counties, Illinois. Eighteen thousand acres have been tested, and three strata of coal found: the first 36 feet deep and 6 feet thick, the second 77 feet deep and 4½ feet thick, the third 119 feet deep and 6 feet thick. The quantity of coal in the area already examined is, according to the common methods of measurement, 450,000,000 tuns. The pure quality of the Chester coal makes it the best in this country, if not in the world, for the manufacture of pure iron. It has less than one per cent of sulphur and is comparatively free from bitumen. Iron manufacturers assert that it makes a better and stronger metal than the Scotch pig. The coal field lies only twelve miles from the Mississippi river, fifty from the iron mountains of Missouri, and seventy-two from St. Louis by river. A railroad from Chester to the mines is now contemplated, to connect with the St. Louis and Cairo railway, which has been already surveyed. It will be twelve miles long and cost $300,000. These conditions, it is expected, will lead to the erection in the vicinity of St. Louis of the largest iron works in the United States.——180,000,000 fish hooks are turned out every year by the American Fish Hook and Needle Company at New Haven: mainly cod and mackerel hooks.

Miscellaneous.—Maine is making the most energetic strides toward the manufacturing eminence to which her great water power entitles her. The action of the city of Augusta has been imitated by the town of Oxford, which has voted an exemption from taxation for ten years to all manufacturing capital introduced in lots not less than $10,000. The legislature has legitimated a large brood of new manufacturing enterprises, not less than thirty-three companies, with an aggregate capital of $13,160,000. The following, according to the Boston *Commercial Bulletin*, are the most important.

Saco Water Power Machine shop, machinery, wood, cotton, woolen, etc., capital $300,000; Casco Paper Co., at Yarmouth, $50,000; Hinckley Knitting-Machine Co., Biddeford, $300,000, with power to increase to $500,000; Lockwood Mills Co., Lewiston, cotton, wool, and flax, $2,000,000; Madawaska Mills Co., Lewiston, cotton, wool, and flax, $1,000,000; Hollis Manufacturing Co., Hollis, wool and cotton, $300,000; Portland Stone Co., stone ware, $100,000; Androscoggin Water Power Co., Lisbon, wool, cotton, iron, etc, $500,000; Muzzy Iron Works, Bangor, $150,000; Monson Manufacturing Co., Kennebunk, cotton, wool, etc., $199,000; Ticonic Water Power and Manufacturing Co., Waterville, $1,000,000; Ne Plus Ultra Collar Co., Biddeford, $100,000.

The proposed investment by the Spragues of Rhode Island in the Augusta water-power purchase will amount to about $8,000,000. It is understood to be their intention to build five mills, with an aggregate of 500,000 spindles. These will demand only about one third of the water power, which is equal to carrying 1,200,000 spindles in the dryest season ——Another form of wooden solid shoes has been patented and is now made by a manufacturer in Maine. A cushion of curled hair is fixed upon the inner side of the sole, and the bottom is covered with gutta-percha cement, upon which is applied a perforated plate of malleable cast iron, to give the wearing surface. The welts are cemented to the sole.——A new paper mill on a large scale is to be built at Jewett City, Conn., by the Reade Paper Company.——The New York Watch Company, who own the patent of the Mozart escapement, propose to locate their works in Springfield, Mass., if $150,000 of the $500,000 capital should be subscribed there. The machinery is building at Providence.——The cheese factories of the state of New York already number more than 500, using the milk of over 200,000 cows. Cheese factories are multiplying in Vermont. ——The water power obtained by the construction of immense dams across the Licking and Muskingum rivers, at Zanesville, Ohio, now runs five flouring mills, three foundery and machine shops, two founderies, the Ohio Iron Works Company's rolling mill, three glass factories, two paper mills, one cotton and two woolen factories, one last factory, seven breweries, six tanneries, one sash and blind factory, and a number of other establishments.——The lumber marketed from the mills on St. Anthony's Falls, at St. Anthony and Minneapolis, the last year, amounted to 77½ million feet, 34½ million shingles, 18 million laths, and minor items. The product of the flour mills was worth $1,661,500; lumber, $1,855,000; woolen mills, $174,000; machine shops, $211,450; paper mill, $100,000; cooperage, $106,000; planing, sash and door mills, $84,200; furniture, $96,000; pails, etc., $60,000— total, $4,348,150. The manufacturing investments amount to a capital of $1,651,000. This business is the growth of less than ten years, and constitutes barely a beginning in the utilization of the almost matchless water power of the Mississippi at this point.——The United States Clock and Brass Company is an extensive concern lately gone into operation near Chicago. They have started a little town of shops and dwellings (including 25 of the latter) on the lately bare prairie.—— A heavy establishment has been started in Jefferson City, La., for the manufacture of bricks and tiles, at the rate of 20,000 per day. The oven or kiln is a vaulted round house 150 feet in diameter, in twelve compartments, each holding 20,000 bricks, and connected with an immense furnace flue which runs under ground and terminates in a chimney 100 feet high. The drying tunnel is heated from the same source, and the bricks are run in and through, and thence to their places in the kiln, on a railway. It is expected that this enterprise will have a material effect upon building and real estate in New Orleans.——Fowler & Co.'s English steam plow has gone regularly to work on Louisiana plantations.

THE ALCHEMISTS AND THE ART OF TRANSMUTATION.

Lord Bacon likens the labors of these early pioneers of chemical science in their vain search for the philosopher's stone or the elixir of life to "the young men of the fable who carefully digged and re-digged their father's field in search of a treasure which they never found, but whose labor was amply repaid by the fertility of the soil which they turned up with other intentions." It is curious to mark the diversity of opinions to which, after careful investigations, different authorities have arrived respecting the value of these early researches: while Harris and his class indiscriminately condemn the whole practice, by the concise and sarcastic definition of alchemy as "an art without art, originating in falsehood and proceeding through labor to beggary," others again, though lamenting the selfish ends which furnished the motive, are bountiful in their laudations of the benefits accruing to mankind as the result of their labors. Dufresnoy, one of the best authorities on this subject, takes a middle stand and prefaces his history of Hermetic philosophy with the singular statement that he is about to favor his readers with the history of the greatest folly and the greatest wisdom of which man can be capable, immediately after explaining this paradox by enquiring whether "there is anything more insane than the wish to change the inherent nature of created things, or anything wiser than the desire to be prosperous and possess health and riches," adding "such are the men of whom I speak and among them are to be found many foolish and but very few wise men."

The time to which the knowledge and practice of alchemy can be traced back, is limited only by the credulity of the inquirer. With some enthusiasts the belief is unquestionable that Noah possessed the fabulous elixir of life, while they as persistently claim the modern word chemistry as but a natural corruption of the name of one of his sons, Cham the first king of Egypt. However originated, certain it is that in the remotest times rudimentary chemistry formed an important element of the famed wisdom of the Egyptians and was early incorporated into their religious ceremonies by the priests, whose experiments in the so-called sacred art were conducted in the strictest privacy, any revelation to the uninitiated being punished by death. While Egypt retained her national supremacy, rapid advancement in the holy art was impossible, but when the state lost its independence the field and facilities for study became greatly extended. The history of alchemy during the early ages mentions few writers of reputation, and these are separated by long intervals of time. From the days of Hermes Trismegistus who, it is believed, lived in the year of the world 2076, and whose memory is still perpetuated by the designation often given to alchemy as the Hermetic art, down to the second century of the Christian era, the list of distinguished proficients embraces but three prominent names; the celebrated philosopher Democritus, the father of the atomistic theory, who lived in the year 460 B. C., the Greek physician Discorides, the inventor of the art of distillation, and Alexander of Aphrodisias who about the same time described the distilling of sea-water and of wine.

Unrivalled among the alchemists of the middle ages stands the learned but pedantic Prince Geber. The numerous works of this author are replete with the most abstruse sentences, so that Dr. Johnson in his dictionary claims that the derivation of our word gibberish, signifying whatever is outlandish and unintelligible, arises from the name of this philosopher because of the profuseness of involved expressions in all of his writings. These works contain the germs of the belief in the transmutation of metals and in the universal elixir, which he believed to be a solution of gold. They contain also useful details concerning the nature, fusion, purification and malleability of metals and describe the properties of nitric and sulphuric acids, aqua regia, alcohol and the preparations of mercury and metallic salts. Geber, like those preceding him, believed that the metals were compound in their nature, consisting of mercury and sulphur with a third element, arsenic, which in its varying proportions gave to the metal its characteristic form.

Four hundred years after the death of Prince Geber, appeared nearly cotemporaneously the celebrated scholar Albertus Magnus, remarkable for his learning and especially his knowledge of physics; Raymond Lully, who as keeper of the mint under King Edward applied his rare knowledge of the metals to the benefit of his government; and Roger Bacon, the discoverer of gunpowder and of the use of concave and convex lenses, and the most eminent of English natural philosophers previous to the era of his namesake. These men were each siezed with the popular delusion of transmutation and by their writings raised the study of alchemy to a degree of credit that it little deserved.

Passing to the fourteenth century the first name preserved for us as a successful alchemist is that of Nicholas Flammel. The story of this man's life records his accidental meeting with a very curious old book which concealed under "Vails, Types, and Hieroglyphic Covertures" the wonderful art of transmutation. Leaving his legitimate calling of a scribe he passed through many countries before procuring a translation of this work. Finally successful, he minutely followed the instructions given therein, meeting with perfect success and becoming by this means immensely rich. This latter statement must be accepted with reserve for, unfortunately for the art, it has been proved that alchemy played a very unimportant part in the acquisition of this wealth, as the various journeyings ostensibly seeking an interpretation of hidden mysteries were in reality for the collection of debts, and while the unsettled state of the country at that time made travelling unsafe he had recourse to this artifice for safely transporting jewels and treasures entrusted to him from one country to another, and by this means amassed a considerable fortune.

What Makes Iron Fibrous.

When Mr. Bessemer began to manufacture wrought iron from cast, by blowing air into the molten metal, it was objected to the product that it had no fiber, as common puddled iron had, and that iron without fiber must necessarily be weak. In this inference—which was wholly theoretical—we did not concur, and the question then arose, what does fibrous iron really mean? When the particles of wrought iron are brought to a high temperature, without the presence of any intervening material, they cohere in every direction, and the iron is not fibrous. But when slag is intermingled, as in common puddled iron is the case, there are intervening layers of cinder, which, when the iron is passed through the rolls, are not wholly expelled, but are only greatly attenuated; and as these planes are then very numerous, and pass in every longitudinal direction, they prevent to some extent the lateral adhesion of the particles, which, however, adhere end to end, and a fibrous iron is thus produced. It is now well known that homogeneous iron is much stronger than fibrous iron. But at the beginning of the manufacture, fiber was accounted as necessary in iron as in ropes or thread—a theory resulting merely from the accident of the production of fiber by the modes of manufacture then exclusively employed. In the case of iron produced by the common process, any bubble or vacuity in the metal becomes filled with slag, which hinders the sides from being effectually welded under the hammer. But in the Bessemer iron, as the slag is absent, the sides of the bubble cohere when the ingot is subjected to pressure while still hot. It is better to hammer the ingots while still hot, after having been poured, than to allow them to cool and to heat them afterwards. For in the one case the heart of the ingot is the hottest part, and in the other the coldest.—*Engineering.*

Quicksilver Mining.

California now produces more quicksilver than all the rest of the world; if we may trust the statistics embodied in the recent report of the "New Almaden" company. The total production of the quicksilver mines of the world for 1866 is there given as 85,534 flasks, and the accumulated supply in the different markets of the world, is estimated to be about 120,000 flasks. The largest contributor to the total for 1866 is the "New Almaden," 35,150; next the Almaden, in Spain, 32,400; then the "Idria" in Austria, 7,225, and the "New Idria" Cal., 6,045, with three smaller California mines, making up a total of 45,909 flasks American, 39,625 foreign. The Santa Barbara mine, in Peru, is nearly abandoned. It does not appear that any considerable part of this increase is wanted as yet by mankind, for, though serving to lower the price to $30 per flask, very little of it has been absorbed by increased demand, and the present rate of supply is said to be at least double the wants of the world. The direct cost of producing the New Almaden article is about $16 15 per flask. There is therefore probability of a further great reduction in the price, which may possibly bring the increasing supply into more extended uses.

The African Telegraph.—The natives in the "Camaroons" country on the west coast of Africa, use an instrument which they call "Ellembic," upon which they produce a variety of sounds, audible at several miles distance, and arranged so as to form a perfect and distinct language, in which they send their "telegrams" from point to point. The instrument has been in use from immemorial time.

Editorial Summary.

ABOUT FOOD.—An English physician (Dr. Thudichum) asserts that Liebig's extract of meat lacks the essential properties of nutriment. It contains the elements required in very small proportion and in an oxydized state, and is simply a stimulant, a strong beef tea, when prepared for swallowing. Of the 25 per cent solid substance contained in meat, four fifths are insoluble in water or become so by boiling, allowing only one fifth of the solid parts, or five per cent of the whole, to be saved in the extract. He thinks that after eggs, the nearest substitute for meat is Indian corn and other kinds of seeds, beans, peas, etc., when grown in southern climates. Northern grown beans are not approved, and this kind of food always requires peculiarly careful preparation to be digestible. Vegetable food requires much digestion, and its use demands and creates an increase of the stomach, which is visible in well-fed vegetarians, and in the lengthening of the intestine of the domestic cat from the proportions of the wild state, in consequence of changing its diet from flesh exclusively to bread and potatoes.

IMITATIONS OF GOLD.—Oreide, the beautiful alloy resembling gold, manufactured in Waterbury, Conn., is a French discovery, and consists of pure copper 100 parts; zinc, or (preferably) tin, 17 parts; magnesia, 6 parts; sal ammoniac, 3.6 parts; quicklime, 1.8 parts; tartar of commerce, 9 parts. The copper is first melted, then the magnesia, sal ammoniac, lime, and tartar in powder, are added little by little, briskly stirring for about half an hour, so as to mix thoroughly; after which zinc is thrown on the surface in small grains, stirring it until entirely fused; the crucible is then covered, and the fusion maintained for about thirty-five minutes, when the dross is skimmed off, and the alloy is ready for use. It can be cast, rolled, drawn, stamped, chased, beaten into a powder or leaves, and none but excellent judges can distinguish it from gold. Another beautiful alloy rivalling the color of gold, is obtained with 90 per cent copper and ten per cent aluminium, which must be perfectly pure, of the best quality, and in exact proportion. It is little affected by the atmosphere, and is strong, malleable, and homogeneous in structure.

THE MORTALITY OF BACHELORS.—Dr. Stark of the Scottish Register Office, has compared the vital statistics of married and unmarried men, and announces that the mean age of the married at death is 60·2 years, while that of the bachelors is only 47·7—excluding those who die before 25 in both classes. We don't wish to set *every*body against the poor bachelors, but this point seems to demand the attention of life-insurance companies—if indeed bachelors ever imagine their lives worth enough to anybody to deserve insuring. We did not know that to the command "increase and multiply" was tacitly attached the promise "that thy days may be long in the land" etc.; but it seems, so far, that if bachelors wish to recover an average of twelve and a half years of life, or such part thereof as may not be already irretrievably forfeited, they should make haste to be married Celibacy appears to be one of Nature's capital offences.

THE BROADWAY BRIDGE.—Our engraving and description of this convenient and handsome structure have attracted much attention abroad. The London papers strongly urge upon the city government the construction of similar bridges at crowded points in that metropolis. It is now understood (says *Engineering*) that the experiment of an over-street bridge for foot passengers is to be made in London, near Hyde Park corner. About 200 persons, it is added, are yearly killed outright, and upwards of 2,000 are more or less injured, by being knocked down by vehicles in and near London. The plan of bridging streets is open to many doubts, which are pointed out by our English contemporary, and we should suppose the London authorities would prefer to await the result of our experiment before proceeding to build.

FROZEN FRUIT TREES.—A correspondent of the *Prairie Farmer* gives an experience to the effect that shaking apple trees when frozen by untimely frost, destroyed the trees. Six trees thus gathered, never leaved out again, while others of the same varieties that were not shaken received no injury. This effect of vibration—if that were all—upon the frozen veins of the tree, is conceivable, but extraordinary. Violent winds at a similar juncture would destroy the whole stock of apple and many other kinds of trees.

SAFETY LAW FOR PUBLIC ASSEMBLIES.—The Legislature of Pennsylvania has passed a law requiring all doors of egress to be kept fastened open during any public assembly, unless they are hung so as to open outward, and prohibiting the obstruction of the passages in any manner, as by benches, chairs, etc.

TREE-PLANTING has begun in earnest in different parts of the country. It will probably soon become general, except in localities where tree-saving is not too late as a substitute. In Minnesota, says the *Prairie Farmer*, tree-planting was all the rage last fall. A farmer in California is about to plant a hundred acres with locust trees.

HYDROPHOBIA.—Crystals of nitrate of silver rubbed into the wound, are prescribed by Youatt, who has been bitten eight or ten times by rabid animals. It is a disease to which the susceptibility of individuals seems to vary so remarkably that no remedy has yet been found generally applicable.

EXTREMELY HARD CAST IRON has been made by M. Gaudin by introducing a small quantity of boron, and lately, by combining the fused iron with phosphate of iron and peroxide of manganese.

VITRIFYING SURFACES.—Experiments are making under the direction of the French Government, with a view to the production of vitrified armor plates and iron hulls. The method employed is that of M. Balloutrey, who places the surface in contact with the elements by which white glass is produced, and heats it to the point of vitrification. The surface iron unites with the silicic acid and participates in the resulting silicate,) producing the toughest description of glass in a state of inseparable contact with the plate. To prevent the destruction of the coating, even if thin, by the vibration of the iron from mechanical shocks or changes of temperature, is the point of difficulty.

A new method of enameling pottery has been patented by M. Clemandot, director of the Crystal Glass Manufactory of Clichy, near Paris. The soluble alkaline silicates form a hard combination with clay, by the aid of heat. The article of clay, after being wholly or partially baked, is either steeped in or coated with a solution of the silicate until its surface is saturated, and then heated to fusion of the silicate, which then combines with the pottery. The common but objectionable use of lead is thus dispensed with.

DRAINAGE.—The Metropolitan Sanitary Commission of London compute that for every inch depth of water drained off, and which would otherwise pass into the air as vapor, as much heat is saved per acre as would raise eleven thousand cubic feet of air one degree in temperature. A farmer was asked the effect of some new draining, when he replied, "All that I know is that before it was done I could never get out at night without an overcoat, but now I never put one on." A physician took one of the Sanitary Commissioners to a hill overlooking his district. "There," said he, "wherever you see those patches of white mist I have frequent illness, and if there is a cess-pool, or other nuisance as well, I can reckon on typhus every now and then. Outside these mists I am rarely wanted."

THE SPIROMETER—measuring the actual bulk of respired air in any individual pair of lungs—has shown that this measure, as might be supposed, is a very good general index of the state of health and vigor in all respects, even when the variation is not very perceptible in other ways. A medical reviewer in a late publication testifies that "in examining for insurance persons apparently robust, we have found that none of those who habitually drink spirits between meals, even in such moderation as to be considered strictly temperate, can blow up the spirometer to their due figure. And in several instances of really intemperate persons, this mode of observation has led to the detection of their secret.

A CONVENIENT TABLE.—The following statement is given by an exchange as a guide for estimating the quantity and cost of nails for a given definite piece of work:—

3-penny	1 inch	557 nails	₱ M.
4-penny	1½ inches	378 nails	"
5-penny	1¾ inches	232 nails	"
6-penny	2 inches	167 nails	"
7-penny	2¼ inche	141 nails	"
8-penny	2½ inches	101 nails	"
10-penny	2¾ inches	68 nails	"
12-penny	3 inches	54 nails	"
20-penny	3½ inches	34 nails	"
Spikes	4 inches	16 nails	"
Spikes	4½ inches	12 nails	"
Spikes	5 inches	10 nails	"
Spikes	6 inches	7 nails	"
Spikes	7 inches	5 nails	"

FRENCH IMPROVEMENTS.—An American telegrapher writes: "Your issue of March 30th contains a notice of 'Telegraph Lightning Protectors' just invented in France. This announcement reads strangely to one who has used the lightning protectors (or as known among telegraphers, lightning arresters) for five or six years. The French may excel us in some of the arts but it is doubtful if they excel in telegraphing. They should visit Yankeedom and examine the telegraphs, then take a jump ahead five or six years instead of inventing instruments which have gone out of use here."

A FREAK OF WEATHER.—A correspondent travelling in the Red river country, Louisiana, writes that the country is all overflowed again, and that after three weeks summer weather, thermometer at 90°, crops all planted, corn growing, and trees in bloom, on the 12th of March the mercury fell from 90° to 28° between 9 A. M. and 5 P. M. The wind blew furiously all night, depositing a crust of frozen sleet two inches thick, on the top of which the snow fell ancle deep. Of course the agricultural labor and the promise of the fruit trees were wholly lost.

STEAM PLOWING IN ENGLAND.—The Steam Cultivation Commission appointed by the Royal Agricultural Society, find that some 400 steam cultivators are at work on 230,000 acres of arable land, displacing 2500 horses. The machine eats only when working, and thus saves in that item at least $500 a year to its employer, while doing its work deeper and more thoroughly and rapidly than it can be done by animals.

EXPLANATION.—"Civil Engineer" requests us to explain that in his plan for constructing sub-aqueous tunnels, the chambers between the double walls of the coffer dam—not its main interior—were to be employed for getting access to the bottom and excavating a bed for the dam.

AN AUTOMATIC SCALE FAUCET has been introduced, which measures the liquid drawn with perfect accuracy as it runs out, cutting it off at the required point. Barston & Childs who now manufacture the article at Utica, are making arrangements to start a branch factory in New England.

THE POINT OF ABSOLUTE COLD, or deprivation of all heat, is estimated to be about 275° below zero, centigrade, equal to 463° below zero, Fah. The centigrade degree is equal to 1.8 of the Fah. and its zero is the freezing point of water, or 32 Fah. degrees above the Fah. zero, which is therefore —17 $\frac{8}{9}$ centigrade.

SUGAR REFINING IN SCOTLAND.—At a festival held by the employees of a Greenock firm, a few weeks since, M. Niccol, the author of a well known treatise on sugar refining, boasted that Greenock refined sugars had the preference at the same price, among the London grocers and their customers, over those of London; while the former undersold the latter, even when the raw sugars had been bought in London, carried to Greenock, refined there, and returned to the London market. The working capacity of the Greenock refineries had been more than tripled in the last nineteen years mainly by improvements in construction and processes. The speech is fully reported in *The Grocer* (London) without remark.

LARGE WOOD-SCREW BOLTS for securing armor plates are forged in France by an unknown process which has exercised the conjectures of the Sheffield men not a little. *Engineering* suggests that such bolts may be rolled between plates grooved in a proper manner. Others think the screw is forged in a machine, with a shaped trip hammer. One or the other process would seem to be a practicable and valuable improvement worthy the attention of our ingenious machinists.

THE AMERICAN NATURALIST.—Not a few of our readers, we are persuaded, will learn with pleasure that a handsomely printed monthly under the above title is to be issued by the Essex Institute, Salem, Mass., designed to "popularize the best results of scientific study" in the department of natural history.

ARGENTIFEROUS LEAD ORE is deprived of its silver by M. Cordure, by adding a small quantity of zinc to the fused ore. The zinc forms an alloy with the silver, lighter than the lead, and thus brings it to the surface, where it cools and may be removed, remelted and separated.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The regular meeting of this branch of the American Institute, was held on Thursday evening, March 28th, Prof. Tillman presiding.

At the meeting of the Polytechnic Association, March 28th., Dr. Rowell explained a theory of the regular migration of icebergs from the supposed polar sea to the Atlantic. The line of glacier-bearing coast is supposed to be from 6000 to 10,000 miles in extent. The glacier is assumed to increase and descend upon the coast from constant or periodical causes until its projecting mass over-lapping the water becomes detached by its own gravity, at about the same time at all points. The submersion of this inconceivable mass would raise the level of the polar sea and cause a tremendous eruption of its waters into and through Baffin's bay, clearing the channels of fixed and floating ice, and carrying out to sea the majestic fleet of icebergs which explorers have so often counted to the number of five hundred at a time. The regular current setting in through Behring's strait resisting the swell in that direction, and the correspondent outward current with the wider outlet through Baffin's bay assisting it, the icebergs necessarily drift out through that channel and not the other.

Fruit Essences.

Dingler's Polytechnic Journal gives the following table of the composition of artificial fruit essences, showing the number of parts of each ingredient to be added to 100 parts of alcohol—all chemically pure. Glycerine is found in all—it appears to blend the different odors, and to harmonize them:—

		Peach.	Apricot.	Plum.	Cherry.	Black Cherry.	Lemon.	Pear.	Orange.	Apple.	Grape.	Gooseberry.	Raspberry.	Strawberry	Melon.	Pineapple.
Glycerine		5	4	8	3	..	5	10	10	4	10	..	4	2	3	3
Chloroform		..	1	..	..	..	1	..	2	1	2	..	..	..	..	1
Nitric Ether		..	..	..	..	..	1	..	..	1	..	..	1	1	..	..
Aldehyde		2	..	5	..	..	2	..	2	..	2	1	1	..	2	1
Acetate of Ethyl		5	..	5	5	10	10	5	5	1	..	5	5	5	..	..
Formiate of Ethyl		5	..	1	..	..	..	..	1	..	2	..	1	1	1	..
Butyrate of Ethyl		5	10	2	..	..	..	..	1	..	..	..	1	3	4	5
Valerianate of Ethyl		5	5	..	..	..	..	..	..	..	..	..	..	..	3	..
Benzoate of Ethyl		..	..	..	5	5	..	..	1	..	..	1	1	..	..	..
Œnanthylate of Ethyl		5	1	4	1	2	..	..	..	10	1	1	1	..	..	..
Sebacic Ether		1	..	..	..	..	..	..	..	..	..	..	1	..	10	..
Salicylate of Methyl		2	2	..	..	..	..	..	1	..	1	..	1	1	..	..
Acetate of Amyl		..	..	..	..	..	..	10	10	..	..	..	1	3	..	..
Butyrate of Amyl		..	1	..	..	..	..	..	..	..	..	..	1	2	..	10
Valerianate of Amyl		..	..	..	..	..	10	..	..	10	..	..	..	..	..	..
Essence of Orange		..	..	..	..	..	..	..	10	..	..	..	..	..	..	..
Alcoholic solutions saturated in the cold of	Tartaric Acid	..	..	..	..	..	10	..	1	..	5	5	5	..	..	..
	Oxalic Acid	..	1	..	..	1	..	..	..	1	..	..	..	..	..	..
	Succinic Acid	..	..	..	..	..	1	..	..	..	3	1	1	..	..	..
	Benzoic Acid	..	..	1	3	..	..	..	..	..	..	1	..	..	..	..

How to Save the Rain.

The waste of the rainfall in a small and crowded territory like England, is becoming a serious matter as towns enlarge and multiply and begin to clutch at the limited sources of pure water supply. At the rate of progress in the past, the attainment of wholesome water for London and all the other great towns, now so expensive and difficult, will in time become impossible. To give the population of London 50 gallons of water per head per day, would require the mean rainfall of 70,000 acres, if every drop were saved. The project put forth by an English engineer, to collect rain for the metropolis on glass roofs (beneath which winter gardens might be carried on) would require glass making on a rather large scale. Not to destroy the land, at least half the rainfall must be given up to irrigation, so that 140,000 acres of glass roofing would be the smallest allowable estimate. Probably the plan is designed only to supply pure water for drinking and culinary purposes, leaving the Thames to meet the coarser wants. The 4,000 acres which it is proposed to roof with glass would give nearly a gallon and a half of water per day to each of the inhabitants of the metropolis. This would require nearly 175,000,000 square feet of glass, costing from fifteen to twenty millions of dollars and a much larger sum for the framework, besides reservoirs, conduits, etc. The calculation shows how hard it may one day become to meet the wants of increasing population.

ELECTRIC LIGHT.—WILDE'S MAGNETO-ELECTRIC MACHINE.

The subject of electric light is now attracting more attention than at any former period. Every day we find something about it in our foreign and domestic exchanges. Three of the city newspapers within a few weeks have printed full column editorials under the title of Electric Light. The light-house directors of England, France and America simultaneously but independently are instituting experiments on a liberal scale to determine if the electric light may not be the best for light houses. And as a natural consequence of these movements a business association under the style, "The American Electric Light Company" has been chartered, and will be soon in active operation.

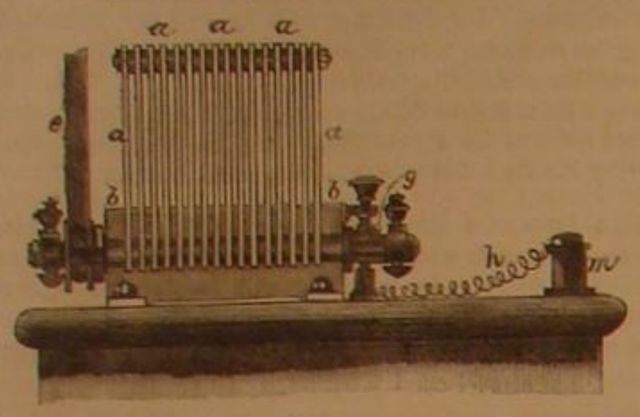


Fig. 1.

This new interest in electric light was originated by the exhibition in England of the machine which is described in this article. No wonder, for the light from it is the most powerful artificial light ever produced. Mr. Crookes testifies that when he saw it, it had three or four times the power of the sun-light. The machines first built were found too powerful for light-house illumination, and it was found advisable to make machines for that purpose of only one-half the original sizes. So much light also implies that the Wilde machines are the most powerful electric apparatus ever constructed.

The first impression that our engravings will give to those who are familiar only with the ordinary magneto-electric machines, is that Wilde's machine is more complicated and depends upon different principles. But the fact is that the arrangement is very compact and simple, and no principle is involved which is not understood by all electricians. Wilde's machine may be considered a compound magneto-electric machine; a magneto electric machine having permanent magnets furnishing an electric current to excite the magnets of a second magneto-electric machine which differs from the first in being larger and in having electro magnets instead of permanent magnets; this second machine may drive a third, and so on, each additional machine greatly increasing the power of the final electrical current. Thus with the smallest magneto-electric machine with permanent magnets as the original source, the final current may have any desired power.

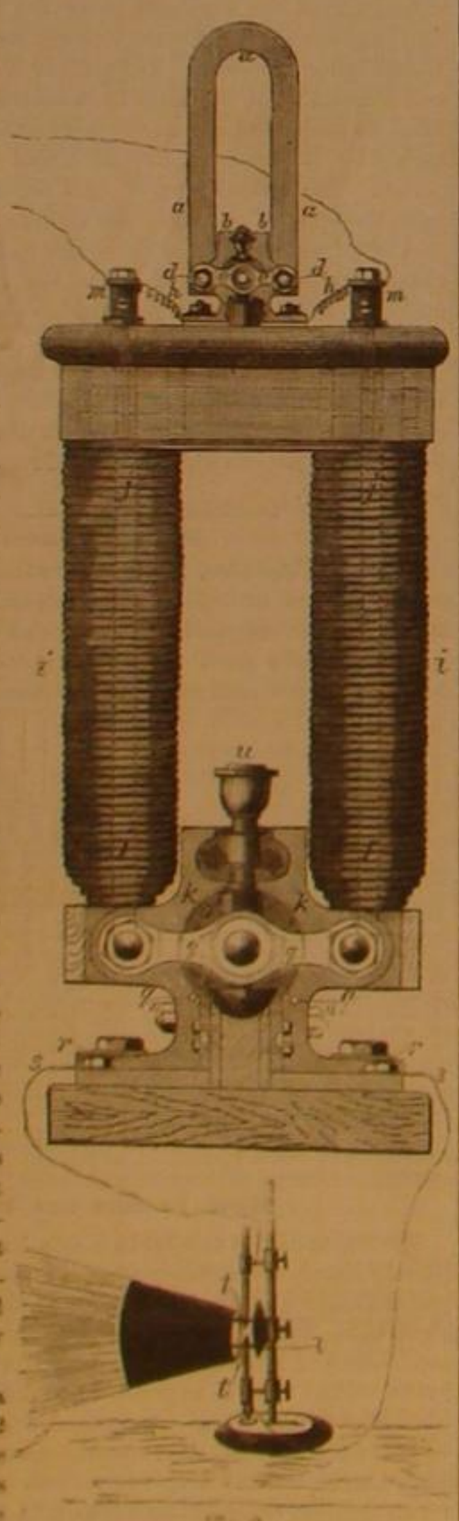
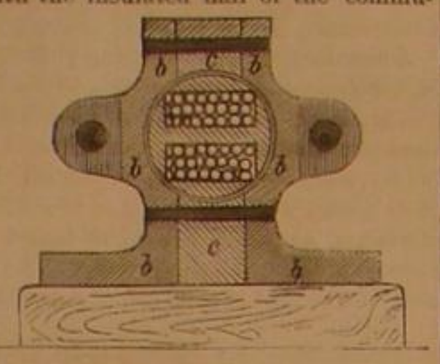


Fig. 2.

Fig. 1 represents a side view, and Fig. 2 an end view of the machine, the letters referring to the same parts in each. *a a a a* are 16 permanent magnets, bolted on to the magnet cylinder *b*, shown in magnified section at Fig. 3. The magnets weigh about 3 lbs. each, and will support a weight of about 20 lbs. In the magnet cylinder the part *b b* is iron and *c c* brass, and it is so arranged that *b b*, being screwed on to the respective poles of the magnets at *d*, form one entire north pole and one entire south pole to the 16 magnets, separated from each other by the brass pieces *c*. A circular hole, 2½ inches in diameter is bored lengthwise through the metals, so as to form them into a hollow cylinder of brass and iron. Fig. 4 represents the armature, a transverse section of which is also shown in its place inside the hollow cylinder, Fig. 3. It consists of a cylinder of cast iron, about one-twentieth of an inch less in diameter than the hole in the cylinder *b c b c*, so that it may revolve in very close proximity to the interior of the hollow cylinder without touching it, being held at each end by appropriate brass supports, in which the axis of the cylinder works. At one end of the armature is a cylindrical prolongation *d*, on which a pulley *e* works, and at the other end is fixed a commutator. About fifty feet of insulated copper wire, one-eighth of an inch in diameter, are wound upon the armature in the direction of its length, as shown in Fig. 4, and in section in Fig. 3. The inner extremity of the wire is fixed in good metallic contact with the armature, the other end being connected with the insulated half of the commutator. Bands of sheet brass, *f f*, are bound at intervals around the armature, in grooves sunk in it for that purpose, their object being to prevent the convolutions of insulated wire from flying out of position by centrifugal force when in rapid rotation.



By means of the small strap *e* the armature is made to revolve in the interior of the magnet-cylinder at about 2500 revolutions per minute. During each revolution, two waves of electricity, moving in opposite directions, are induced in the insulated copper wire surrounding the armature. The rapid succession of alternating waves thus generated at the rate of 5000 per minute are, by means of the commutator at *g*, converted into an intermittent current moving in one direction only, which is conducted along the wires *h*.

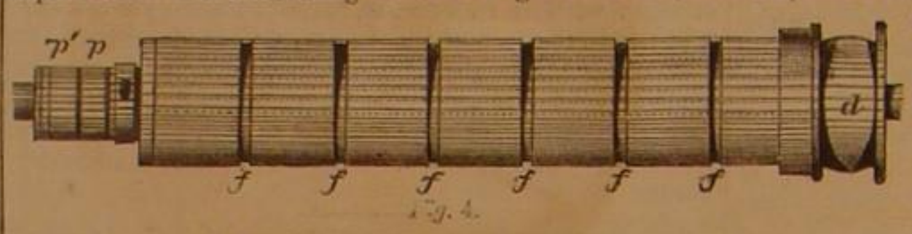


Fig. 4.

The electro-magnetic machine by which the light is produced is of precisely the same construction as the magneto-electric machine just described, except that an electro-magnet *i* is substituted for the permanent magnets *a a*. The electro-magnet *i*, Figs. 1 and 2, is formed of two rectangular plates, *j*, of rolled iron, 36 inches in length, 26 inches in width, and 1 inch in thickness, as shown by the dotted lines. They are bolted, parallel with each other, to the sides of the magnet cylinder *k* by means of the bolts *l*, and the plates are connected together at their upper extremities by being bolted to a bridge formed of two thicknesses of the same iron as that of which the sides are made. All the component parts of the electro-magnet, requiring to be fitted together and to the magnet cylinder, are planed to a true surface, for the purpose of ensuring intimate metallic contact throughout the entire mass.

Each of the sides of the electro-magnet is coiled with an insulated conductor, consisting of a bundle of seven No. 10 copper wires, laid parallel to each other, and bound together with a double covering of linen tape. The length of conductor coiled around each side of the electro-magnet is 1650 feet. Two of the extremities of the coils are connected together so as to form a continuous circuit 3300 feet in length. The other extremities of the coils terminate in the two insulated metal studs *m m*, fixed upon the wooden top of the machine, and connected thereby with the wires *h h*. The total weight of the two coils of insulated copper wire, without the iron, is half a tun. The diameter of the hole in the magnet cylinder is 7 inches, and its length 35 inches. The separate parts of the cylinder are bolted together at the top and bottom by means of 12 copper bolts *n*, three-quarters of an inch in diameter. The armature *o*, which is an exact fac-simile, except as regards size, of the one already described, is about one-eighth of an inch less in diameter than the bore of the magnet cylinder. It is wound with an insulated strand of copper wire, 350 feet in length and a quarter of an inch in diameter, as shown in section in Fig. 3. A pulley *d*, 7 inches in diameter, is keyed upon one end of the armature, and upon the other end are fixed two hardened steel collars *p p*¹, one of which is insulated from the armature axis. These form part of the commutator, by means of which the rapidly alternating currents are converted into an intermittent current moving in one direction only. These currents of electricity, which produce the light, are taken from the steel collars by means of the springs *q q*, and thence to the screw nuts at *r*, from which they can be conveyed to any place required by the conductors *s s*.

The apparatus for the light is that ordinarily used with the galvanic battery and is shown at the lower part of Fig. 5; *t t'* are the carbon points, and *v* is a concave reflector.

The armature of the 7-inch machine is driven at 1800 revolutions per minute by means of the strap *s*, from the same shaft as the magneto-electric machine. Reservoirs for oil are shown at *u*. The total weight of the machine complete is a little more than 1 tun.

The action of the machine will be readily comprehended from the explanation previously given. The electricity induced from the permanent magnets *a a a*, in the rotating armature of the small machine, is transmitted, by means of the wires *h h*, through the coils of the large electro-magnet of the 7-inch machine, the iron plates and magnet cylinder of which acquire an enormous amount of magnetism. Simultaneously a porportionately larger amount of electricity is induced in the wires of the larger armature, and this current of electricity is used for producing the light. When the machine is in full action, an engine of about three horse power will be required to drive it, and the lamp will consume sticks of carbon at least ⅝ inch square. The power of the machine may be regulated according to the quantity of light required to suit the different conditions of the atmosphere, by placing small blocks of iron on the top of the small magnet cylinder *b b*, so as to connect the opposite poles, and proportionately diminish the power of the induced current in the armature.

This machine is, as already mentioned, considerably smaller than the one now in existence. In the former there are only two conversions: that is to say, a permanent magnet—an induced current of electricity—an electro-magnet—a more powerful induced current. In the large machine there is a still further multiplication of force. Its small magneto-electric machine has an armature of 1⅝ inch diameter, armed with six small permanent magnets, weighing 1 lb. each. The induced current from this is transmitted through the coils of the electro-magnet of a 5-inch [for the sake of convenience, the different-sized machines are distinguished by the calibre or bore of the magnet cylinders] electro-magnetic machine, and the direct current from the latter is simultaneously, and in like manner, transmitted through the coils of the electro-magnet of a 10-inch machine. The weight of the electro-magnet of the 10-inch machine is nearly three tuns, and the total weight of the instrument is about 4½ tuns. The machine is furnished with two armatures—one for the production of "intensity" and the other for the production of "quantity" effects. The intensity armature is coiled with an insulated conductor, consisting of a bundle of thirteen No. 11 copper wires, each 0·125 of an inch in diameter. The coil is 376 feet in length, and weighs 232 lbs. The quantity armature is enveloped with the folds of an insulated copper plate conductor 67 feet in length, the weight of which is 244 lbs.

With the three armatures driven at a uniform velocity of 1,500 revolutions per minute, an amount of magnetic force is developed in the large electro-magnet far exceeding any thing which has hitherto been produced, accompanied by the evolution of an amount of dynamic electricity from the quantity armature, so enormous as to melt pieces of cylindrical iron rod fifteen inches in length and fully one-quarter of an inch in diameter, and pieces of copper wire of the same length and one-eighth of an inch in diameter. With this armature in, the physiological effects of the current can be borne without inconvenience; immediately after 15 inches of iron bar had been melted, Mr. Crookes grasped the terminals, one in each hand, and sustained the full force of the current. The shocks were certainly severe, but not inconveniently so.

When the intensity armature was placed in the 7-inch magnet cylinder, the electricity melted 7 feet of No. 16 iron wire, and made a length of 21 feet of the same wire red-hot. The illuminating power of the current from this armature was of the most splendid description. When an electric lamp, furnished with rods of gas carbon half an inch square, was placed at the top of a lofty building, the light evolved from it was sufficient to cast the shadows of the flames of the street lamps, a quarter of a mile distant, upon the neighboring walls. When viewed from that distance, the rays proceeding from the reflector have all the rich effulgence of sunshine. With the reflector removed from the lamp, the bare light is estimated to have an intensity equal to 4,000 wax candles. A piece of ordinary sensitized paper, such as is used for photographic printing, when exposed to the action of the light for 20 seconds, at a distance of 2 feet from the reflector, was darkened to the same degree as a piece of the same sheet of paper was when exposed for a period of one minute to the direct rays of the sun at noon on a very clear day in the month of March. The day on which Mr. Crookes saw the machine at work (toward the end of June), the mid-day sun was shining brightly in at the window. He took the opportunity of roughly comparing the intensity of the sun with that of the electric light armed with the reflector. From a comparison of the shadows thrown by the same object, it appeared to him that the electric light had between three and four times the power of the sunlight. That the relative intensities were somewhat in this ratio, was evident from the powerful scorching action the electric light had on the face, and the ease with which paper could be set on fire with a burning glass introduced in the path of its rays.

The extraordinary calorific and illuminating powers of the 10-inch machine are all the more remarkable from the fact that they have their origin in six small permanent magnets, weighing only 1 lb. each, and only capable at most of sustaining collectively a weight of 60 lbs. When working up to its full intensity, it requires an engine of about 7 horse-power to drive it.

Science Familiarly Illustrated.

The Education of the Eye.

Our physical senses are unreliable until developed by use. The infant as readily reaches for the moon as for the rattle lying in his lap, and even apprentices to a mechanical occupation frequently make ludicrous mistakes until they have acquired that skill of vision usually known as the "mechanical eye," so necessary to every finished workman.

It should be the object of boys even in their sports to cultivate this sense of vision as a means to their after success if any mechanical branch is to be their business in life. For this reason the use of the fowling piece, rifle, and the bow and arrow is to be commended. By either of these the eye becomes accustomed to measuring distances. This quality of calculating distance is first acquired by the observation of the relative position of objects. If a rifle is used and the sight is adjusted to one hundred yards it is well to first measure the distance by a line, as a pocket tape, and gradually to become

accustomed to fix the distance by the eye without any mechanical aid. It is surprising how expert even a boy may become in measuring distances by practice. We said the noting of the relative position of objects should at first be used as a means to the end, but as soon as possible the tyro should emancipate himself from this dependence. After becoming familiar with distances on land the learner will find great difficulty in estimating distances on the water, especially on a smooth expanse, having no fixed objects above its surface. He will generally underrate the distance. So in measuring across depressions, as a valley or even a narrow gulley, every boy knows the liability and danger of such miscalculations. It may appear easy to leap from one bank to the other of a brook, but often his confidence in the uneducated eye may be punished by a good, thorough wetting.

The laws of optics should be made a study by the young. We well remember the many trials to which we were subjected when a boy in consequence of our ignorance of the refraction of light in passing from a medium like the air into a denser one, as water. The pickerel loves to sun himself lying in shallow water, just beneath the surface, where he remains perfectly motionless unless disturbed. The shooting of these fish, either with bow and arrow or with the fowling piece, is a common amusement, but he who would succeed must understand, in practice if not in theory, the refraction of rays of light. The fish is not where he appears to be when seen at an angle, as when the spectator is on the bank. If aimed at the shot will not touch him. This quality of light can be illustrated by thrusting a straight stick into still water, as in a pail or tub of water. At the point where the surface of the water touches the stick it will appear as if broken or bent at an angle.

Measurements on a much smaller scale are also useful as educators of the eye. After an examination of the foot rule with its divisions it is well to mentally calculate surfaces, as the length, width, and hight of a table, the dimensions of a block of wood, etc., and then to verify the calculation by the application of the rule, which may be at all times carried in the pocket.

These experiments may seem puerile, but the mechanic knows the value of them, and it is as well that the boy—the future apprentice and workman—should thus prepare himself for his course and make his way, as a learner, easier. No means to an end should be despised because of its apparent simplicity, and whether a man is a practical mechanic or not, he will often see the value of a correct eye in estimating and measuring.

OPENING OF THE PARIS EXPOSITION.

The Great Exposition of 1867 was opened on the day appointed, April 1st. It was a miracle of swift massing of work; but the imperial credit was involved in the punctuality of the performance, and it had to be done—albeit the clutter and confusion were most admirable. The weather was fine, eight thousand policemen kept everybody in statuesque propriety, and about five thousand guests were assembled or swallowed up in the immense gasometer (as it appears externally) which was dressed with innumerable flags of all patterns and hues of nationality. The distinguished and overdressed company inside received the Emperor and Empress in the central hall at two p. m. All nations were represented, in full national costume, from Paris around to Paris again. All did their best in their peculiar styles to welcome their magnificent host, on his approach; the English and Americans taking the lead with their boisterous fashion of "cheers" and "hurrahs." There were no ceremonies, other than a tour of the building and the personal and international greetings. But we must leave the rest of this to Mr. Jenkins, and turn to more practical matters.

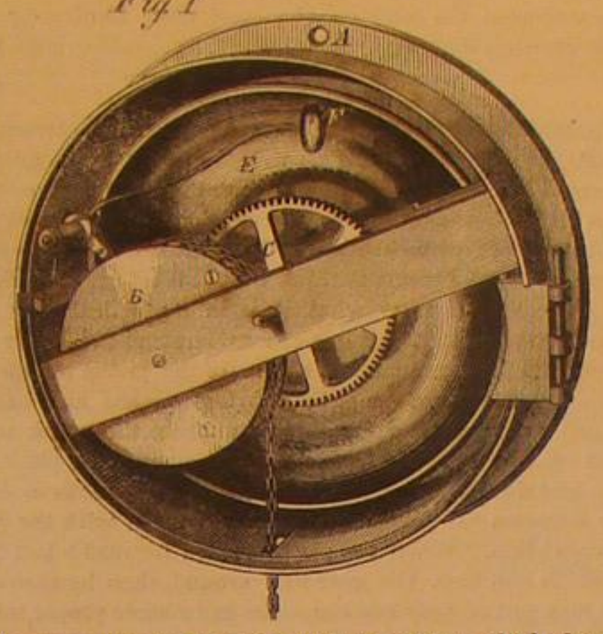
There is little to say. The Exposition is emphatically "open" now, and will not be filled up and fit to be seen until May. The concourse of strangers is nothing like what was expected, and the number of Americans not much greater than usual. May will put an end to this comfortable state of things, however, as well as to the easy vacuity of the exhibition galleries. At present not even the French space (which is half of the whole) is in order, and not one tenth of the foreign goods arrived are yet opened and arranged. Next to the French the Russian department is most advanced, and next to the Russian the English. The American department is one of the most incomplete, and complaint is poured upon the inefficiency of Commissioner Beckwith. Bad luck, or inefficiency, or possibly Congressional economy, has persecuted our exhibitors on the high seas, for it is reported that the only goods damaged on the voyage were American. They had the worst voyage to make. Our fine-art committee achieved honorable mention on the opening day for many good pictures well hung, but the English display was much greater. The only palm for America was carried off by our ladies, who were conceded the prize of beauty. But this, after all, like our reading and writing, comes by nature, in spite of the arts. It is of no use for the American ladies to vie with the French in paint and upholstery. The American *man*kind, however, may take a little credit for the bright atmosphere in which we rear our beauties.

The neighboring English, as might be expected, outdo us distant Americans from the start, in massive machinery; and Europe in general, with the advantage in age, cheap labor and proximity all on its side, excludes us as manufacturers, with a few exceptions, from the markets of the old world. As inventors we can hold our own anywhere, and for valuable patents the Exposition is of course of great advantage to Americans. In manufactures, indeed, our countrymen are able to do their native land great credit in almost every department. But it is at their own expense, and very rarely to their profit; and glad as we are to see our manufacturers so generously rivaling the world at Paris, for the honor of American industry, we have carefully abstained from seeming to incite hopes of reward. If the nature of the case were not demonstration in itself, our experience as Commissioner in 1855 at the beginning of these things, taught very impressively the cruel delusion of returns hoped for from manufactured samples in the bazaars of Europe. We have a world of our own: let us but make it our own, and we may leave the Old behind.

MASSEY'S SHIP LEAKAGE ALARM.

The dangers of the sea are not few nor insignificant. Among them is that of sinking in consequence of a leakage. Many a good ship has gone down carrying with her all her passengers, crew, and cargo by the insidious encroachments of a leak, which had attained large and fatal proportions before being discovered. It is evident, therefore, that any contrivance which would infallibly indicate the presence and progress of a leak would be of great value on all water craft.

Fig. 1



Our two engravings show such a machine which does not depend entirely upon its intrinsic merits as claimed for it by the inventor, but has for its support the approval of such men as Admiral D D. Porter, Hugh McCulloch, Secretary of the Treasury; and of the officers detailed for naval inspection by the Government, the New York Board of Underwriters, and many other parties, competent to judge of its value, and whose recommendation carries with it the weight of position and competency. It is the subject of two patents, one dated August 11, 1857, and the other Feb. 19, 1867, granted to G. B. Massey, of New York City.

Fig. 2.

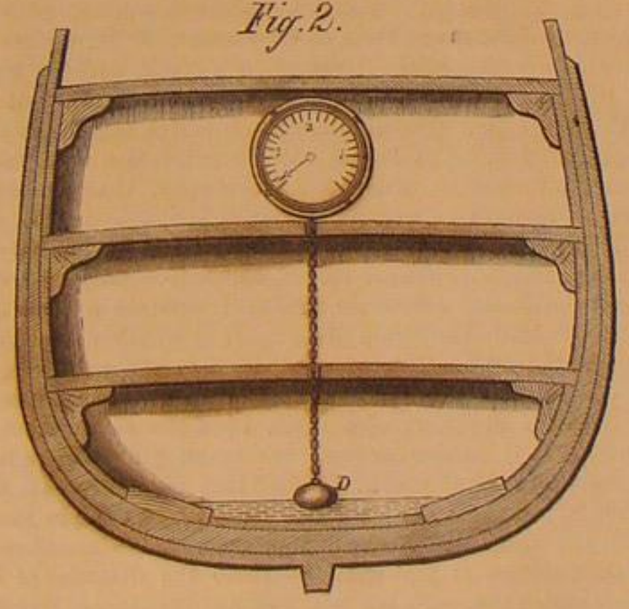


Fig. 1 represents an inside view of the apparatus, the dial having been removed. The machinery is inclosed in a circular box, A, of brass, and consists of a drum, B, holding a coiled spring, the tendency of which is to wind the chain upon the outside of the drum. On the bottom, or inside end of the shaft of drum, B, is a pinion which engages with the large gear, C, to the stud of which is secured an index hand, as seen in Fig. 2. This hand points to divisions of the dial plate, Fig. 2, proportioned to represent feet and inches. A float, D, Fig. 2, is attached to the chain and rests on the surface of the water in the ship's well. Now it will be seen that as the water rises the chain is slackened, allowing the coiled spring to revolve the drum, pinion, gear, and index, thus surely denoting the level of the water in the ship's hold at all times. As the water falls by pumping, the float, D, acts as a weight, rewinding the coiled spring.

In addition to this action of the apparatus as an indicator, it is also an alarm. Inside the case, A, is a bell, E, which is struck by a hammer, F. The hammer is actuated in this manner: The inside disk of the drum, B, is furnished with a circle of projecting pins which as the drum rotates engage with a jointed pawl to the hub of which the handle of the hammer, F, is secured. As the drum is rotated by the rise of the water the pawl is depressed, drawing back the hammer which is thrown with force against the rim of the bell by the tension of a spiral spring on the stud that supports the pawl. If, on the contrary, the drum rotates in the other direction by the lowering of the water, the jointed portion of the pawl yields and no action of the hammer is produced.

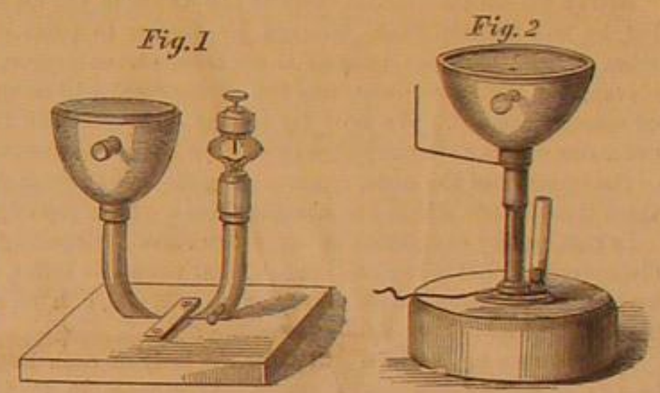
The advantages of this apparatus are obvious. The box can be secured as shown in Fig. 2, at any convenient point and will always show the state of water in the hold. Information relative to this gage may be obtained of the American Leakage Alarm Gage Company, No. 68 Broadway, New York City.

ANSELL'S FIRE DAMP INDICATOR.

The subjoined engravings represent the fire-damp indicator (Fig. 1), and the carbonic acid indicator (Fig. 2). The first is an iron funnel with a prolonged neck curved in the shape of the letter U, and fastened to its base in an erect position. The end of the U-shaped tube is fitted with a glass tube closed with a brass cap, through which passes a conductor of copper wire tipped with platinum, and of course insulated from the rest of the instrument. This wire is connected to one of the poles of an electro-magnetic apparatus, and the other pole is connected by another conductor to the lower part of the instrument. The top of the funnel is closed with a tile of wedgewood ware, and the neck is filled with mercury to within a sixteenth or thirty-second of an inch from the platinum point of the conductor. Whenever the dangerous gas begins to mingle with the surrounding atmosphere, it passes freely through the pores of the tile and mingles also with the air in the funnel, instantly pressing the mercury in the neck up into contact with the conductor, completing the electrical circuit, and setting in motion the mechanism of an alarm, within from two to four seconds, according to the distance left between the mercury and the conductor, from the first irruption of the gas. The "fire-damp," or light carburetted hydrogen, transpires through the tile nearly twice as fast as air, and thus creates a pressure exactly as any other body would if urged into the reservoir faster than the air can escape from it.

For the detection of carbonic acid, or "choke-damp" in the atmosphere of a mine, a modification of the instrument is used. For the wedgewood tile, a diaphragm of Sicilian marble is used. The wire with which the mercury is to be brought in contact, is introduced into the tube a little below the funnel, and the mercury is pressed upward and sustained in proximity to the point of the wire by a bag of air beneath it, pushed by a screw in the base of the instrument.

Fig. 1 *Fig. 2*



Thus the mercury virtually rests on an elastic cushion of air, and is balanced between the pressure of the compressed air in the bag, and the resistance of the air in the funnel. Whenever carbonic acid becomes present in the atmosphere, transpires through the porous diaphragm and mixes with the air in the funnel—nearly an equal volume of the air being at the same time displaced and passing out—the mixture resulting becomes more compressible than air, presents diminished resistance to the mercury pressed upward by the elasticity of the air cushion beneath, and consequently the mercury rises sufficiently to touch the conductor, complete the electric circuit and actuate the alarm. The wine and beer makers are expected to find this instrument valuable for detecting the commencement of fermentation.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

A Substitute for the Try Square Wanted.

MESSRS. EDITORS:—A suggestion thrown out in your journal has several times, to my knowledge, called out inventions of importance by directing inventive talent to a public want.

Perhaps another would fill a want for some kind of trying implement for joiners and other workers in wood to use in squaring up stuff with planes. The ordinary try square is rather an imperfect implement for such purposes from the difficulty of seeing when it fits, particularly in a side sight. It is also inconvenient from the fact that the workman has to stoop down in an awkward and tiresome position to apply it. We want something that can be used without stooping and that can be used in any kind of sight, and if possible something that will secure greater accuracy in squaring up. It would also add to its convenience if it could be retained in the hand while planing, and applied without removing the plane from long pieces. J. KIRKER.

Cincinnati, Ohio.

Spacing of Letters.

MESSRS. EDITORS:—I send you an article on a subject which I think will interest many of your readers, and may perhaps be of great assistance. It is on lettering. Although a great many works have been written on this subject, the authors seem to have given their attention merely to the construction of the letters, and a great many excellent works have been written on this special part; but none of them (so far as I can learn) have given their thoughts to the very important art of spacing. Poor spacing is a bad fault, and to remedy this evil, and aid those who have not a natural taste, and also in some degree those who have a taste for drawing, I will mention a

few rules which I think will be of practical value to the draftsman.

These rules were established by observing the manner in which type are constructed; that is, by measuring and comparing different founders' castings.

Every letter used in printing is upon one end of a rectangular prism (which we will call the body), and no matter where each letter is placed, whether it be beside an O or an M, the body of the letter always remains the same in the same sized letters. This being the case, if we wish to establish rules for spacing, it is only necessary to ascertain accurately the size of the body of each letter in the alphabet. This I have done for both the upper and lower cases together with the numerals.

We all know that the body of each letter is the same size one way, *i. e.*, in hight, and only varies in width. The way in which I have arrived at these rules is this: I have drawn each letter carefully, and found the space which it occupies. Now the end of the body is wider than the letter itself, and after drawing the letters, the following way of determining the size of the body has been adopted. In examining the letters of the alphabet we find that some of them are composed of straight, others of curved lines. I have taken for my base ten divisions, which I call spaces. Suppose I have an O, which letter itself is the same in width as in hight (which would be ten spaces) I add to each side one half space, thus giving me the width of the body as eleven spaces, and we have this rule for the distance of the curved edge of the letter from the edge of the body, viz., one half space. In the case of straight line letters, as in H, for instance, the letter itself is eight spaces wide. I add to each side one and a half space, thus making the body eleven spaces in width, and I have for the distance of all straight-line letters from the edge of the body one and a half spaces. The above rules are for capitals.

In the lower case I have taken the hight for the letter as six and a half spaces and the distance of the letter from the edge of the body, for curves one fourth, and for straight lines three fourths of a space. We see from the above rules that the distance of curved lines from the edge of the body is one third of the distance of straight lines from the edge, both in the upper and lower cases.

After a person has learned to make the letters of the alphabet, he will proceed thus—Suppose he wishes to print the word GOOD; here the body of G occupies eleven spaces, O eleven, and D eleven spaces, and the whole word will occupy 44 spaces (capitals). We now lay off the four spaces in the order desired, and we can judge by our eye about the distance of the letter from the edge, remembering the rule: curves one third the distance which the straight lines are from the edge.

In making my examinations for these rules for spacing I discovered the following curious fact, that upon one letter, o we can make eleven letters depend, viz., a, b, c, d, e, h, m, n,, p, q, u—which is very useful to remember.

I will give a table which will show the body of each letter in the alphabet: Hight—10 spaces. Width—B, F, P, ten spaces; A, C, D, E, G, H, K, N, O, Q, T, T, V, X and Y, eleven spaces; I, five spaces; J, eight spaces; S and L, nine spaces; E, thirteen spaces; W, seventeen spaces; Z and &, twelve spaces. Numerals—1 equals five spaces; 2, 3, 5, 7, 8, nine spaces; 4, eleven spaces; 6, 9, 0, ten spaces. Lower Case—hight 6½ spaces. a, b, d, k, p, q, x and z, equal seven and a half spaces, or three fourths of the hight of capitals; c, e, o, s, seven spaces; f, i, j, l, t, three spaces; g, h, n, u, eight spaces; m, thirteen spaces; r, v, y, six spaces; w, ten spaces.

Albert F. Hall.

Charlestown, Mass.

Ventilators Operated by Solar Heat.

Messrs. Editors:—In your issue of March 9th, page 156, Mr. Boyd, of Boston, is represented as having exhibited a new ventilator in which the solar rays are employed to heat a chamber placed directly over the mouth of the ventilating tube and so rarify the air at that point, which of course would cause an upward current in the air, even when there was no wind to act upon the ventilator. If I understand his plan this chamber is formed of two cones joined at their bases the apex of one cone pointing down the tube. If such is the formation I can inform you that precisely that plan is now and has been for the last eight years in use on no less than thirty of the public schools of this city. On one of them the ventilators were painted black to attract the sun's rays and intensify the heat of the cones. B. F. Miller.

New York City, March 28 1867.

Tempering Steel.

Messrs. Editors:—The tempering of steel tools seems to be a subject of discussion between correspondents V., and W. L. Dolbier, in numbers 7 and 12 current volume. Both appear to rely upon the color the surface of the steel assumes while drawing the temper after hardening, in order to determine the proper degree of hardness to the tool that it may best perform its part in the work designed. I believe both to be in error. By experience I have found that we can neither depend upon the degree of polish nor color of surface. The secret lies in the working of the steel, and in the proper degree of heat given the steel to be hardened. You cannot tell that a piece of steel is hard or soft by polishing its surface and then exposing it to the heat and watching the different colors, for the same colors will appear on steel that has never been hardened as on a hardened piece when exposed to the same degree of heat. There are so many tools made from steel each having its own peculiar duty to perform, requiring a special temper, that in my opinion there can be no fixed rule laid down to govern the art of tempering steel tools. To become an expert in the business requires judgement, close attention and long experience. It is a fact that there are more butchers of steel, disguised as blacksmiths, who are sure to destroy the life of a piece of steel the first time they place it in the fire than there are of those who understand steel or even know anything about its nature. If a tool does not stand after going through their butchering process the fault is laid to the steel, the quality is bad, etc. For hardening I believe that steel should never be heated above a cherry red, and dark at that, and then in drawing the temper one must be governed by experience. W. L. D., should not mind as to what degree of polish he gives his steel providing he still persists in risking the merits of the tools he tempers by the color; all that is necessary is to remove the outside or scale so that you have a white surface. E. M. F.

Springfield, Ohio.

[Our correspondent is undoubtedly correct in his belief that judgement, close attention, and long experience is necessary to give assurance of success in working and tempering steel. It is an art not to be learned from verbal instructions alone. But his experience differs from ours if no dependence can be placed upon the color of steel in tempering. If he who tempers the tool knows the use to which it is to be applied, and the amount and kind of forging to which it has been subjected, the color on the steel, after hardening and while drawing the temper, is, we think, a valuable guide. Eds]

The Crank Motion.

Messrs. Editors:—In No. 13 of your journal a correspondent, P. Y. seems very desirous to know what is the average leverage of a crank 4 feet long as used in the steam engine. Then he professes to answer the question himself by saying that it is 2 feet, while others say it is 2 feet 8 inches; but at the same time he seems to think that it is all guess work. I will try to demonstrate what it is in a practical way and make it so plain that any one can understand it. Every one knows that it takes an 8 feet stroke of the piston to operate a 4-feet crank so that the piston moving forward and back it has had a motion of 16 feet. Now suppose the crank to be taken off, and a gear 16 feet in circumference at the pitch line to be put in its place. Next put two long racks a little over 8-feet on the piston with teeth to mesh with the gear between them. When the piston moves forward 8 feet it is evident it will turn the gear half around, then by throwing that rack out of gear and the other in by some proper means at the right time the piston will with the rack moving back finish one revolution of the gear with the same leverage in every part of the stroke, and also the motion the same in every part of the stroke, and the amount of leverage used is just half the diameter of the gear which is 2 feet $\frac{5}{10}\frac{4}{0}\frac{6}{0}$, and that must be the average leverage of a 4-feet crank, and while two strokes of the piston moves the gear at the pitch line only 16 feet, it moves the crank pin 25 feet $\frac{1}{1}\frac{2}{0}\frac{5}{0}$, and also while the gear would move one foot the crank pin would move with the same piston 1 foot and $\frac{5}{4}\frac{7}{0}\frac{0}{0}$.

Wm. Hall.

North Adams, Mass.

Messrs. Editors:—Your correspondent, P. Y., desires to have shown the average leverage of a crank, without resort to the higher mathematics, and I propose to show it by such self-evident propositions as will scarce require further demonstration. If it is not self-evident, it is a well established principle in mechanical philosophy, that an equal amount of work or mechanical effect is required to raise a body a given hight whether it is raised perpendicularly or through longer or shorter curves, and it is equally true that equal mechanical effects are produced whether a body falls perpendicularly through a given space or whether it describes a curve in its fall. This being admitted, it follows that equal mechanical effects are produced whether a weight is suspended from the periphery of a drum upon the crank shaft, or whether it is suspended from the crank pin by means of connecting rod and piston, provided that in both cases it falls through the same perpendicular space while the pin moves from the upper dead center to the lower. The circumference of such a drum is just equal to twice the diameter of the circle which the crank pin describes, and the average leverage of the crank is just equal to the radius of the drum, which, being a uniform is consequently the average lever. The circumference of the drum being given, the radius is formed by the rule which shows the relation of the diameter to the circumference, and which is, to divide the circumference by 3.1416 to find the diameter, half of which is the radius. The average leverage of a 4-feet crank is 2.5464 feet.

Providence, R. I. E. M. Chaffee.

Mean Leverage of the Crank.

Messrs. Editors:—In the Scientific American of 30th March, page 202, a correspondent ("P. Y.") asks for the mean leverage of a crank four feet long—by which is understood the leverage required under a uniform force on the crank during the entire stroke, that should be equal to it, actual and usual working.

The mean leverage of all cranks is as 0·6367 to 1, consequently 2·547 is the mean for a 4-foot crank.

Let the constant force=1. Then

2·547 leverage×1 force=2·547,

and 4×0·6367=2·547.

While the above shows the equal latent force of the two leverages, the respective distances moved determines the mechanical effect.

For 2·547 leverage—8 half circle×1 force=8 effect.

4—12·566×0·6367=8 effect.

The ratio of 0·6367 to 1 for mean leverage remains correct for all lengths of connecting rod, and is found by dividing the stroke by the half-circle path of the crank.

Thos. W. Bakewell.

Cincinnati, March, 1867.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Beehive.—Hamilton Clipp, Orange, Ind.—This invention consists in the combination of a feeding trough with the interior boxes of the hive, so that the bees, when not at work, may be provided with food in such a manner as to prevent their escape or disturbance, and in the combination of a sliding and a fixed grate with each other and with the second interior box, so that the bees may be shut into the upper boxes, when it is desired to remove the lower box to destroy moths, or for any other purpose.

Washing Machine.—Robert E. Downie and H. C. Johnson, Delevan, Wis.—This invention consists in providing open rubbers for a washing machine, in such a manner that the water will readily pass through between the rubbers when the machine is in operation.

Turning Irregular Forms.—A. R. Stewart, Douglas Harbor Canning, N. B.—This invention relates to a new and improved method of turning irregular forms whereby duplicate cutters may be used on the same piece of wood and to the manner in which the cutters are arranged and operated.

Soda Fountain.—T. A. Long, Meadville, Pa.—This invention consists in placing the materials of which soda-water is formed in a suitable vessel, and forcing the same into an air chamber, whence the soda-water is expelled by the force of the compressed air in the chamber: also in making the apparatus portable.

Frame for Railroad Car Bodies.—S. Merrick, New Brighton, Pa.—This invention relates to improvements in the construction of iron frames of railroad cars, and consists in applying arch trusses in the center and ends of the sides, in combination with the main sills and stanchions, and also tying the main and cross sills with a flat, horizontal plate, in such a manner that all the parts of the frame shall be firmly secured to each other, and so connected and related as to be self supporting, independent of panels or lining.

Shrinking Wagon Tires.—Caleb Jackson, York, Ill.—This invention has for its object to furnish an improved tire-shrinking machine, simple in construction, effective in operation, and which can be operated by one man.

Device for Moving Pianofortes.—D. J. Langworthy, Jamestown, N. Y.—By this mover pianofortes can be taken down, moved, and set up with safety, expedition, and with much less labor than is now required.

Sleigh.—W. H. Huyck, Charlton, Iowa.—This invention relates to the manner of constructing the lower portion of a sleigh on which the body is supported, whereby a very strong and durable sleigh is obtained at a much less cost than by the ordinary mode of manufacture.

Grain Cradle.—C. P. Kelsey, Livingstonville, N. Y.—This invention consists in a peculiar manner of securing the fingers of the cradle to the braces and cross bars, whereby they may, with the greatest facility, be adjusted to suit the length of the scythe.

Cleaning Flax and Hemp.—Arnold Gartner, New York City.—This invention relates to a flax or hemp brake, which is composed of a hollow drum made of perforated sheet metal, and provided with a series of beaters and flyers, which are arranged in lines at suitable distances apart. The flyers are rigidly secured to the periphery of the drum, but the beaters are hung on gudgeons so that they are yielding, whereby injury to the fibers is prevented. The flax or hemp is fed to the machine over curved adjustable aprons which extend downward, so that the dust and dirt are carried down, and by using a foraminous drum the draught of air is materially diminished, and the dust and dirt are less liable to cause inconvenience to the workman than in machines of the ordinary construction.

Car Coupling.—J. H. Harris, Virginia, Ill.—This invention consists in constructing a car coupling in such a manner that when the cars are coupled it brings the platform of the cars so near together that a person cannot fall between them, thus preventing many accidents to which railroad men are daily exposed.

Combined Swift and Reel.—G. W. Horton, Belvedere, Ill.—The object of this invention is to construct a reel or swift for winding up yarn, which may, without the use of set or other screws, be easily secured to any table or chair back in a horizontal or vertical position, and which can, when not used, be folded up so as to fill the least possible room, and which is connected with an indicator wheel whereby the number of revolutions of the reel can be accurately ascertained, and consequently also the length of the yarn wound around the same.

Saw.—E. W. Tilton, Oshkosh, Wis.—This invention relates to the manner in which an upright or horizontal saw is made to saw circular forms, such as felloes for wagon wheels or other circular bodies, staves for barrels, and all work of that description.

Regulator for Watches.—Augustine Jewett, Boston, Mass.—The object of this invention is to enable the movement of a watch to be regulated to a degree as near as it is capable of running with certainty and ease.

Loom.—Willoughby W. and Varnum J. Phillips, Wellsville, N. Y.—In this loom the pawls, ratchet wheels, and cams, which operate the shuttle, are arranged in a novel and ingenious manner, and ensure a uniform and perfect operation.

Wind Mill.—H. P. Gallup, Medina, Mich.—This invention has for its object to furnish an improved wind mill, simple in construction, cheap, durable, and strong, and easily regulated to run fast or slow as desired.

Carriage Step.—John H. Yager, Trenton, Ohio.—By this invention the construction of carriage steps is much simplified and cheapened, as well as rendered more practical and efficient.

Wrench.—Samuel S. Barnaby, Chicago, Ill.—This invention consists in a novel arrangement of the movable jaw of a wrench with regard to its fixed jaw, whereby it can be readily adjusted and set at any desired position.

Plow Sulky.—Daniel W. Colburn, Loami, Ill.—This invention relates to a carriage or vehicle which is so constructed that any of the ordinary plows in common use may be attached, and the labor of plowing performed while the driver can ride and make the work easy.

Carriage Step.—Francis Baker, New York City.—By the construction of carriage steps embraced in this invention, when not in use, they can be wholly incased within the body of the carriage and thus concealed from view.

Repeater Fire-arms.—Peter Sheckler, Orangeville, Ill.—This invention relates to the combination and arrangement of parts by which the cartridges are introduced into the magazine of the gun, moved forward therein, and guided into the rear end of the bore of the gun, and to the combination and arrangement of parts by means of which the gun is cocked and discharged.

Shirt Stud.—Patrick Kenny, New York City.—This invention is designed to furnish a shirt stud, by the use of which from the elasticity of the connection between the plates, the button holes in the shirt bosom will be less liable to be torn or injured, and which will be more easily inserted and removed than the studs now in common use with rigid connection.

Sink or Water Trap.—John E. Taber, Fall River, Mass.—The object of this invention is to provide a safeguard against the impure air and foul vapor which arise from sink spouts, cess-pools, or water closets, and also to prevent the evaporation of liquids where they are exposed to the atmosphere.

Sleigh Runner.—Charles Stoddard, Hancock, N. Y.—This invention has for its object to so improve the construction of sleigh runners that the shoe may be held firmly and securely in place, even should it become broken while in use.

Watch.—J. A. Hamann, New York City.—This invention consists in so constructing the pendant of a watch as to receive and hold the key for winding and setting the movement of the watch.

Steam Boiler.—Thomas Holt, Trieste, Austria.—This invention consists in constructing steam boilers or steam generators, both for marine and land service, in such a manner that while the evaporation power of the boiler is not diminished, the dimensions of the boiler may be materially lessened, whereby fuel is greatly economised.

DOOR STRIP.—J. P. Force and W. W. Egnew, Jarvis, Ind.—The door strip is hinged to the threshold so as to vibrate downward in the direction of the motion of the opening door, when the door is closed it strikes against an arm of the rock shaft which elevates the edge of the strip so as to form a valve to close the opening under the door.

GATHERING APPLES AND OTHER FRUIT.—H. F. Wadhams, South Dansville, N. Y.—This invention consists in the application to the body of an apple or other fruit tree of a fruit receiver constructed of canvas or other suitable cloth arranged in such a manne that it will receive the fruit when the tree is shaken without injuring the fruit in the least, thereby avoiding the tedious labor of picking by hand.

SEWING MACHINE.—George S. Darling, Bridgeport, Conn.—This invention consists in connecting the presser foot with the take up or with the thread controller, or with both, in such a manner that the supply of thread to the needle regulates itself according to the thickness of the material to be sewed.

SCAFFOLD.—Horace Littlefield, Lewis, Iowa.—This invention relates to a scaffold which can be folded for transportation, and which can be arranged higher or lower as may be desired.

HAT BLOCKING MACHINE.—S. S. Middlebrook, Sandy Hook, Conn.—This invention relates to a machine by which the conical hat body is gradually transformed into a perfectly shaped hat and consists of three distinct portions, through each of which the hat body is passed before its shape is perfected.

LIFTING APPARATUS.—Wilson L. Jones, Baldwin City, Kansas.—This invention has for its object to furnish an improved lifting apparatus by means of which heavy weights or burdens may be lifted readily and conveniently.

WASHING MACHINE.—William A. Terry, Prairie du Chien.—This invention consists in the combination of a vertical shaft to the lower end of which the movable rubber is attached with the pinion wheel by which said shaft is operated so that the said shaft may move freely up and down to enable the rubber to adjust itself to the various thicknesses of clothes to be washed.

MACHINE FOR MOLDING POTTERY.—A. Keil and John Tresch, New York City.—This invention relates to a machine whereby flower pots and similar articles of pottery can be molded in the shortest possible time and in a simple manner.

APPARATUS FOR MAKING VINEGAR.—Theodor Grundmann, Milwaukie, Wis.—This invention consists in the construction of the troughs through which the liquid, which is to be transformed into vinegar is passed. These troughs are placed on a perfect level and are provided with vertical walls for detaining the liquid in its passage, and by which the same is made to transverse hundreds of feet in a trough of from 12 to 20 feet in length. These troughs are placed one above the other, the upper one serving as cover for the one below.

TRIMMING METAL AND OTHER PLATES.—J. H. Ferguson, and H. W. Lovejoy, New York City.—This invention relates to a machine by which the edges of metallic or other plates can be chamfered off and the roughness removed, leaving the edges round and smooth.

MACHINE FOR MAKING TROUGHS.—Albert T. Stearns, Dorchester, Mass.—This invention relates to an improvement in that class of machines for making troughs in which a cylindrical saw is used to cut out the required cavity. In ordinary machines of this class the stick of timber is secured to a reciprocating carriage by means of dogs so that that side of the stick which rests on the carriage and its back cannot be reached by cutters while the stick passes through the machine and furthermore, much time is lost in gigging back and in removing, replacing and dogging the sticks.

DRILLING OIL WELLS.—Nelson Pontious, Hallsville, Ohio.—The object of this invention is to provide means for automatically turning drilling tools in the bore of an oil or other artesian well and also to reverse the direction of rotation by automatic action through the vibration of the walking beam.

SHIFTING RAIL FOR BUGGIES AND WAGONS.—Alonzo E. Bailey, Middleville, N. Y.—This improvement relates to the manner in which the rails for the back and the rail for the top are shifted from one vehicle to another.

CHURN.—George Deckman, Malvern, Ohio.—This invention has for its object to improve the construction and application of Deckman's improved churn dasher patented July 31, 1866, and numbered 56,728.

OIL CAN.—J. A. Whitman, Auburn, Me.—This invention consists in forming a funnel shaped collar around the tube of the oil can which catches and holds the oil which would otherwise drop from the tube and be wasted.

WEED CUTTER.—C. G. Lathrop, San Jose, Cal.—This invention relates to an apparatus for reducing manual labor in eradicating weeds and also for completely destroying the latter. It consists chiefly in the use of a V-shaped horizontal cutter which is secured to a standard that is attached to the underside of a common plow beam.

DENTISTS' VULCANIZING FLASK.—Henry F. Clark, Poughkeepsie, N. Y.—This invention relates to the manner in which the parts of the flask are secured together.

DOUBLE-ACTING SASH FASTENER.—John Wiard, New Britain, Conn.—The object of this invention is to so arrange and construct a sash fastener which is to be applied to weighted sashes that the latter will not only be locked when the window is closed but also in any other desired position.

GATE.—S. E. Anthony, Stillwater, N. Y.—This invention relates to a gate of that class which are constructed and arranged in such a manner as to slide longitudinally a certain distance and then swing or turn entirely open. The object of the invention is to obtain a gate of the class specified which may be opened and closed with greater facility than hitherto and be stronger and more durable.

SURFACE CONDUCTOR FOR ELECTROTYPING.—Samuel Hallock, New York City.—This invention relates to a mode of electrotyping and consists in applying a metal conductor of electricity to the surface of the mold to be electrotyped instead of the usual method of employing wire pins pierced through the wax mold in contact with the bottom of the pan.

ATTACHMENT TO MILLSTONES FOR COOLING THE MEAL, ETC.—M. Cosgro, Peoria, Ill.—This invention relates to improvements in devices applied to millstones for the purpose of cooling the meal, dissipating the moisture arising from the grain generally in grinding and keeping the curb clean and dry.

LITHOGRAPHIC PRESS.—Geo. Dunlop, Brooklyn, E. D., N. Y.—This invention relates to a printing press which may be properly termed a litho-chromatic printing machine, a carriage or truck being provided which forms the bearings for the wetting roller, for a sectional inking-in roller, and for one or more ordinary inking-in rollers and which operates in combination with a sectional and with an ordinary feed roller in such a manner that by pushing said carriage back and forth the inking-in rollers are charged with ink and the ink is transferred to the stone so as to produce the desired shade.

LATHE FOR TURNING LASTS.—Mathias Spenll, Detroit, Mich.—This invention relates to a lathe which is so constructed that the right and left last may be turned simultaneously and furthermore a small last may be turned from a large pattern or vice versa.

TREADLE FOR SEWING MACHINES, ETC.—John G. Folsom, Winchendon, Mass., and W. Clair Anderson, St. Louis, Mo.—This invention relates to a treadle attachment for sewing machines and for other small machines, which attachment is so constructed that the machine to be operated can be placed on a common table and by stepping with the foot in the treadle the desired motion can be effected.

THE MARKETS.

The entire prostration of business which has been so characteristic of the past few months, seems gradually to be relaxing itself and slowly and imperceptibly regaining vitality. As anticipated, the arrival of spring has brought with it some little activity though the volume of trade far from reaches its ordinary magnitude and the season is so far advanced that no hopes are indulged in, that the customary briskness will be realized this year.

COMMERCE OF GREAT BRITAIN.—The British Board of Trade's returns for the past year give the total value of exportations to have been valued at £136,827,785, which is an increase of fourteen per cent over the total of the preceding year and eighteen per cent over that of 1864.

COTTON.—From the same report we learn that the shipments of cotton manufacturers was in value £90,865,022, showing an increase of thirty per cent on that of the year preceding. The imports during the year were 12,295,993 cwt., against 8,731,949 in 1865. Of this supply 4,643,370 cwt. were received from the United States against 1,212,790 in 1865 and 126,322 in 1864. The last monthly report on the condition of the Liverpool cotton market concludes that from present prospects there is no room for any serious decline below the present prices, nor, owing to the state of the manufacturing trade, need any marked advance be anticipated, but it seems probable that a period of healthy activity and moderate prices is not far distant.

WOOL.—In 1859 the total value of the woolen manufacturers of the United States was $14,500,000; in 1840 it amounted to $20,700,000; ten years later the valuation was $43,200,000, and in 1860 it reached its highest figure before the war, viz., $68,900,000, during which year 80,386,527 lbs. were consumed. During the four years of war the consumption of wool for manufacturing purposes increased from 104,860,000 lbs. in 1862 to 143,878,000 lbs. in 1865. The market being overstocked at the close of the war, Government being no longer a buyer, prices fell heavily. Many large mills were compelled to succumb, and many more are now idle or running at a loss. The new tariff seems to have been framed wholly in the interests of wool growers and is so extreme that it is believed it will defeat its own end.

COPPER.—The copper resources of the Pacific coast are steadily gaining in importance. While in 1862 the whole exports amounted to 3,660 tuns, last year 21,476 tuns were shipped from the port of San Francisco, an increase of nearly 18,000 tuns in five years.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

E. L. B., of N. Y.—1. "What is the explanation of the sound produced by the cracking of a whip? 2. What is the cause of the light seen in the eye when you close it and press the finger on one side of the ball?" (1) The concussion of the lash with the air and the concussion of air in closing up the vacuum left in the path of the lash. The sound produced by the concussion of air with air is illustrated by the the whistling of a bullet. (2.) The light is probably an optical illusion. The ordinary sensation of sight is supposed to be due to the mechanical force of light acting on the optic nerve, and the compression of the eyeball acts upon the nerve probably in a somewhat similar manner.

S. T. R., of N. Y.—Our instruments are not sufficiently sensitive to detect any attraction beyond a few feet from a magnet. But if the law that the attraction varies inversely as the square of the distance is rigidly true, the attraction of a magnet, however small extends to the ends of the universe.

T. L., of Pa.—All in the Northern Hemisphere, agree to call March April and May the spring months, but some reckon the beginning of spring at the vernal equinox, about the 21st of March.

G. B. F., of Montana has been assured by what was sufficient testimony for him that a stone has been discovered which attracts gold as the loadstone does iron, and he expects to come into possession of such a stone. He says: "I scouted the idea at first but was finally forced to believe it from the testimony of dozens of perfectly reliable persons, and I am now on track of such a piece of rock which I hope to procure for the advancement of science!" . . . There is no special treatise on the spectroscope and spectrum analysis. But abundance of information on the subject may be found in recent treatises on chemistry and especially in Fresenius' "Qualitative Analysis." Spectroscopes are made in this city and may be procured from the dealers in philosophical instruments.

M. M. R., of N. Y.—We are not aware that any thing has ever been put into hydraulic lime when used for lining cisterns to prevent its hardening the water. We would suggest as a possible preventive, to wash the surface of the plastering after it has become set with a weak solution of silicate of soda or soluble glass.

S. M., of Ill.—To silver mirrors the glass must be carefully cleaned and the mercury and tin foil should be pure. The mercury is best purified by distillation. The tin foil most commonly sold, contains more lead than tin. . . . We know of no more perfect way of decolorizing sorgo sirup than by filtering it through animal charcoal. The process, however, is commonly considered too expensive for so crude a material as sorgo sirup. Bullock's blood is only useful for clarifying. It contains albumen which on coagulating entangles, and carries with it the floating solid particles which made the liquid turbid. Our correspondent thinks his sirup is darker on account of the cane having been raised on dark bottom land; a new theory to us.

A. F. F., of Wis., says that some months since he addressed to the editor of the *Clipper* the following question: Suppose a man to be in Washington, D. C. at 12 o'clock noon on Monday, and he were able to travel fast enough to keep directly under the sun, and by so doing in 24 hours he would arrive in Washington again, but it would be Tuesday. Where would the first point be struck that the people at that point would call Tuesday, it being noon with the man the whole 24 hours." He received the following answer: "I guess he would or any other man."

J. F. H., of N. Y.—A conducting surface is given to wax for electrotyping by brushing over the wax fine plumbago. Another way is to moisten the surface with a solution of nitrate of silver and shortly after pour on a weak solution of pyrogallic acid.

W. H., of Pa.—In former volumes we have given pretty full details of the manufacture and uses of aluminium. The Wurtz amalgamation Co., have erected a large factory for the manufacture of sodium and they have facilities for producing aluminium on the large scale. Up to the present time, however, it has been prepared in America only in small quantities.

E. G., of Mich.—For the ascending power of balloons see page 158.

H. B. L., of R. I.—We have no more explanation of the cause of elasticity than we have of gravitation. Elasticity is a name we give to certain phenomena about the nature of which we know very little. . . The theory of spontaneous generation is now generally abandoned. It has been demonstrated that in most of the supposed cases, the germs of life came from the air or other matter where they are known to flourish. The germs of the maggots which breed in the middle of a cheese, may have got into it when it was milk, either from the air or from the cow with the iron tail.

W. K. N., of N. Y.—There is no doubt of the truth of the statements often made that a rifle ball may be fired through a pane of glass, and leave a hole without cracks, and that a candle may be fired through a board. In trying the experiment you might have a dozen failures to one complete success.

E. G. G., of Mich.—There are many plants which contain oxalic acid, but it is not now profitable to extract it from them. Till within a few years it was manufactured from sugar and nitric acid. At the present time the raw materials used are saw dust and soda.

D. C. S., of Ind.—The common mouth blow pipe is used in soldering small articles of silver and gold. The flux used is borax. . . . You can get wire gages at the hardware stores.

M. L. M., of N. Y., wishes to get a noon mark or meridian without using a compass or chronometer. There are several ways; perhaps the following is the simplest. The shortest shadows are at noon select some high point (as the top of a church spire) and the direction to this point, from the point of shortest shadow, is in the meridian.

R. M., of Ill., says there is an article extensively in use in England for facing cards and whitening straw under the name of "white paste" What is it? He says it is not white lead.

J. L., of O.—We suggest that you apply to the professor of chemistry at the medical college in your city for the testing by the spectroscope of the matter you speak about. If you prefer, however, to send it to us, do so, and we will examine it.

W. H., of Ill.—Please read your paper more carefully. You will find answers to all your questions in recent numbers.

N. W. C., of Vt.—Ransome's artificial stone is most talked about and is probably the best of its kind. It is not made in this country.

J. W., of Pa.—If you immerse an engraving or a printed page in a weak solution of potash, the ink becomes softened. Dip the paper in a weak acid solution, and then lay it on a lithographic stone and roll through the press. The impression will be transferred to the stone and copies may be printed from the stone in the usual way. This is known as the anastatic process. There are several other processes for copying printed matter, but the one most generally used is that by photography. The preparation to which you refer is probably a spirit varnish. The varnish is applied to the print and the print is thus attached face on to a smooth surface of glass wood or metal. After the varnish becomes dry and hard the paper is moistened with water and becoming softened is rubbed off leaving the impression in the varnish. This last process is used for ornamenting fancy boxes, glass vases, etc. With care you may in the same way make transparencies for the magic lantern.

T. M. S. Jr., of Ga., asks if the top of a wagon wheel *turns* faster than the bottom. We reply: it does not. A point at the top of a wheel moving over a level plane, as a wagon wheel, *moves* through a greater space in the same time than a point on the lower side opposite does. This appears to be a catch between the terms *turn*, as a periphery turning about its axis of rotation, and *move* as denoting the distance traveled by the different parts of a wheel.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Wanted.—Second-hand engine lathe in good repair, 12 to 18 inch swing. Address, with full description and price, Henderer Brothers, Binghamton, N. Y.

Manufacturers of Spinning Wheels will please send their address to G. C. Bradway, Maquoketa, Iowa.

I wish to purchase machinery for making matches. Wm. H. Thomas, Box 1,203, Cairo, Ill.

An interest in a valuable invention will be given to any one who will assist in getting it patented. Address B. Emert, Houston, Shelby county, Ohio.

Machine for Stirring Butter, Improved Carpet Fastener, Improved Lifter for Stove Covers, Pots, etc., Improved Button-hole Cutter. The inventor of the above new improvements desires to communicate with parties who will pay the expenses of obtaining the patents, manufacture or produce the articles, and take a share in the patents.

NEW PUBLICATIONS.

GENERAL PROBLEMS OF SHADES AND SHADOWS, Formed both by Parallel and Radial Rays, etc. By S. Edward Warren, E. C. New York: John Wiley & Son, 535 Broadway.

The author of this volume is too well known, from his previous works on geometry and its departments, to require any certificate as to the value of this present publication. Such a work is invaluable to the engineer, draftsman, and mechanic, and as a means of amusement and of intellectual discipline, it is eminently attractive. The volume is illustrated with numerous plates engraved on a large scale. Lovers of the noble science of geometry who are in possession of Mr. Warren's previous treatises will not neglect to procure this interesting volume.

GROUP OF QUAIL.

Messrs. L. Prang & Co., Boston, have just issued another of their beautiful Chromos, representing a group of Quails, after a painting by A. F. Tait. This Chromo was printed from nineteen stones, and is similar to the Ducklings and Chickens issued last year. The resemblance to oil painting is so close that it requires an eye skilled in the arts to detect the difference.

THE ATLANTIC MONTHLY

For April is brim full of very choice reading. Among the contributors are Oliver Wendell Holmes, Edward E. Hale, T. B. Read, Bayard Taylor, James R. Lowell, and others.

THE ANNUAL OF SCIENTIFIC DISCOVERY—

A Manual indispensable to every one interested in arts or sciences—is issued for 1866-7 under the editorial charge of Dr. Samuel Kneeland. In the able hands of the new editor the high position established for this publication by its originator, David A. Wells, will be well sustained. Mr. Wells, engrossed with important duties as Commissioner of Revenue, gives in this volume a temporary (at least) valedictory to the readers of the Annual.

THE AMERICAN GARDENERS' ASSISTANT; Containing Complete Practical directions for the Cultivation of Vegetables, Flowers, Fruit Trees, and Grape Vines. By Thomas Bridgman. New Edition, revised, enlarged, and illustrated by S. Edwards Todd. 12mo, pp. 377. New York: William Wood & Co.

The primary object of this well filled volume was to enable seedsmen, of whom the author was one, to afford instruction at a trifling cost to such customers as had not a regular gardener, and thereby save themselves from the injury involved in a mismanagement of their seeds. The objects of the buyer and planter of seeds will naturally be promoted by the same means in like measure.

EXTENSION NOTICES.

Sherburne C. Blodgett, of Bridgeboro', New Jersey, having petitioned for the extension of a patent granted to him the 3d day of January, 1854, Antedated July 3d, 1853, for an improvement in hemming and cording umbrella covers, for seven years from the expiration of said patent, which takes place on the 3d day of July, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 10th day of June next.

George Sharp, of Philadelphia, Penn., having petitioned for the extension of a patent granted to him the 5th day of Jan., 1864, for an improvement in design for spoon handles for seven years from the expiration of said patent, which takes place on the 5th day of July, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 10th day of June next.

Edmund Munson, of Utica, N. Y., having petitioned for the extension of a patent granted to him the 19th day of July, 1853, for an improvement in eyes for mill stones, for seven years from the expiration of said patent, which takes place on the 19th day of July, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 1st day of July next.

William Mann, of Philadelphia, Penn., having petitioned for the extension of a patent granted to him January 11, 1853, and Antedated July 11, 1852, for an improvement in manufacturing copying paper, for seven years from the expiration of said patent, which took place on the 11th day of July, 1866, and this application having been authorized by Act of Congress, it is ordered that the said petition be heard at the Patent Office on Monday, the 10th day of June next.

Benjamin Irving, of New York City, having petitioned for the extension of a patent granted to him, August 30, 1853, for an improvement in steam boilers, for seven years from the expiration of said patent, which takes place on the 30th day of August, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 12th day of August next.

MORRIS' AXLE LUBRICATOR.

The engraving represents a longitudinal section of a wheel hub with an improved lubricating tube inserted. It is the subject of a patent granted through the Scientific American Patent Agency to Jacob F. Morris of Lansingburgh, N. Y., Feb. 12, 1867. A brief description will explain its construction.

It is a conical case of metal having a hollow threaded stud at the bottom which screws into a tapped hole in the iron sleve of the hub, thus securing it firmly. The top of the case is octagonal to permit a wrench to be used for seating it into the hub, and it stands flush with the outside. Inside the reservoir is a perforated cup-like strainer held in place by a wire secured in its center and bearing against the inside of the cap. On this strainer is a sponge and the reservoir being

Fig. 1

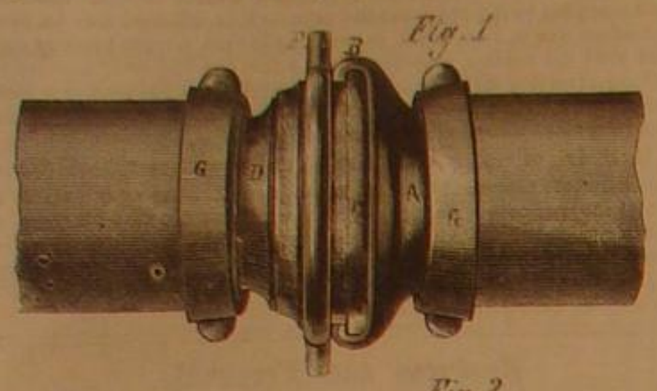
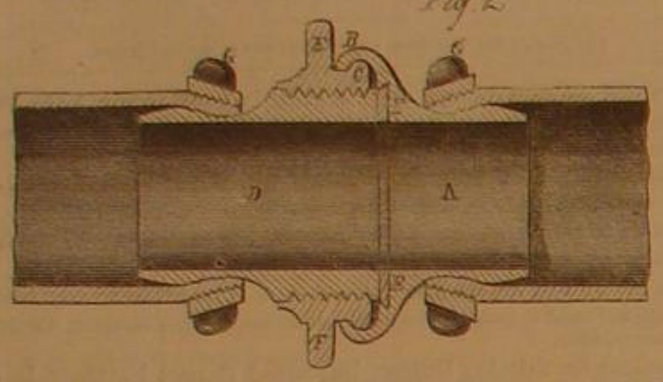


Fig. 2



filled with oil the sponge prevents it from running out of the little pipe at the bottom when the carriage is at rest. When in motion the jars and jolts serve to squeeze the sponge and allow the escape of the oil to the axle. The vehicle may be run for weeks with once filling the reservoir. The only projecting part is the cap, which is ornamental and stands but slightly above the hub.

This device is applicable to all sorts of vehicles, pleasure carriages, wagons, trucks, etc., and adapted to the object sought. For rights and for further information address Morris & Lochrow, Lansingburgh, N. Y.

MAN AND NATURE.

Matured science is a critical expounder of revelation. It corrects many crude notions of the meaning of the inspired writings, and wherever it bears upon them unfolds a sublimity of enlarged significance in the words, which deepens our reverence and wonder. Geology first taught man to read the story of the Creation in its magnificence, and with the sister sciences will doubtless carry daylight through many deep, dark passages yet unexplored. In like manner the triumphant progress of chemistry for the last twenty years has thrown a new meaning into the commission of man from the Almighty, to "replenish the earth and subdue it."

We supposed that we were to wrestle with the elements and forces around us, to utilize or counteract them by our ingenuity, and to achieve an external supremacy over the tributary yet foreign dominions of Nature. It was considered until lately impossible to invade these dominions and take the work of Nature out of her hands. But since this has been done, by the chemical fabrication of organic products such as glycerin, grape sugar, alcohol etc., the barrier has been broken, and probability points further than we dare speculate toward a conquest of the internal administration of nature by man.

Not that such human administration of nature should be necessarily in the old forms; although every plant and creature domesticated by man receives from him a preternatural development, and the secret processes of organic life itself are yielding gradually to man's understanding and control. But the work now opening before us in chemistry appears almost as free and limitless as the combinations of thought and language. A given number of elements will "spell" many more new combinations than the same number of letters. Numerous as are the substances existing in nature, to the long catalogue of which new additions are made daily, the chemical permutations of which the elementary substances are capable by fresh grouping, are practically infinite, and may yet eclipse the corresponding productions of nature (as in some cases they already do) in brilliancy and value as well as in multitude. The rapid development of laws and possibilities for the combination of new substances with all imaginable or unimaginable properties and powers, looks to a New Nature yet to be evolved by man as the rational soul of the world—a nature transcending the old, as the soul transcends the clod, and for which the whole prior development was but a provisional foothold.

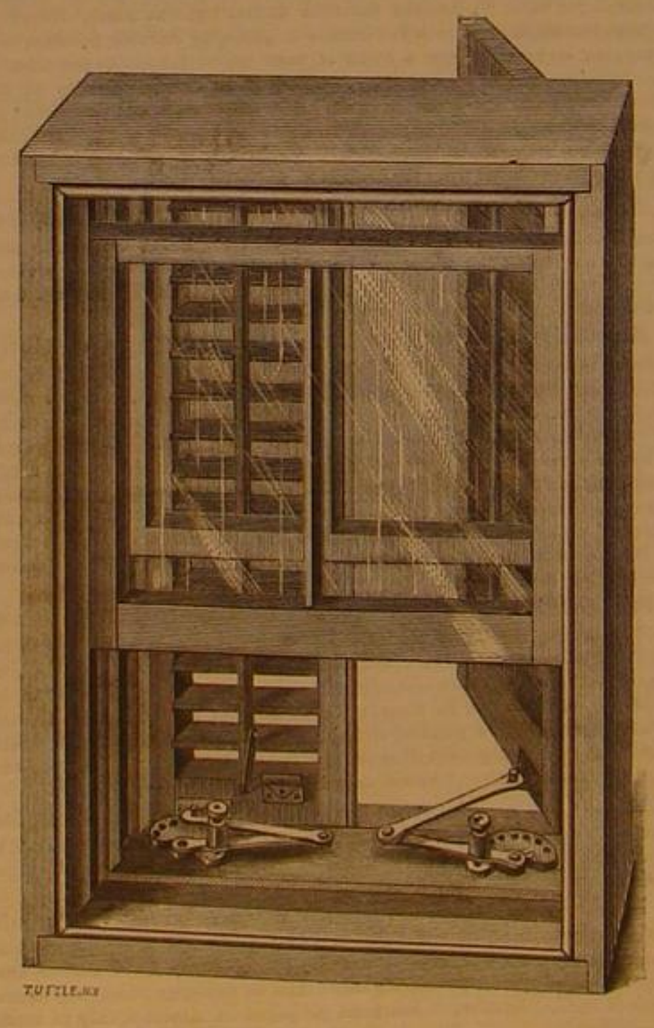
And why not, when we read man's commission from the lips of his Maker, as the vice-gerent of God? Who dare assert that the commission to "subdue" this universe has but a superficial and deceptive sense, leaving Nature still supreme in the interior realm of vital powers, and man, as he really has been, her dependent and her slave? It seems rather, as if God in the six æonic days of creation had but prepared the embryo of the universe to receive its soul, and having thrown Man into the organism prepared, rested from the work and left it to one in His image and his stead. "My Father," said the Second Adam, "worketh hitherto, and [now in the Sabbath] I work."

Nutrition and Physical Power.

Careful and exhaustive experiments upon muscular action by Dr. Frankland, have led to the conclusion that animal mechanical power is principally generated, not as has been supposed, by oxidation of the muscles, or of the nitrogenous constituents of food, but by the non-nitrogenous elements, sugar, fat, starch, etc., through the medium of the blood. The blood is thus the true fuel for *both* the chief forms of force in living animals, viz. heat and mechanical power. The muscle is only a part of the machinery through which the force is utilized, and its waste and repair are analogous to those of the metallic parts of a steam engine. In Dr. Frankland's table, the theoretical force-producing capacities of the leading kinds of food are proportioned as follows: beef fat, 3,841; butter, 3,077; Cheshire cheese, 1,846; flour, 1,627; rice, 1,591; refined sugar, 1,418; yolk of eggs, 1,400; mackerel, 683; lean beef, 604; milk, 266; wheat bread, 910; potatoes, 422.* The cost of the same articles for a given amount of work will be in the following proportions: beef fat, 550; butter, 1,250; Cheshire cheese, 1,150; flour, 375; rice, 550; refined sugar, 1,500; eggs, 1,450; mackerel, 2,500; lean beef, 4,250; milk, 1,550; bread 475; potatoes, 525. Thus it will be seen that the most nutritious varieties of food are by no means the most economical sources of physical power, and it should also be remembered that the value of any food is even more dependent upon its fitness for the individual, than upon its richness. After all investigation, therefore, the primitive dictates of nature in the appetite, provided that has been kept healthy and sufficiently enlarged by experience, are the best rules we can obtain for diet.

WING AND BRADEEN'S BLIND FASTENER.

It is a bother, and sometimes a danger, especially if the window sill is low, to unfasten a thrown back blind in order to close it. There is no reason why some simple arrangement cannot be placed inside the room for this purpose. And, then, it is not unfrequent that the blind, secured in a partially opened position, would give an agreable shade while admitting all the air. The device shown in the engraving secures both these objects.



Two jointed levers are arranged as seen in the engraving, the outer end of one attached to a pivot plate on the blind and the inner end of the other to a semi-circular plate on the window sill. The other ends are pivoted together. This semi-circular plate has holes near its edge in which a spring bolt on the inner arm catches. This bolt is lifted by its head and held as the blind is pushed open, until the blind is in the position desired, when, by releasing it, the spiral spring in the bolt case throws it into a hole, firmly securing the blind. It will be seen that this locks the blind, not only when thrown entirely back and when closed, but, also, when at any point between these two positions. Its operation can be easily comprehended by reference to the engraving.

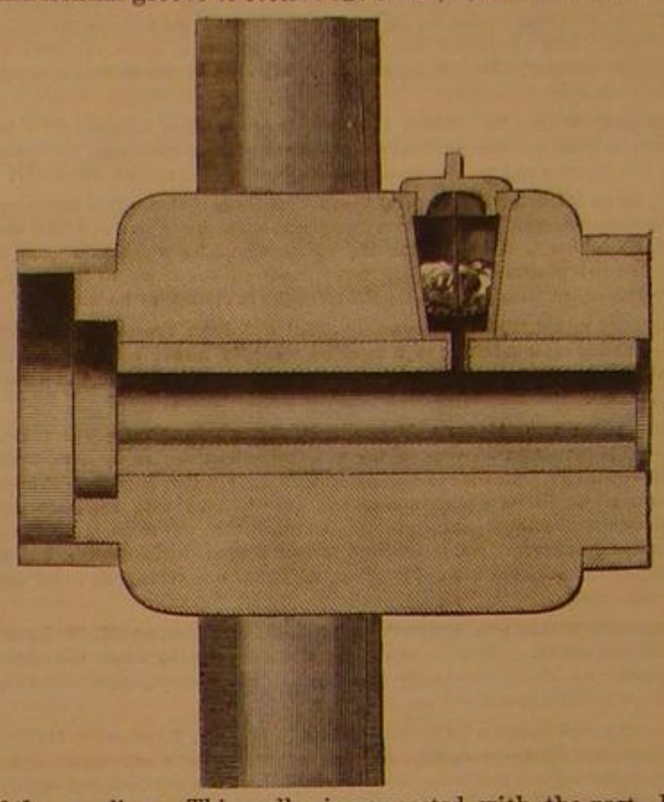
A device is also shown for holding the slats in any position. It is simply two arms attached to the connecting rod, one of which, by a cylindrical bent arm, is held in a sleeve clamp of sheet metal fastened to the lower frame of the blind. The apparatus, being of brass, white metal, or silvered, is ornamental as well as useful.

It was patented through the Scientific American Patent Agency, January 22, 1867, by Wing & Bradeen, who may be addressed for state, county, or manufacturer's rights, or for samples, at the corner of Johnson street and Railroad avenue, Newark, N. J. The States of New York, New Jersey and Pennsylvania are already sold.

OSBOURNE AND MASSEY'S IMPROVED HOSE COUPLING.

There have been a number of attempts to improve upon the ordinary method of connecting the ends of hose for fire, locomotive, and other purposes, some of which have been more or less successful, but none of which that we have examined have combined so many advantages as the one shown in the accompanying engravings. We do not hesitate to commend it for simplicity, quickness of connection, and closeness of joint. A description of reference to the parts will enable any one to understand its construction and operation. Fig. 1 is a perspective and Fig. 2 a sectional view of the coupling both showing it as closed.

The part, A, has on its outer end a projecting head having, for one-half of its circumference, a lip, B, with an inside circumferential groove to receive the collar, C, on the other part



of the coupling. This collar is connected with the part, D, by a left hand thread on its inner surface, engaging with a corresponding thread on the outside of the part, D. A recess inside the head, B, receives an annular packing of leather or other suitable material, seen in section at E. The collar, C, is provided with snugs, F, by which it is turned, either with the hand or a common hose wrench. The force of the hand, however, is in all cases sufficient to make a perfect joint.

Now if the collar, C, is turned so that its face is flush with that of the pipe, D, on which it turns, and it be dropped into the recess of B, a slight turn of the lugs, F, to the right will advance the pipe, D, and make a perfect joint between the collar and the packing. The joint can be thus instantly formed, or the hose disconnected without turning or twisting the hose, and it can be done by one person.

The connection of the leather, rubber, or canvas hose with the metallic pipes is almost as quickly made. It will be observed that the parts, A and D, are somewhat reduced in external diameter. The hose is slipped over the ends of the pipes and secured by the screw collars, G, whose inner surfaces are dished or inclined to correspond with the bevel of the pipes.

It is obvious that this device can be applied to any case where flexible hose and metallic pipes are to be united. It is certain there is no exposed screw thread to be injured by contact with the pavement and that the hose can be kept untwisted.

This device is the subject of a patent issued to Wm. J. Osbourne and G. B. Massey, of New York city, March 5, 1867. For additional information in regard to it address Cooper, Jones, and Cadbury, Philadelphia, Pa., or Massey, Shaffer & Co., 68 Broadway, New York city.

New Mode of Glass Engraving.

We are indebted to Judge Paschal, of this city (late of Texas), for specimens of window glass engraved by a process patented by C. C. Stremme, of Austin. The process consists in forming the design upon ground glass with glue or other strongly adhesive and contractile paste, which in contracting detaches laminæ of irregular shape and thickness from the surface of the glass, and leaves the design wrought in a style of peculiar beauty, resembling hard frostwork. The design in glue may be formed by means of a stencil plate, and the work thus executed as rapidly as the brands on packing boxes, etc. Or, if the design be too complex to be stencilled in a satisfactory manner, the drawing or print to be copied may be laid under the glass and traced in *fac simile* with a lead pencil, after which the lights within and around the design may be covered with a protecting varnish and the glue then applied to the shades, giving the picture in frostwork; or the shades may be protected and the lights may be etched, leaving the picture in ground glass, set in frostwork. It will be seen that the requisite apparatus and skill are within the reach of every one. Glass ware may thus be very chastely marked with the name or cipher of the owner, as readily as linen.

Try It.—A correspondent of *The Country Gentleman* asserts that red cedar twigs bound around the bodies of fruit trees, butts upward, will effectually protect the trees from insects. And if fruit trees, why not shade trees? Col. Dewey of Hartford writes to *The Horticulturist* that in his vineyard, grapes trained upon red cedar posts and trellices are free from mildew and insects, and those growing closest to the posts have the most healthful appearance and are the most productive.

SCIENTIFIC AMERICAN.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents or the SCIENTIFIC AMERICAN.

VOL. XVI., No. 16....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, APRIL 20, 1867.

Contents:

(Illustrated articles are marked with an asterisk,)

*Air-tight Steam Generator 245
Locomotive Engineer Strike in England 245
Science as the Latest Parisian Fashion 245
Business and Manufacturing Items 246
The Alchemists and the Art of Transmutation 246
What Makes Iron Fibrous 246
Quicksilver Mining 246
Editorial Summary 247
Gleanings from the Polytechnic Association 247
Fruit Essences 247
How to Save the Rain 247
*Electric Light—Wilde's Magneto-Electric Machine 248
The Education of the Eye 248
Opening of the Paris Exposition .. 249
*Massey's Ship Leakage Alarm 249
*Anseli's Fire Damp Indicator 249
A Substitute for the Try Square Wanted 249
Spacing of Letters 249
Ventilators Operated by Solar Heat 250
Tempering Steel 250
The Crank Motion 250
Mean Leverage of the Crank 250
Recent American and Foreign Patents 250
The Markets 251
Answers to Correspondents 251
New Publications 251
Extension Notices 251
*Morris' Axle Lubricator 252
Man and Nature 252
Nutrition and Physical Power 252
*Wing and Bradeen's Blind Fastener 252
*Osbourne and Massey's Improved Hose Coupling 252
New Mode of Glass Engraving 252
What Do We Work For? 253
Natural Gas Supply for Towns 253
The Great Obstacle to Progress ... 253
A Terrible Invention 253
Patent Claims.....254, 255, 256, 257, 258
*Improved Boat-detaching Apparatus 260

CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK ROW, and not at No 39.

WHAT DO WE WORK FOR?

The question we desire briefly to discuss is not "*Why* do we work?" but "What do we work *for?*" Some may answer at once: "For money—wages or salaries." We do not think this is a correct and full reply to the question. Labor may be the Adamite curse, but if so, the innate desires of man and his restlessness and ambition for improvement have changed the curse to a positive blessing and made the earth—thorn and thistle cursed—to bloom and blossom like the rose. We work partly because we need it. We need it for health of mind as well as of body. Idleness leads to decay and decay to death. He who through years of active exertion leaves his employment and "retires from business" usually signs his death warrant. He vegetates for a while in idleness and dies, unless he has sense enough to discover his mistake in time and return to the paths of active usefulness. There are few more pitiable objects than the man who after many years active service in business is deluded into a belief that happiness and a reward for his labors are to be found in withdrawing from all participation in the work of life. Old age is an excuse for idleness, but the possession of money is not.

We do not work for money alone. The mechanic who would be content to do the work of an apprentice, merely because he could earn more wages, would be hardly worthy the name of mechanic. The amount of wages or salary is a recognition of ability and a standard of value for services performed, but not the only incentive to exertion. A workman feels a pride in his work—in the results of his skill—entirely unconnected with the amount of money received for it. If he did not one very strong motive for improvement would be lacking. Almost every mechanic will agree with us that he has done jobs which afforded him more gratification in their success than he derived from the possession of the pecuniary compensation therefor. How often a man will undertake a job which he knows beforehand will not "pay" in cash what it costs, but mainly for the pride of performing successfully. It is true that "the laborer is worthy of his hire," but to agree that the hire is the only, or even the principal incentive is unreasonable, not sustained by facts, and derogatory to the "dignity of labor," a phrase often misued but a perfectly correct one. To be sure, if the efforts of the workman—and by this term we mean all who *do*—are not appreciated by adequate compensation he seeks other employers who have a proper appreciation of his value.

We work for progress; for progress individually and for the progress of the race. One means to that progress is the payment for services rendered, as it will enable the skilful workman and the inventive mechanic to carry forward their plans of improvement in manual labor or in labor-saving machines. We work for the godlike pride of creation. The machine which is an offspring of the brain of the mechanic is as much, and more, his than that of his loins. If he is illy paid for his labor, mental or physical, he has the compensation of a satisfaction in his success which cannot be assured by money only, but which must be felt in the knowledge that he has succeeded where others failed, and has secured an impregnable position as one of the pioneers in the grand march of improvement.

There are few pursuits which demand more hard work—work of the brain—than that of the mechanic. In no sense can he be considered an exemplar of Bunyan's "Muckrake." He must live in order to work, but he does not work merely that he may live. He is always striving to mount the next step on the ladder, and never does he mount but that he carries with him the living, moving world. It is his pride to *excel*; never satisfied with mediocrity, but always striving for superiority. From the workman to the inventor is but a step—a long step it may be—yet not beyond his powers if he employs them properly; and the inventor, not a mechanic, is often dependent on the mechanic for the success of his improvement.

Now, as individual excellence depends largely on individual exertion, although aided somewhat by the recorded efforts and failures of others, it is obvious that associations which "razee" or bring down each individual to a common level as to compensation, must retard the improvement in mechanical science and practice so imperatively demanded by the increasing wants of the age. The associations, whether under the name of "trades unions" or "labor associations," have operated to bring the skillful workmen down to the level of the "botch," and not to elevate the half informed mechanic to their level. The incentive of money—wages received—has been the means used to give these associations power; and as the inferior workmen in all branches of industrial business greatly outnumber the finished mechanics, they, the inferior class, rule these societies. The effect is really a lowering of the status of the mechanic. One may do more and better work—more in quantity and better in quality—than another, but because the inferior workman is on an equality as to standing in the society or union, either the superior workman must submit to be undervalued, to his pecuniary loss and to his injury by depriving him of the laudable ambition of receiving a recognition of his superiority; or the employer is compelled to pay for inferior work the same amount for which superior work could be obtained. In either case it is unjust; in one case to the conscientious and careful workman and in the other to the employer.

The basis of these unions is wrong. They make the amount of wages, not the skill of the workmen, the basis of their demands. The amount of wages paid is not really the criterion of excellence, and under these union rules can never be made so; while if individuals were contracted with, the individual skill would become, as it should, the basis of compensation, and the pecuniary return for services rendered would incite to superior excellence and tend to the general advancement of the world.

NATURAL GAS SUPPLY FOR TOWNS.

The ancient mariners of Lake Erie gratefully remember the Portland light at Barcelona harbor, for it was the largest and brightest light on the lakes and was never known to fail. The light cost less than any other beacon light in the world for it came from the burning of gas which rose up spontaneously out of the ground. The gas was of the best quality and the supply was apparently inexhaustible. There was many times more than was needed or used and for aught we know it was burned during all the day. But the Portland light is now no more, at least for the sailors; the gas now sheds its cheerful beams only on the land lubbers of the village of Westfield.

When the state line railroad was completed, the harbor of Barcelona, which at Westfield, N. Y., was distant from it only a mile, was abandoned and the Portland light was not needed. The gas was wasted on the desert air. Last summer Addison Crosby and D. H. Taylor, under the name of the Westfield Gas Co., having secured a title to the gas brought it to the village of Westfield, a distance of one and a quarter miles.

At the gas spring a pit was dug in the rock five feet in depth and sixteen feet in diameter to accomodate a gasometer of the same dimensions. From the top of this a main was laid to the Westfield gasometer which last has a capacity of 8,000 cubic feet. From the first to the second gas holder there is a gradual ascent of 180 feet and as the gas is lighter than air it travels up without any assistance from pumps. The pressure at the upper holder is nine tenths and at the spring one and a half tenths of an inch water pressure. The supply of gas is so abundant that early in the day the upper holder is filled and is never exhausted at night. The Company have at command three times as much gas as they use and they propose shortly to offer it for fuel as well as light. The gas is in use all over the village, and in all there are 2,000 burners. The villagers pay $4 per 1,000 cubic feet, a good remuneration for the enterprise of the gas proprietors. The stock of the company must be above par. The good people of Westfield ought to be happy and proud. They have one of the most prized luxuries of the cities without any nuisance or danger of gas works.

Fredonia, a neighboring village, has had the prestige for about half a century of getting its light from natural gas, but it must now yield the palm to Westfield. In fact Fredonia never deserved its great renown, for until within a few years the natural gas supplied less than a score of burners, and it was of poor quality. At the present time it depends mainly on its new coal gas works, where a little natural gas is mixed with a large percentage of coal gas. The charge of the company for the mixed gases is $6 per one thousand cubic feet. The Westfield natural gas is said to be richer than the gas of cities in about the ratio of three to two.

THE GREAT OBSTACLE TO PROGRESS.

A condition of ultimate progress more essential than all others, yet little considered by men, is the suppression of moral and social evil. We can never get on while we are discordant and selfish. Capital and labor can never succeed at sword's points. The selfishness of rival interests inexorably bars improvements the most practicable and important. The corruption of politics paralyses government for the great public works that properly belong to it, and the richest commonwealth is glad to borrow from Shylock corporations, on their own terms, the use of roads, bridges or supplementary streets which it needs and ought to own. Nor can we have them even thus: the multitude of Shylocks contending for the prey, and each determined that if he cannot succeed no other shall, is what prevents the construction alike of the Under Broadway and the Upper Broadway and the Back Broadway and the Tubular Ferries. And so it goes everywhere. The strength of union has never been tried. The strength of innocence and loyalty has hardly been thought of. And we may be as sure as we are that there is a good Providence over us, that the power of man will never be suffered too greatly to exceed his fitness for the trust of power. Even without overruling, the natural workings of depravity set limits to the advancement of its own resources. If real union were possible for selfishness and sin, the power man might attain thereby would surpass the wildest dreams of imagination; but it would be a formidable power, and most formidable to itself. The power of a regenerated and united humanity for good, when it comes, will be limitable only by the capacity of its sphere.

A TERRIBLE INVENTION.

It must seem to many of our readers singular and superfluous to occupy valuable space from time to time in pointing out the absurdity of perpetual-motion and power-multiplying machines. If the amount of costly infatuation on these subjects with which we are brought in contact in our patent business could be believed, it would not seem strange that we are prompted to reiterated efforts to prevent what is so hard to cure. If the value of the wasted lives and misdirected ingenuity that are still applied to the solution of problems that involve a contradiction in terms could be realized, it would justify "line upon line, precept upon precept, here a little and there a little," to persuade men to use their reason instead of letting fancy fly away with them.

Bear for a moment with an unfortunate inventor who says of his discovery:

This machine consists in a combination of toggle joints and levers. The action of toggle joints differs greatly from that of the lever. While the laws of leverage show always a loss of space and speed against a gain in power, toggle joints on the contrary show a gain in power besides a gain in space and no loss in speed, provided all parts be in the proper proportion. Toggle joints act with rapidly increasing force until the bars form a straight line and for that reason—by a certain arrangement of compound leverage, toggle joints and levers—any machine constructed according to the same principles as the one on exhibition, will increase its moving force 8 times, with a gain in space of ½, and no loss in speed.

The machine referred to is a small model worked by air compressed into two steam-engine cylinders by muscular power. The motion of the pistons is transmitted through a complicated mechanism until it results in the rotary motion of a fly-wheel and pulley. It will be seen from the words quoted that the inventor thinks the pulley will do eight times more work than the compressed air or the arm that compressed it. That is, supposing the work of one man be required to compress the air, the pulley, if connected with further machinery, will do the work of eight men, or about one horse-power.

Suppose we grant this to be true. Then let us apply this one horse-power to compress air for a machine of exactly the same construction but eight times larger, and we shall obtain eight horse-power, and we may construct a third machine of the same kind but eight times larger than the second and multiply the power to sixty-four horse-power, and by a fourth machine to five hundred and twelve horse-power, which we may apply to a pair of paddle wheels to drive a two-thousand-tun steamer across the ocean, and all that by the power of but two men, one working while the other sleeps!

To make a further illustration: as power may be converted into heat by friction, we may heat our houses in winter with hot air by means of a fifty-horse engine on the above plan, driven by a squirrel in a rotary cage. Nay, we need not make a slave of the poor squirrel, for we may by means of a strap apply a minute part of the fifty horse-power to do the work for him. The only serious objection to the latter plan is that if the strap were to transfer a little too much power, the fifty horse-power would very soon rise to one hundred, and in turn make the strap work stronger still, so that the power of the engine might go on increasing in a geometric proportion until the whole concern would fly to pieces with a disastrous explosion.

This strictly logical *reductio ad absurdum* is applicable to every contrivance, however plausible it may look to the inventor, which assumes to make machinery exceed (or even equal) in work the power applied to it—in other words, generate force, or in still other words, supply perpetual and self-caused motion. A machine generating force in excess of that provided to impel it, if such a thing were possible, could never be stopped by the power that started it, and would become, like the wonderful self-acting cork leg in the song, the master and not the servant of its maker.

M. DAUBRÉE has effected the decomposition of feldspar by rapid rotation in a cylindrical vessel with distilled water. The water became alkaline and he was enabled to separate considerable quantities of potash or soda, according to the rock operated on. If the process be practible on an industrial scale, its importance is obvious. In a scientific point of view, the principle developed is very interesting, and may open the way for varied investigations. M. Daubrèe queries whether decomposition as well as mechanical disintegration of rock may not be produced by the motion of the sea.

THE CENTAL SYSTEM of measuring grain (by the hundred pounds) has fallen through for the present, Boards of Trade in the great grain markets except Chicago, having generally declined to adopt it.

Patent Claims

ISSUED FROM THE U. S. PATENT OFFICE,

FOR THE WEEK ENDING APRIL 2, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $300 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the Scientific American, New York.

63,354.—Grate for Furnace.—Hawley Adams, Stamford, Conn., assignor to himself and W. H. Cobanks and H. Theall, New York City.

I claim a grate for furnaces having its bars, B, extending diagonally across the grate-frame in an unbroken line, in the manner herein set forth.

63,355.—Smut Machine.—Z. G. Allen and G. W. Marshall, Buffalo, N. Y. Antedated March 18, 1867.

First, We claim the combination of the upper and lower concaves, H K, the former of lesser diameter, with the beaters, D D, or their equivalent, when arranged and operating in the manner specified.

Second, We also claim the adjustable beater slats, D D, in combination with the concave formed of the obliquely corrugated iron plates or sections, I I and J J, substantially as described.

Third, We also claim, in combination with the fan, E, and beater shaft, B, the spiral wings, oo, operating substantially for the purposes described.

63,356.—Tongs and Wrench.—John N. Arvin, Valparaiso, Ind.

I claim the arrangement and combination of the levers, A B, straps, C, spring, D, jaws, O P, and shank, m, when constructed substantially as and for the purpose specified.

63,357.—Horse-Yoke Harness.—B. F. Baker, Milton, N. Y.

First, I claim so constructing and applying a horse-yoke harness that the pressure or draft is brought evenly upon the shoulders or breast of the horse or horses instead of upon the upper part of their necks, substantially as described and shown.

Second, The suspension of the bow or bows in a nearly horizontal position from the hame or collar by the means substantially as described and for the purpose set forth.

Third, The diagonal or oblique backstraps or tugs, with one of their ends attached to the hame or collar, and their other ends attached to the extremities of the bows, substantially as described.

Fourth, The central draft chain and short tugs, in combination with the bows and evener, applied substantially as described, for the purpose set forth.

63,358.—Running Gear of Land Carriages.—John Blocher, Buffalo, N. Y.

I claim, in combination with the revolving wheel shafts, a, and axle, d, the clip, e, and collar, i, and nut, l, arranged and operating substantially in the manner and for the purposes set forth.

63,359.—Lantern.—Eliam Boorse, Philadelphia, Penn.

I claim the guards, D D, when adapted to constitute springs to retain the chimney or globe upon the base, A, substantially as described.

63,360.—Mill-stone Dress.—D. Bowman, Knoxville, Tenn. Antedated March 28, 1867.

I claim the mill-stone dress herein described, the same consisting of the upper stone having deep square-edged channels in the back, and feathered to the front side, and the lower stone, with broad equally shallow furrows throughout, and narrow lands, substantially as described, for the purpose specified.

63,361.—Dish Pan and Drainer.—Fred'k Bucknam, Portland, Me.

I claim the combination with the pan, A, constructed as described, of the slide drainer, e, having the rack, c, all arranged and operating as and for the purposes set forth.

63,362. — Portable Fence.—Belus Calkins and Veranus Calkins, Varysburg, N. Y., assignors to themselves and Otis Kimball and Joseph Forsyth, Buffalo, N. Y.

First, We claim a portable fence, made in sections, constructed in the manner and substantially as herein described.

Second, The combination and arrangement of the hinged brace bars, D D, and stakes, E E, forming a portable brace for fences, constructed and adjusted in the manner substantially as herein set forth.

Third, The combination and arrangement of the foundation posts, B, folding fence, A A', top and bottom connecting bars, F and B', and adjustable braces, D E, in the manner and substantially as herein described.

63,363.—Farm Gate.—J. Campbell and A. D. Krewson, Harrison, Ohio.

We claim, First, The fixed tongue or latch, a, in combination with the elevated plateau on which it rests, approached by the inclined planes on one or both sides, as and for the purpose set forth.

Second, The same in combination with the drop latch, D, boxed into post, C, and sliding perpendicularly therein, as set forth.

Third, The elements of the first claim, in combination with the screw-threaded and tapped shank, H, of the eye of hinge, b, forming a brace rod by which the gate may be strained up should it sag.

Fourth, The provision of the hooks, w w', for holding the gate in an open position.

63,364.—Machine for Making Screws.—John Cochrane, Wall Township, N. J. Antedated March 24, 1867.

I claim, First, The combination with each other of two rolls or revolving dies, having projecting threads of proper form and arrangement upon their peripheries, to produce the required screw upon the heated blanks, and working at the proper angle for the production of such screws, and having a a denuded portion of reduced radius in the periphery of either or both of said rolls or revolving dies so as to permit the introduction of the blank bolts between them at the proper moment in each revolution, substantially as herein described.

Second, The combination with each other of two revolving rolls or dies, having the threaded portion of the periphery of either or both of them so formed or shaped as to produce, at each revolution, a screw of uniform diameter, or tapering or gimlet pointed, as may be required, constructed and operating substantially as herein described.

Third, The combination with each other of two rolls or revolving dies, having annular threads or portions thereof upon their peripheries, of suitable form for making screws upon blanks and mounted upon axles or spindles that are so inclined to the axis of the bolt upon which the screw is to be formed as to make such annular threads conform to the angle of such required screw, whether such rolls are mounted on stationary bearings, or upon bearings that are so constructed and operated as to give a lateral movement to the rolls or revolving dies, to and from each other during the progress of the work as required in receiving the blank, and in making a screw thereon, or for imparting to the screw a uniform diameter, or a tapering or gimlet-pointed form, substantially as herein described.

63,365.—Apparatus for Concentrating and Condensing Volatile Metallic Substances.—Joseph C. Coult, San Francisco, Cal.

I claim, First, The arrangement of the furnace, having fire on two sides, and the openings leading to the ore chamber, substantially as described and for the purposes set forth.

Second, I claim the soot and spark chamber and the dry compartments, having a continuous supply of cold water surrounding them to hasten condensation and concentration of volatile mineral substances, as described substantially and for the purpose set forth.

Third, The combined arrangement, broadly, as an improvement upon the Cault and Roach concentrator and condenser, for the reduction of quicksilver ores, and the use of steam or water to produce draft to accomplish all, substantially as in the specification described and for the purposes therein set forth.

63,366.—Hoop Skirt.—Charles Daniels, Birmingham, Conn.

I claim the combination of the fabricated part, B, with the hoops below, when made adjustable, substantially in the manner specified.

63,367.—Roofing Cement.—Joseph Darby (assignor to himself, Stephen Brewer, and Wm. W. Winter), Cortlandville, N. Y.

I claim, as a cement for roofs, walks, and other surfaces, the herein described composition of matter.

63,368.—Steam-Engine Valve.—F. W. Davidson, Cleveland, Ohio.

I claim the arrangement of the valves, D and E, with reference to each other and the arrangement of the ingress and egress steam passages upon the principle and in the manner as herein set forth.

63,369.—Method of Making Plows.—John Deere (assignor to Deere & Co.), Moline, Ill.

I claim, First, The welding brace, A, constructed and arranged for use in the construction of plows, substantially as and for the purpose set forth.

Second, The templet or test plate, T, when constructed and adapted for use in the manufacture of plows, substantially as set forth.

63,370.—Gate.—Daniel A. Denison, Troy, Mich.

I claim, First, A gate latch formed by duplicate hooks, C, attached to common shank, C', operating simultaneously on both sides of the gate, substantially as set forth.

Second, The combination of the sliding gates, A A', double posts, B, rollers, B', latch, C, and eyes, D, substantially as set forth.

63,371.—Roofing.—Drake W. Denton, Ithaca, N. Y.

First, I claim the use of wood-fiber matting, or other cushioning, padding, or matting material, not woven, made into paper, nor felting, when used for the purpose of separating the roofing material from the roof-board, and thus making the coal-tar roofing independent of the variations of the board, by swelling and shrinkage, as described.

Second, I do not claim the mere use in roofing of hydraulic lime, but I do claim its use, substantially in the proportions herein described, for the purpose of so drying and convenient roofing material or mixture with coal tar, so that it shall prevent the flowing, settling, or sliding down of the coal-tar roofing as described.

63,372. — Loom Temples.—Warren W. Dutcher, Milford, Mass.

I claim as my improvement the combination as well as the arrangement of the disks or sections, b, with a series of arms, d, to extend from them, substantially in manner and for the purpose of supporting them when together or in their proper relations to each other and the toothed wheels, as set forth.

I also claim the application of each arm or wheel-carrier section to that, or the end support next to it, so that they shall so interlay or interlock with and support one another as to prevent one from being revolved or turned on their connection rod independently of the other when they are close together thereon, as described.

I also claim each of the said arms, as constructed, with the aperture for receiving the supporting rod.

I also claim the arrangement of the supporting rod with respect to the arms and the end supporters, viz: so as to go through all of them and aid in fastening them together as explained.

I also claim each disk or divisional plate as made with a wheel-receiving recess, l, and journal, c, arranged in it as set forth.

63,373.—Machine for Separating Fibrous Substances from the Seed.—Alfred B. Ely, Newton, Mass.

First, An elastic roll in combination with a concave grating, E, substantially as described.

Second, An elastic roll, substantially as described, in combination with flat plates, a b c d, etc., whether one or more, and whether with plain or serrated edges, when arranged and operating substantially as set forth.

Third, An elastic roll, substantially as described, in combination with hard rolls, B C, or either of them, and whether smooth or corrugated, when arranged and operating substantially as set forth.

Fourth, An elastic roll in combination with flat plates, a b c d, etc., whether one or more, and whether plain or serrated, and hard rolls, B C, or either of them, whether smooth or corrugated, arranged and operating, substantially as described.

63,374.—Malt Drying Apparatus.—H. A. Engels, C. H. Engels, and John Wieland, San Francisco, Cal.

First, I claim the mode of malt drying in which the grains are mechanically carried into and spread about the kiln, then therein turned and propelled by rakes, and at the same time submitted to a current of hot air, combined with the heat of steam pipes, in a manner substantially as described above.

Second, The combination and arrangement of elevator, b, worm, p, picking shaft, q, kilns, i, rakes, D, shafts, r r, funnels, a and d d, steam pipes, k k, hot-air pipes, l n n o o, flue, m, and chute, e f, in a manner and for the purpose described.

63,375.— Steam Generator.— Lewis Fagin, Cincinnati, Ohio.

I claim the arrangement of either cylinder or tubular boilers, one under the other with the flue spaces between them arranged so that heated air shall pass under and between each successive tier, alternately from the upper to the lower, the tubes or boilers being connected by vertical necks and transverse tubes, D, as described, and for the purpose set forth.

63,376.—Illuminating Burning Fluid.—Lorenzo D. Ferguson, Corning, N. Y.

I claim a carbonized benzine fluid for illuminating purposes compounded of the ingredients or equivalents in the proportions, substantially as described.

63,377.—Plow.—Josiah Fish, Smelser, Wis.

I claim the plate connecting the tongue and beam, marked fig. 1, together with the plate attaching my team to the plow, and bars that my plows are attached to for the uses as set forth in my description and specification.

63,378.—Broad-cast Sowers.—F. G. Floyd and E. A. Floyd, Macomb, Ill.

First, I claim the revolving disk, d, provided with the radial flanges, h, having their outer ends projecting beyond the periphery of the disk and curved in the manner shown, substantially as set forth.

Second, The combination of the frame, a, hopper, b, slide, i, and revolving disk, d, constructed as above set forth, all arranged for joint operation as herein described.

63,379.—Axle Box.—Albert A. Freeman, Philadelphia, Pa.

I claim the V-shaped guides, B B, adapted to and combined with the hanger, A, and box, C, substantially in the manner and for the purpose described.

63,380.—Electric Magnetic Engine.—Charles J. B. Gaume, Davenport, Iowa.

I claim the arrangement of the wheels, F F, provided with the electro magnetic coils as described, with the wheel, E, provided with the duplicate set of iron plates, k, arranged radially as set forth, operating through the medium of the alternate battery connection and disconnection, substantially as described.

63,381.—Plows.—Jacob Hege, Shiloh, Ill.

First, I claim as a new article of manufacture, the plow, B, when formed of one single piece of metal, substantially as described and set forth.

Second, I claim the plow, B, when constructed with an excess of metal in that side of the mold board and share nearest the land side, substantially as described and set forth.

63,382.—Hay Loader.—Wm. M. Hall and John Johnson, Barrington, N. Y.

I claim, First, The fork head, M, provided with the arched guide, m, in combination with the hinged clasps, N, having the cross bars, n, attached thereto, stem, O o', and socket, K, when the several parts are constructed and arranged to operate substantially as and for the purpose described.

Second, The detachable driving spur wheel, E, constructed and applied as described in combination with hollow crane post, B, provided with the hinged adjustable crane arm, C, and jointed arm, D, upon which is mounted the spool, G, and its driving pinion, the whole arranged and operating substantially as and for the purpose specified.

63,383.—Bag Holder.—O. Hanks, Cincinnati, Ohio.

I claim the side pieces, A A A A, the cross pieces, B B and C C, the pins or hooks, D D D D, the wheels or rollers, F F F F, the bolts or pins, E E, the whole being combined in the manner and for the purpose as herein set forth.

63,384.—Cultivator.—George D. Hart, Lycoming county, Pa.

I claim the combination of the standards, A, attached to the plate, C, by hinge and standards, A', with its tenon at the upper end, as shown in fig. 1, with the blades or cutters, B, the plates, C, when provided with the slots, g, and the notches, h, and the frame or support, O, all constructed and arranged substantially as described and set forth.

63,385.—Wire Staple.—Hayward A. Harvey, New York City.

I claim a staple with the legs thereof formed with protuberances and depressions, substantially as described.

63,386.—Curtain Support.—C. F. Herrick, Independence, Iowa.

I claim, First, The spring, P, points, a, and back piece, A' constructed and arranged and set forth in combination with the band, C, for the purpose specified.

Second, The strap, B, clamp d, roller, c, and band, C, arranged and operating as and for the purpose described.

63,387.—Well Tube.—P. J. Hershey, Clarence, N. Y.

I claim the shield, A, having fine slits, B, made therein for the entrance of water below the coarse or key slits in combination with the coarse or key slits, D', which are kept closed by the tube, C, in all the movements thereof in the shield, substantially as set forth.

63,388.—Apparatus for Measuring Fluid.—Jacob C. Horton, New York City and Samuel K. Hawkins, Lansingburgh, N. Y.

We claim, First, In combination with the measuring cylinder, reciprocating piston, the valves, a b c d, and oscillating cross bars, K, with arms, K', and connecting rods, L, we claim the reciprocating plate, C, with ledges and springs as described to operate the valves, all being constructed and arranged substantially in the manner set forth.

Second, In combination with a measuring cylinder and reciprocating piston, as described we claim an induction and eduction valve at each end of the cylinder so constructed and arranged that they will be automatically opened and closed by the movement of the piston in the order herein set forth whether described by the precise mechanism herein described or by any other equivalent mechanism.

Third, In combination with a measuring cylinder with induction and eduction valves as described and a reciprocating piston, we claim the reciprocating plate, C, with ledges and s rings, substantially as described to operate the valves by means of any suitable connecting mechanism between said plate and the valves.

Fourth, We claim the reciprocating plate, C, with ledges and springs substantially as described as a means of operating valves to regulate the flow or passage of any kind of liquids or fluids whether in a meter or other machine to which the same may be applicable.

63,389.—Fan.—James L. Jackson, New York City, assignor to David N. Ropes, Orange, N. Y.

I claim the fan with its outer leaves, a a', connected to the adjacent leaves by straps, d, and the remaining leaves retained by straps, g g', whereby the outer leaves protect and inclose all the leaves when closed and form a handle for the fan when extended, substantially as represented and described.

63,390.—Apparatus for Separating Sugar.—Gustavus A. Jasper, Charlestown, Mass.

I claim the arrangement of chutes, sieves, discharging spouts, and mechanism for operating such sieves substantially as described.

63,391.—Condenser.—W. Jeggle and L. A. Brooks, Chicago, Ill.

We claim the arrangement and combination of the cones, A C D E, pipes, H K and F, when the whole is constructed substantially as and for the purpose set forth.

63,392.—Boring Bit.—Melvin Jincks, Danville, N. Y.

I claim the shank, A, as constructed in combination with the gage, f, cutter, g, marker, e, and an adjustable bit, substantially as and for the purpose described.

63,393.—Clothes Pin.—Charles C. Johnson, Springfield, Vt.

I claim the metallic eyelet hinge connection made and applied to the two levers of the clothes pin, substantially as described.

63,394.—Collecting Gold from River Bottoms.—John Johnson, Saco, Me.

I claim the system herein set forth for the recovering of gold from the beds of rivers.

63,395.—Stovepipe Damper.—Ernst Kabisius, Davenport, Iowa.

First, I claim the form of the valve, B and C, with the scraper, E, attached to clean the inside of cylinder, F.

Second, The scraper, D, attached to cylinder, F, for cleaning outside of valve, B.

Third, The damper drum as a radiator and damper combined, all as herein set forth.

63,396.— Fan.— Frederick Koppenfels and Gustav Brueck, New York City.

We claim the combined fan and perfumed sachet constructed as specified, as a new article of manufacture.

63,397.—Clothes Stick.—Christian Kuder, Rochester, N. Y.

I claim as a new article of manufacture, the laundry, or clothes stick, S, constructed substantially as herein shown and described, with the ring, or rim, r, and hooks or points, t, for the purdoses set forth.

63,398.—Shearing and Punching Machine.—Isaac Lamplugh, Peoria, Ill.

I claim the improved combined punching and shearing machine, constructed and operating substantially in the manner and for the purposes described.

63,399.—Ferrule for Boiler Tubes.—Elbridge Lawton, New York City, Thomas J. Jones Summit, N. J., assignors to C. J. Eames, New York City.

We claim, In stopping boiler tubes the use of a ferrule, c, with projections, a a, when attached to the tubes by means of a screw cut upon its surface so that the tubes themselves shall be made to answer the purpose of stays or braces for the tube sheat, substantially as above represented and set forth.

63,400.—Petroleum Stove.—Joel Lee, Galesburgh, Ill.

I claim, First, Packing the conducting tube with wood in the manner and for the purpose set forth.

Second, A gas generator made of a coiled tube to encircle the jet of gas, the lower point being turned so as to allow the gas to flow through the center of the circle and burn against the bottom of the cooking vessel substantially as set forth.

63,401.—Corn Planter.—Noyes Liddell, Lafayette, N. Y.

I claim the hopper, A, seeding cylinder, B, cup, C, lever, O, with its attached gear wheels the harrow, F, tooth, D, cover, G, and roller, H, when constructed arranged, and operating as and for the purpose specified.

63,402.—Washing Machine.—W. N. Lockwood, Woodcock, Pa.

I claim the levers, H, springs, J K, links, G, and rollers, E, in combination with the roller, L, arms, C, and slotted stays, D, arranged in the manner and operating conjointly substantially as and for the purpose set forth.

63,403.— Machine for Bending Bars of Metal.—Obed Long, Joilet, Ill.

I claim, First, The lever, k, with the friction roller, l, combined with the slotted plates, n n, constructed as and for the purposes described.

Second, The use of the trip, e, and the weight, b, with the crank shaft, d, and the connecting rods, c c, constructed and arranged for the purpose of operating the head block as described.

Third, The adjustable former, h, in combination with the nipple, m, and the gage, j.

Fourth, A combination of all the parts described substantially as and for the purpose set forth.

63,404.—Apparatus for the Manufacture of Ice.—T. S. C. Lowe, New York City.

First, I claim the expansion chamber, G, in an apparatus for manufacturing ice by artificial process when constructed with fixed freezers, G', around and in immediate contact with which the cold gas or vapor circulated, substantially as described.

Second, In such an apparatus fixed freezer's G1, in combination with plungers, G2, arranged to operate substantially as and for the purpose set forth.

Third, The elastic stoppers, G4, when used for the purpose and substantially as set forth.

Fourth, The combination of fixed freezers, G', elastic stoppers, G4, and falling doors, G3, or their equivalents, substantially as and for the purpose set forth.

Fifth, In combination with the expansion chamber, G, the eduction pipe, I, and water tanks, H, enclosing the same for the utilization of the cold gas or vapor passing from the expansion chamber so as to reduce the temperature of the water before entering the freezers, substantially as set forth.

63,405.—Apparatus for Condensing Carbonic Acid and for Drawing off and Applying the same for Cooling and Freezing.—T. S. C. Lowe, New York City.

First, I claim so arranging and operating an apparatus for condensing and retaining under pressure in the form of a liquid, substances which in their normal state are gases, that the heat generated in condensation, shall be taken up by the water in a cooler, C, and the liquid be condensed in a condenser, E', which is maintained at a temperature below that of the cooler.

Second, In such an apparatus the combination of a condensing pump, B, cooler, C, dryer, D, and the condenser, E', substantially as set forth.

Third, The mode substantially as set forth of inducing the flow of the liquified product of condensation from the condenser, E', into a gage, F', or their receiver.

Fourth, The mode substantially as set forth of regulating the temperature of the expansion chamber by pipes, F, leading thereto connected respectively with the upper and lower parts of the condenser, E'.

Fifth, The combination of the condenser, E', pipe, F, gage, F', and expansion chamber, G, substantially as and for the purpose set forth.

63,406.—Bread Cutter.—John Madden, Cleveland, Ohio.

I claim the slide, B, hand piece, b, and guard, F, in combination with the way, A', knives, C C', and side piece, E, substantially as and for the purpose set forth.

63,407. — Machine for Sharpening Saws. —Thomas T. Markland, Jr., Philadelphia, Pa.

First, I claim a reversible and portable rest, B, connected with the standard, C, adjusted by means of the set screws, j j, and arranged and operating substantially as described and for the purpose specified.

Second, The clamping disk, D, and clamping plate, E, when arranged in relation to the rest, B, and saw, F, substantially as and for the purpose set forth.

Third, The combination of the clamping board, P, with the rest, B, operating substantially as described and for the purpose specified.

Fourth, The combination of the shaft, J, having arms, q q, with the swivel plate, K, the said arms being adjusted by the set screws, u u, substantially as described and for the purpose specified.

Fifth, The slotted finger or catch strip, G, when arranged and operating in rotation to the saws, E and O, substantially as described.

63,408.—Machinery for Making Rope.—Horace Mayson, Hopkinton, R. I., and Job Johnson, Brooklyn, N. Y.

First, We claim the traveling carriage, d, carrying the reversible head, g, and spindle, f, in combination with the spools, b, supplying yarn at each end of the rope walk, as and for the purposes set forth.

Second, We claim the shaft, e, and miter gearing, in combination with the spindles, f, and carriage, d, for twisting the strands in a rope walk as and for the purposes set forth.

Third, We claim the endless rope, h, and pulley, n, applied in the manner set forth, in combination with the traveling carriage, d, and spindles, f, substantially as specified.

Fourth, We claim the pulleys, 3 4 5 and 6, and ropes or belts and shaft, x, in combination with the clutch lever, 9, and pulleys, 7 and 8, for moving the carriage, d, in either direction, or allowing it to remain stationary, as and for the purposes specified.

Fifth, We claim the supports, s or t, fitted to rock or turn down, in combination with the traveling carriage, and reversible head, g, substantially as and for the purpose specified.

63,409. — Apparatus for Separating High and Low Wines.—Edward B. McDowell and Thomas W. Wilson, Philadelphia, Pa.

First, We claim the combination of a thermometrical tube and a hydrometer with a balancing lever, the same being arranged to operate together, substantially as and for the purpose described.

Second, We also claim, in combination with the subject matter of the above claim, the application of a valve to the lever, so that the said valve will be operated thereby in relation to the outlet tube beneath it, substantially as and for the purpose described.

63,410.—Grain Cleaner.—John McTaggart, Rochester, N. Y.

I claim the peculiar form and arrangement of corrugations when combined with the perforations or their equivalents, substantially as specified.

63,411.—SPARK ARRESTER.—William J. Mehary, Philadelphia, Pa.

I claim the lauer casing, D, its wire-gauze cover, E, and deflector, H, the casing, B, chimney, A, and the annular opening, b, the whole be ng constructed and arranged substantially as and for the purpose herein set forth.

63,412.—DRYING APPARATUS.—John O. Mellen, St. Louis, Mo., assignor to L. G. Quinlan, Jr.

I claim the hollow spiral or spirally-flanged conveyors, C, in combination with a double bottom trough, B, and chamber, b2, substantially in the manner and for the purpose herein set forth.

63,413.—MODE OF MANUFACTURING ICE.—T. S. C. Lowe, New York City.

First, I claim compressing carbonic acid or other equivalent gaseous body into a liquid by a pump, and then permitting it to expand in a close chamber, in contact with the exterior surface of the vessels or pipes containing the water or other substance to be refrigerated.

Second, Compressing carbonic acid or other equivalent gaseous body into a liquid by a pump, and then permitting it to expand in a close chamber in contact with the exterior surface of the vessel or pipes containing the water or other substance to be refrigerated, and then returning the gas to the condensing pump to be recompressed and reissued.

Third, Compressing carbonic acid or other equivalent gaseous body by a pump ha ing sufficient power to convert it into a liquid, removing the heat evolved by compression by exposing the pipe containing the compressed gas to the action of cold currents of water or al in contact with the surface thereof, and then permitting it to expand in a close cnamber in contact with the exterior surface of the vessels or pipes containing the substance to be refrigerated.

Fourth, Compressing carbonic acid or other equivalent gaseous body by a pump having sufficient power to convert it into a liquid, and removing any watery vapor or moisture from the compressed gas by passing it through chloride of ca cium or equivalent absorbent.

Fifth, Introducing the cold current of water or air to the cooling coil at the point most distant from the pump and causing it to flow along the pipe towards the pump and escape from the point nearest the compressing pump.

63,414.—MACHINE FOR CUTTING OUT THE BODIES OF FRUIT BASKETS.—Henry Mellish, Walpole, N. H., assignor to David Lyman, Washington Whitney, and Gilman Waite.

First, I claim the two parallel rings, J J', enclosing the log, and traversed along as the work proceeds and carrying the cutting apparatus, substantially in the manner herein set forth.

Second, I claim, in combination with a machine cutting conical spiral shavings, the knife, R, carried on a rolling device as represented and adapted to measure off and cut uniform length of such shaving as herein specified.

Third, I claim cutting holes or slots in the bodies of baskets made from shavings by means of the cutters, Z, or their equivalents, arranged and operating as specified.

Fourth, I claim the supplementary cutters, M and N, arranged and operating as and for the purpose herein specified.

63,415.—MACHINE FOR CUTTING TOY PAILS FROM WOOD.—Henry Mellish, Walpole, N. H., assignor to David Lyman, Washington Whitney, and Gilman Waite.

First, I claim the conical scroll cutter head, L, for supporting the knife or knives arranged in the manner substantially as and .or the purpose set forth.

Second, I claim arranging or supporting the conical scroll cutter head, L, in such a manner as to leave a space between the scroll and the frame of the slide rest to which it is attached, as and for the purpose set forth.

Third, I claim the combination of the knife, M and O, with the conical scroll cutter head, L, when operating substantially as and for the purposes set forth.

Fourth, I claim the helical ring, L, with its cutter, N, in combination with the scroll cutter head, L, substantially as and for the purposes set forth.

63,416.—GAS ENGINE.—Francisque Million, Paris, France.

I claim, First, The combination of the cylinder, C, the pump, A and B, the branch receiving pipes, a and b, and the mixer, F, in such a manner that the air and gas to supply the engine shall be forced simultaneously through the mixer to supply the cylinder by the simultaneous action of the two pumps, A and B, as set forth.

Second, The combination of the mixer, F, represented in figs. 4 and 5, composed of a folded plate of metal as described, with the branch pipes, a' and b', so constructed and arranged in combination with each other and the main pipe as to deliver the gas in the latter in their alternate layers, as set forth.

Third, The combination of the parts represented in fig. 7, or their equivalent, with the cut-off rod, in such a manner that the closing of the current shall be effected simultaneously with the closing of the cut-off valve, substantially as and for the purpose set forth.

Fourth, The combination with a gas burning engine of a porous substance, E, placed in the receiving pipe, as represented in fig. 8, substantially as and to the effect set forth.

63,417.—BLOTTER.—Charles C. Moore, New York City.

I claim the attachment of the lower plate of "C. C. Moore's Improved Blotter," one or more pieces of felt, or other elastic material equivalent for the purpose, forming an elastic pad or springing cushion, substantially as herein described and for the purposes specified.

63,418.—WATER TANK FOR RAILROADS.—John Morton, Winchester, Ind.

First, In combination with the tank, A, and stationary pipe, B, I claim a horizontally adjustable connecting pipe, D, arranged to operate substantially as and for the purpose set forth.

Second, The combination of the pipe, B, adjustable connecting pipe, D, and adjustable hinge, E, substantially as set forth.

Third, The combination of the horizontally adjustable pipe, D, and the ropes and weights, H, and swivel pulley, I, substantially as and for the purpose set forth.

Fourth, The combination of the cord, C2, bell crank, C1, and valve, C, with its stem and weights, G, substantially as set forth.

63,419.—FILING AND RECORDING BONDS, ETC. — Francis Munson, Chicago, Ill.

I claim, First, The preserving, filing, and verifying of bonds, coupons, certificates, and all similar documents, by the means and in the manner substantially as herein set forth.

Second, I claim the book and register, constructed and used as and for the purposes set forth.

63,420.—PROCESS OF CLEANING TEXTILE FABRICS AND YARNS SOILED IN DYEING.—Alfred Paraf, Mulhouse, France.

In the process of cleaning of the whites of textile fabrics or yarns, which have been soiled during the dyeing operation by madder or other vegetable color.ng matter, I claim in lieu of and as a substitute for the soaping heretofore practised, the use of animal charcoal either alone or in combination with vegetable charcoal, substantially in the manner hereinbefore described.

63,421.—MECHANISM FOR OPERATING THE PICKER STAFFS OF LOOMS.—Willoughby W. and V. J. Phillips, Wellsville, N. Y.

I claim the ratchet wheels, R R, and pawls, P P, in combination with the cams, f F, bent rod, m, spring, S, picker staff, B, rod, a, and picker, C, for operating the shuttle, substantially as described.

63,422.—STOVE PIPE.—Martin L. Powell, Newcastle, Ind.

I claim, First, The collar, A, constructed substantially as set forth, so as to be attached to the stove in any of the modes above set forth.

Second, I claim the reversible elbow, B, composed of any number of angles, the sum of which shall make an angle of 45 degrees, constructed and operated substantially as and for the purposes set forth.

Third, I claim the combination of the reversible collar, and the reversible elbow, B, constructed and operated in combination, substantially as and for the purposes set forth.

63,423.—ADJUSTABLE POLE FOR CARRIAGES.—J. E. Prudden, Birmingham, Conn.

I claim the combination of the key bolt, F, the inclined plate, E, and the shackle, A, when constructed and arranged so as to be adjustable, substantially in the manner specified.

63,424.—COMBINED PLANTER AND CULTIVATOR. — Ansel Wallace Putnam, Suisun, Cal.

I claim, First, The apparatus for furrowing for and covering the seed, consisting of the marker, S, the diverging plates, T T, and the converging plates, V V, co bined and arranged substantially as described.

Second, The wheel, D, and bent arm, E, together with the sliding plates, L L', and the regulating slide, P, for dropping the seed, constructed and operated substantially as described.

Third, The rocking chair attached to the frame, and the hinged arm, h h, for the purpose of raising and lowering the frame, substantially as described.

63,425.—WAGON SEAT.—Ezra Reed, Owego, N. Y.

I claim a spring wagon seat, made either of wood or iron, when constructed in the manner and for the purpose substantially as herein set forth.

63,426.—CULTIVATOR.—James H. Reynerson, Pleasant Plain, Iowa.

I claim the manner of shifting the plows and beams either in or out, by means of the slotted rods and curved slotted bars of iron at D D D D, and the upright bar with holes, together with the movable cross timber and slide at E, also the ma ner of fastening the shovels to the beams by means of blocks of wood at H H H H.

I also claim as an improvement the general construction and combination of the machine aside from the wheels, axle, and tongue.

63,427.—HARVESTER RAKE.—Lafayette M. Rice, Oregon, Wis.

I claim, First, The combination of the five wheels, x z a b c, arranged substantially as set forth, to affect the reciprocating motion of the rake.

Second, The combination of the connecting rod, J, the crank, I, the points or heads, P O, the pin, W, and the rods, C D, to affect the raising of the rake, and th owing it down.

63,428.—COMPOSITION FOR COATING WOOD AND OTHER MATERIALS.—Charles L. Robertson, Providence, R. I.

I claim a composition for coating articles of wood or other material, prepared substantially as herein described, which under the application of heat will develop the characteristics herein mentioned.

63,429.—ROOFING.—Frederick O. Rogers, Niles, Mich.

I claim a roof covered first, with felt, or equivalent fibrous substance, then with rooing composition or pitch, and finally with the tar mortar, substantially as herein specified.

63,430.—CULTIVATOR.—Theodore B. Rogers, Weathersfield, Conn.

I claim the frame, A, arm, B, posts, D, in combination with the blade, E, and bearers, F, substantially as and for the purpose described.

63,431.—STEAM GENERATOR.—Stephen P. Ruggles, Boston, Mass.

I claim arranging a steam chamber or generator at or near the bottom of a closed steam boiler, as and for the purpose substantially as herein described.

63,432.—DEVICE FOR SALTING AND SEASONING MEAT.—Warren Sadler, Lockport, N. Y.

I claim the instrument as shown and described consisting of the tube, A, probe, C, and scoop, D, operated as set forth.

63,433.—BABY CARRIAGE AND VELOCIPEDE.—Joseph Scheen, New Haven, Conn.

First, I claim the upright, z, with its socket, m, and rubber spring, n, or equivalent, in combination with the grinding wheel, w, as set forth.

Second, The combination of the levers, f, cranks, g, ratchet, d, and wheels, k, when constructed and arranged substantially as described.

63,434.—HAT-BLOCKING MACHINE.—Julius Sheldon (assignor to Griswold and Sheldon), New York City.

First, I claim the combination of stem, a, plate, c, and bars, d, arranged substantially as described.

Second, The combination of the ring, l, with the springs, m, one separate spring for each clamp, arranged substantially as described and for the purpose specified.

Third, The rubber ring, p, applied to the tip of the hat body, substantially as described.

Fourth, The combination of the ring, o, with the ring, l, the said ring, o, being made detachable, substantially as described and for the purpose specified.

63,435.—APPARATUS FOR FORMING HATS.—Louis Simonet, Paris, France.

First, I claim locking and unlocking the dome, b b', carrying the diaphragm, o, and the several connections by a bayonet joint, constructed and arranged substantially as and for the purposes herein set forth.

Second, I claim, in combination with the turning dome, b, and its connections, the fixed frame, a, and its connections, and the forcing means, f, etc, the adjustable bracket, l, supporting the water-carrying joint, c, so that it can be moved horizontally and vertically, substantially as and for the purpose herein set forth.

Third, I claim, in combination with the dome, b, diaphragm, O, water joint or hinge, c, mold, w, and locking and unlocking means, as herein specified, the fluid reservoir, a', constructed in and joining a part of the framing, a, substantially as and for the purposes herein set forth.

63,436.—CHIMNEY.—C. F. Smith and J. Speth, Aurora, Ill.

We claim the combination of the bricks, A, when laid in chimneys, in combination with the common bucks, H, substantially as set forth and described.

63,437.—TRANSPARENT SLIDE FOR THE MAGIC LANTERN.—Samuel Solomons, London, England.

I claim a magic lantern slide, consisting of a sheet of gelatine, or its equivalent, ornamented, as herein described and confined between two plates of glass.

63,438.—BIT BRACE.—Greenleaf Stackpole, New York City. Antedated March 18, 1867.

I claim the bit brace, constructed and operated substantially as herein described.

63,439.—TABLE CUTLERY.—James Stott, Philadelphia, Pa.

I claim the blocks, D and D', with the r lugs, e', and rivet, j, constructed and adapted to the scales, B and B', their openings, i i, and recesses, e e, and to the shank, a, of a table knife, substantially as described for the purpose specified.

63,440.—CURTAIN FIXTURE.—Levi H. Thomas, Waterbury, Vt. Antedated March 27, 1867.

I claim the elastic friction band, G, in combination with the elongated roller arbor, B, and prong, F, on the bracket, E, operating substantially in the manner herein described for the purposes set forth.

63,441.—LANTERN.—William S. Thompson, Rochester, N. Y.

I claim the combination and arrangement of the two slots i i, and apertures j j, concentric with the annular plates f m, and pins l l, with the parts A, and E, of the lantern case, substantially as and for the purposes set forth.

I also claim in combination therewith the concentric flanges n o, of the rims f m, the one fitting within and serving as a guide for centering, the other arranged and operating substantially as described.

63,442.—MACHINE FOR FORMING THE BARB OF CROCHETING AND KNITTING NEEDLE.—J. P. Tirrell, North Bridgewater, Mass., assignor to himself, J. O. Nash, J. E. Nash, and Ira Merritt.

I claim the combination of devices in their equivalents substantially as described by means of which the needle blank is held and carried and acted upon by the milling tool all as set forth.

63,443.—MOLD FOR CASTING GROOVED ROLLS.—Robert C. Tolten. Pittsburg, Pa.

I claim a series of metallic rings, each ring made in one or more pieces with angular rectangular or curved inner faces for forming the grooves of a grooved chilled roll, such rings being packed in a mold made of sand or other more metallic composition, or arranged substantially as described with other rings which form the cylindrical surface of the mold, the construction being substantially as above set forth.

63,444.—GATE.—E. H. Van Eps, Farmington, Iowa.

I claim the manner in which the gate c, is hung by the means of vibrating bars d, being attached to beam e, and bottom bar of gate f.

I also claim the latch g, for the purpose of holding the gate open as herein set forth.

63,445.—MACHINE FOR COILING WIRE.—William Weaver, Phœnixville, Penn.

First, I claim the frame A, with its standards B, and B', and revolving former D, the whole being constructed arranged and operating substantially as and for the purpose described.

Second, The tension guide G, consisting of the jaws n n', with the projection q, and recesses o, and u, the whole being arranged for use in connection with the revolving former D, substantially as described.

Third, The grooved cylinder I, constructed and adapted for attachment to the conical grooved section h h', of the former D, substantially as and for the purpose specified.

Fourth, The former D, with its openings j, adapted for the reception of a detachable pin m, for the purpose set forth.

63,446.—MACHINE FOR CUTTING SCREWS.—George H. Wells, (assignor to himself and Judson A. Cleveland,) Logansport, Ind.

First, I claim the combination of the stock A, hinged jaw H, and adjustable cutters C, substantially as described.

Second, The combination of the stock A, cutters C, bar E, cam F, constructed and arranged substantially as and for the purpose set forth.

Third, The combination of the stock A, jaw H, and adjustable leg B, substantially as described.

Fourth, The adjustable bearings K, in combination with the jaw H, and stock A, substantially as described.

Fifth, The combination of stock A, hinge and jaw H, set screws H2 lug e, and wedge formed key H', substantially as described.

63,447.—CULTIVATOR.—P. L. West, Bath, Ill. Antedated March, 19, 1867.

First, I claim the construction and arrangement herein shown and described of the plows D D, their attachment links d2 and their draft rods d.

Second, I claim the devices C, a C1 C2 C3 and c' for giving the plows D, the requisite lateral motion.

Third, I claim the combination and construction of the posts d' and props d4, substantially as described and set forth.

Fourth, I claim the construction and arrangement of the plows D' and the curved bars D3 also the device d5 d6 c7 d., for raising the said plows up out of the ground, substantially as described and set forth.

63,448.—BARBER BRUSH.—John A. Wiedersheim, Philadelphia, Pa.

I claim as an article of manufacture the barber brush the same consisting of a flexible back and a rubbing portion o. elastic fringe C, substantially as herein represented and described.

63,449.—CEMENT.—Leonard Woolworth, Albion, Wis.

I claim the use of my new cement as herein described using as materials for its composition the articles above enumerated.

63,450.—REVOLVING FIRE ARMS.—Reuben W. Drew, Lowell, Mass.

First, I claim the tubular sliding ejector constructed and operating in the manner described.

Second, The arrangement of the hinged guard with devices for fastening the same in place when constructed and attached to the stock or frame in relation to the perforated cylinder all in the manner described.

63,451.—COTTON CULTIVATOR.—Robert N. Adams, Greenfield, Ohio.

First, I claim the rotating hoes in combination with the endless chain and the two pulley wheels B', and c', constructed and arranged substantially as described.

Second, I claim the thinner S, in combination with the inclined cogs on the driving whee s, and the intermediate ma hinery by which a vibrating motion is given to said thinner, substantially as described.

Third, In combination with the vibrating thinner and the revolving hoes, I claim the scrapers D D, constructed and arranged substantially as described.

63,452.—SPIRIT METER.—Joshua G. Allen, Philadelphia, Pa.

First, I claim the application of the escapement movement consisting of the lever L, acting upon the ratchet wheel S, or its equivalent for the purpose of regulating, controlling and calling into action the motive power and machinery used for turning and working the stop cocks and valves constructed substantially in the manner herein described and set forth.

Second, The bifurcation or division into two arms M and N, of one end of the escapement lever L, constructed substantially in the manner and for the purpose herein set forth.

Third, The hole or perforation O, in the lower arm of the escapement lever L, for the purpose of allowing the rod Q, of the float or float pan R, to pass through it.

Fourth, The application of the float or float pan R, constructed substantially in the manner herein set forth and used for the purpose of regulating moving and controlling or aiding in regulating moving and controlling, the escapement lever L, and attached machinery.

Fifth, The series of glass tubed or hydrometer chambers H, constructed substantially in the manner and for the purpose herein set forth.

Sixth, The graduation of the hydrometer chamber-tubes H, and this connection with the receiving cistern so as to indicate the depth or amount of liquid in the cistern.

Seventh, The application of a stop cock v, or its equivalent with each hydrometer chamber so arranged, moved, turned and worked by appropriate machinery as to keep se ure and retain for a variable period of time a specimen of the liquid or spirits, that are or may have been in the cistern.

Eighth, The application of cam wheels Y Z, for the purpose of thus turning, working and regulating the hydrometer chamber's stop cocks or valves v, constructed and acting substantially in the manner herein described and set forth.

Ninth, The combination and connection of this series of hydrometer chambers H, with the three-way cock C, or an equivalent valvular arrangement for regulating the ingress and egress of the spirits to and from the meter constructed substantially in the manner and for the purpose herein set forth.

Tenth, The application of the interrupted cog wheels c d, for the purpose of turning, regulating and reversing the three-way valves as herein described and set forth.

Eleventh, The arrangement of two or more spirit meters with a corresponding number of cisterns each and all leading to the main pipe A, coming from the same still with a plain ordinary stop cock r and s, at a suitable and convenient place in each pipe thus leading to the main pipe A coming form the still as herein described and set forth.

Twelfth, The combination and connection with each other of the various parts of the machine herein described and claimed, constructed substantially in the manner and for the purpose herein set forth.

63,453. — MATERIAL FOR PREVENTING INCRUSTATION IN STEAM BOILERS.—Josiah J. Allen, Philadelphia, Pa.

I claim the application to steam boilers in the manner described or any equivalent to the same of hydro-carbons, for the purpose specified.

63,454.—PUMP PISTON PACKING.—M. J. Althouse, Waupun, Wis.

First, I claim providing for sustaining a leather, rubber or other soft packing between expansible rings or segments so as to protect the exposed portions of the soft packing, substantially as described.

Second, The combination of the expansible hard metal or wood rings, and the rubber or other soft rings, all constructed and applied substantially in the manner and for the purpose herein described.

63,455.—GATE.—Sherman E. Anthony, Stillwater, N. Y.

First, I claim the hinged guide bars, C, in combination with a sliding gate, A, arranged to operate in the manner substantially as shown and described.

Second, The curved rod, E, attached to the post, B, the rod, J, in the gate and the hinge, d, when said parts are used in combination with a sliding gate, A, arranged on a guide slat or bar, C, substantially as and for the purpose specified.

63,456.—SASH SUPPORTER.—Joseph Ayers, Greenbush, N. Y.

I claim the spring attached to the edge of the sash and engaging in recesses in the casing, substantially as described and represented.

63,457.—SHIFTING RAIL FOR CARRIAGES.—Alonzo E. Bailey (assignor to himself, W. W. Mosher and W. W. Jackson), Middleville, N. Y.

I claim the pivots, B, back rail, C, composed of one piece, and having pendent pieces, the lower ends of which fit over said pivots, B, B, on the back of the seat, A, and top rail, D, composed of one piece and fitting over the pivots, B, substantially as herein set forth for the purpose specified.

63,458.—CARRIAGE STEP.—Francis Baker, New York City.

First, I claim the combination with a carriage body of a series of steps whether more or less in number, when such steps can be folded up or together and the said body is suitably constructed to receive and hold the same, substantially as and for the purpose described.

Second, I claim the spring catches, I and J, whether separately or together, substantially as described for the purpose specified.

63,459.—WRENCH.—Samuel S. Barnaby, Chicago, Ill.

I claim the movable jaw, l, hollow sleeve, o, spring plate, n, spiral spring, y, cam lever, w, constructed, arranged and operating upon the bar, c, substantially as and for the purpose herein set forth.

63,460.—Suspended.

63,461.—MACHINE FOR DRYING CLOTH, ETC.—Leander W. Boynton, Hartford, Conn.

First, I claim the combination of the endless chains and the tenter hooks in a machine in which high steam is used, when the machine is constructed, combined and fitted to produce the result, substantially as herein described and set forth.

Second. The combination of the apparatus for conveying the cloth to be dried with an apartment in which high steam is used (where most of the moisture is converted into steam) and an apartment supplied with dry air (when the drying is completed) when they are constructed and arranged substantially as herein described and set forth.

63,462.—DRYER FOR WOOL, ETC.—Leander W. Boynton, Hartford, Conn.

I claim the combination of the internal cylinder, D and its wings or vanes g g etc., with the eduction port, B, and the induction port, C, when the whole is constructed and arranged and the cylinder, D, caused to revolve substantially as herein described and set forth.

63,463.—PLAITING ATTACHMENT FOR SEWING MACHINES.—Samuel C. Brown, Borough of Carlisle, Pa.

First, I claim my improved plaiter made with the combination and arrangement of the adjustable plates, A and B, the adjustable gage, I, and the stationary gage, C, operating and connected with D in the manner and for the purpose described in the foregoing specification.

Second, The adjustable parts, L and F, and the rod, H, and plate, E, operating as described and connected adjustably to the sewing machine by means of the part, G, in the manner and for the purpose described in the foregoing specification.

63,464. — SEAT OR SHELF. — Franklin C. Brownell, East Orange, N. J.

I claim the standards, C, with the recesses, E E, and with or without the recesses, H H, the arms, L, and projections, A, combined and arranged substantially as and for the the purposes specified.

63,465.—CLAMP FOR LEATHERING BILLIARD CUES.—E. Brunswick, Chicago, Ill.

I claim the clamps to leather the billiard cues, constructed and operating substantially in the manner herein described and specified.

63,466.—GATE LATCH.—Joseph T. Bryan, Lebanon, Ind.

I claim the latch, 1 and 2, and the connection of this latch, 1 and 2, with the catch, 5, and incline, 6, all operating and arranged as described and for the purpose set forth.

63,467.—PADLOCK.—Ira D. Bush, Detroit, Mich.

I claim the combination of the sliding link bolt, B, stop, D, and locking bolt, G, or their respective equivalents, when arranged together and operating substantially as and for the purpose described.

63,468.—CLAMP FOR FURNACE MOLDS.—Edward Card, Providence, R. I.

I claim the hollow arm, with a ratchet arm movable back and forth within by a cog wheel in combination with a lever pawl to operate upon said ratchet; together forming a clamp for the uses and purposes for which clamps are used and to which this may be adapted, shaped and constructed, as herein described and set forth.

63,469.—STEAM GENERATOR.—Charles E. Case, Xenia, Ohio.

First, I claim the application to the exterior of steam generators of a coating composed of asbestos mixed with fire clay and held in place by a metal covering, as herein shown and described.

Second, In combination with a generator, constructed as herein described, I claim the coiled pipe, B, terminating in the perforated nozzle, C, all arranged to operate as set forth.

63,470.—DENTISTS' VULCANIZING FLASK.—Henry F. Clark, Poughkeepsie, N. Y.

I claim a dentist's vulcanizing flask constructed substantially as herein shown and described, and with the parts secured and held together by keys, substantially as set forth.

63,471.—MACHINE FOR BURRING WOOL, GINNING COTTON, ETC.—Robert J. Clay, Greenpoint, N. Y., assignor to himself, James T. Husted, Etenger J. Burling, and Cornelius Corson.

We claim, First, In machinery for burring wool, ginning cotton, or other analogous purposes, a combination with a suitable feed and burr or seed extractors or delivery device of a gang of reciprocating blades having saw-shaped teeth at their edges for operation relatively to the feed, substantially as specified.

Second, The combination in connection with a suitable feed of a series of reciprocating blades having teeth on their edges and working through ways or passages which pass the fiber but exclude the burs, with a series of intermediately arranged rotary burr extractors, for operation together as herein set forth.

Third, The toothed shaped blades, J, made of taper form in direction of their length, as described, in combination with a suitable feed, and series of burr extractors, essentially as and for the purposes herein specified.

Fourth, In a gang of saw-shaped blades operating as described, for the purposes set forth, constructing the teeth of said blades straight or shelving on their outer edges and sharpened from their roots to their points on their outer or front faces, substantially as shown and described.

63,472.—BEEHIVE.—Hamilton Clipp, Orange, Ind.

I claim the combination of the sliding feed troughs, H, with the interior boxes, E and F, of the hive, when said sliding troughs are constructed and arranged substantially as herein described and for the purposes set forth.

63,473.—SULKY PLOWS.—Daniel W. Colburn, Loami, Ill.

I claim the combination and arrangement of the beams, E, chains, D, roller, C, arm, K, notched bar, J, and standard, I, substantially as described, for the purpose specified.

63,474.—TOOLS FOR UPSETTING FLANGES.—James Connolly, Newburgh, N. Y.

I claim the tool aforesaid, for flanging as above described, and which will produce the intended effect.

63,475.—Potato Digger.—S. B. Conover, New York City.

I claim, First, The combination of the carrying wheel, D, with the shovel plow, C, each constructed substantially as herein set forth, for the purpose specified.

Second, The construction of the carrying wheel, D, with curved slots or openings, n*, substantially as herein set forth, for the purpose specified.

Third, The combination of the guards or fenders, F G, with the carrying wheel, D, substantially as herein set forth, for the purpose specified.

Fourth, The shaking screen, E, arranged in relation with the carrying wheel, D, and shovel plow, C, substantially as herein set forth, for the purpose specified.

Fifth, The arrangement of the deflecting arms, I, in relation with the shovel plow, C, and carrying wheel, D, substantially as herein set forth, for the purpose specified.

63,476.—Combined Cultivator and Planter.—S. B. Conover, New York City.

I claim, First, The combination with the main frame, A, supplemental frame, D, and fixed ratchet bar, F, of the operating lever, E, bell crank levers, b, horizontally connecting rods, c, and upright connecting rods, d, substantially as herein set forth, for the purpose specified.

Second, The sliding rods or braces, I, attached to the supplemental frame, D, passing up through suitable holes or slots either vertically or on an incline, in combination with the main frame, A, and operating parts above recited, substantially as herein set forth, for the purpose specified.

63,477.—Cotton and Hay Press.—J. W. Conway, Madison, Ind. Antedated March 21, 1867.

I claim both pressing and compressing the bales in one press, when the followers act alternately, and by the same arrangement of leverage, but in reverse motions thereof, substantially as and for the purpose herein specified.

I also claim the detached follower, D, arranged and operating substantially as and for the purpose herein set forth.

I also claim the system of six levers, G H I J K and L, arranged and operating in combination with the sliding rack, N, substantially as herein described.

I also claim the combination of the lever system, G H I J K and L, and the toggle lever and bar, R S, through the medium of the rope, T, substantially as herein specified.

63,478.—Harness Snap.—Edward A. Cooper (assignor to himself and J. N. Johnson), Lancaster, N. Y.

I claim securing the spring, C, to the main body of a harness snap, by means of the lug, D, the thumb lever or tongue, B, being made so as to shut over and inclose the lug, in the manner substantially as herein described.

64,479.—Grinding Mill.—Martin Cosgro, Peoria, Ill.

I claim the mill stones constructed with oblique top wings, a connected to oblique side wings, b, and operating substantially as described, for the purpose specified.

63,480.—Lantern.—A. R. Crihfield, Lincoln, Ill.

First, I claim a hot air chamber above the glass globe or lantern case, in combination with an air pipe or pipes to conduct the heated air therefrom to the chamber in the base, from which the illuminating flame is fed with oxygen, substantially as and for the purpose described.

Second, I claim so arranging the air-conducting pipes, P P P, as to serve the purpose of guards to the glass globe or lantern case, as well as that of conducting air to the lower air chamber, substantially as described.

63,481.—Wrench.—James E. Cronk, Poughkeepsie, N. Y.

I claim the combination of the eccentric wheel, G, the pin, F, projecting from one part, A, of the wrench, and the recess or slot, E, in the other part, A, substantially as shown.

63,482.—Picket for Fences and Walls.—Alphonso Dabb, Elizabethport, N. J.

I claim as a new article of manufacture a picketed strip made up of a wrought iron bar or strip, a, and malleable cast iron pickets, B, for use on walls or fences, substantially as specified.

63,483.—Sewing Machine.—George S. Darling, Bridgeport, Conn., and Elias Howe, Jr., Fairfield, Conn.

We claim, First, The pin, b, or its equivalent, projecting from or connecting with the bar or any other part of the presser foot, to act in combination with the take up, E, substantially as and for the purpose described.

Second, The pivoted elbow lever, F, operating in combination with the presser foot, substantially as described, for the purpose specified.

63,484.—Salting and Preserving Meat and Other Materials.—Enoch Darnell, Fox, Ill.

I claim the mode of preserving salt meat, lard, butter, or other substances, by means of stone, brick, or concrete tubs built in a stone or brick walled cellar, substantially in the manner herein described and specified.

63,485.—Churn.—George Deckman, Malvern, Ohio.

I claim the combination of a series of double concave disks, L, attached to a horizontal shaft, H, with the box, A, having rockers, F, attached to it, substantially as herein shown and described and for the purpose set forth.

63,486.—Saw.—Chas. Disston, Philadelphia, Pa.

I claim the lips, i, on the edge of the projection, d, of a saw tooth or on the edge of the recess in the blade, in combination with a groove and recesses, m, in the projection or in the blade, substantially as specified.

63,487.—Mode of Manufacturing Saw Blades.—Henry Disston, Philadelphia, Pa.

I claim a saw blade composed of tough wrought iron or homogeneous or Bessemer steel, and having a hard, carbonized exterior surface.

63,488.—Washing Machine.—Robert E. Downie and H. C. Johnson, Delavan, Wis.

First, We claim the eccentric shafts, E E, employed for adjusting the vertical position of the roller frame, D D, and resting upon the bottom of the tube so as to sustain the said frame at both ends, substantially as described and represented.

Second, In combination with the above we claim the removable uprights, F F, pendent bar, H, and rubber, I, all arranged in the manner and for the purpose specified.

63,489.—Lithographic Press.—George Dunlop, Brooklyn, N. Y.

First, I claim the movable carriage, A, containing a wetting roller, a, and inking-in rollers, G H, in combination with the trip lever, e, dog, f, cam, f', and feed rollers, E, constructed and operating substantially as and for the purpose described.

Second, The springs, g, under the ends of the rail, C, in combination with the carriage, A, containing the inking-in rollers, G H, and with the feed rollers, E F, constructed and operating substantially as and for the purpose set forth.

63,490.—Hot-Air Furnace.—H. A. Engels, C. H. Engels, and John Wieland, San Francisco, Cal.

We claim the arrangement of the set of pipes, c i p l q, bolted and cemented together, and at the same time staying the side plates, the sections and the whole structure of the furnace by means of the grooved shoulders and flanges of said pipes, as shown in figs. 5 and 6, in combination with the square tubes or drying chambers, r s, substantially in the manner, for the purpose, and upon the principle as herein set forth.

63,491.—Machine for Trimming Metals.—James H. Ferguson and Henry W. Lovejoy, New York City.

We claim the clamps, D, and carriage, E, in combination with the table, F, cutter head, A, on the adjustable headstock, B', and stationary knife, H, all constructed and operating substantially as and for the purpose described.

63,492.—Extracting Silver from Argentiferous Lead Ore.—C. Flemming Flach, Call, Prussia.

I claim improvement in extracting the silver and treatment of the lead contained in argentiferous lead ore by the means of a blast furnace process, in a manner substantially as described above.

63,493.—Churn.—Orlando V. Flora, Madison, Ohio, and Jas. S. Bogle, Springfield, Ind.

We claim the combination of the dasher, G G, breaker slats, H H, fan, N, and ice box or chamber, S, arranged and operating substantially as and for the purpose herein specified.

63,494.—Treadle.—John G. Folsom, Winchendon, Mass., and W. C. Anderson, St. Louis, Mo.

First, We claim the adjustable shackle bar, D, with the hinged stirrup, E, and band, F, in combination with the driving wheel of a sewing machine or of any other small machine and with a suitable clamp, B, constructed and operating substantially as and for the purpose set forth.

Second, The sustaining plate, b, in combination with the machine, C, clamp, B, wheel, A, shackle bar, D, and stirrup, E, all constructed and operating substantially as and for the purpose described.

63,495.—Weather Strip.—James P. Force and William W. Egnew, Jarvis, Ind.

We claim the bent rod, E, hinged in the holdfast, F, constructed and operating as described and represented.

63,496.—Apparatus for Expelling Water from the Holds of Vessels.—Thos. W. Fox, New London, Conn.

First, I claim the combination of the valve with the cylindrical vacuum producer, when they are constructed, arranged, and fitted for use substantially as herein described and set forth.

Second, I claim the combination of the cylindrical vacuum producer with the elongated main cylinder when they are so constructed and fitted to each other that when the part, K, of the cylindrical vacuum producer is raised out of the water the part, I, will close the apertures, C, in the main cylinder, substantially as herein described and set forth.

Third, I claim the combination of the cylindrical vacuum producer with the rod, E, and its collar and binding screw, m, when they are so arranged and connected that the cylindrical vacuum producer may be raised or lowered by the rod, E, and may be secured at any and every desired elevation by the collar and binding screw, or any other analogous device, substantially as herein described and set forth.

63,497.—Belt Rivet.—Conrad Frank, Cincinnati, Ohio.

I claim the combination of the internally threaded conical sleeve, E, the screw, F, and the two flange heads, B C, all constructed as and for the purpose herein shown and described.

63,498.—Wind Mill.—H. P. Gallup, Medina, Mich. Antedated March 21, 1867.

I claim, First, The wind wheel, C, with arms, c3, fitted in grooves constructed and arranged in the wind chamber, substantially as described and for the purpose set forth.

Second, The combination with the wind wheel, C, of the inclined wind passages, D, substantially as described and for the purpose set forth.

Third, The combination with the air passages, D, of doors, E, substantially as described and for the purpose set forth.

63,499.—Machine for Cleaning Flax and Hemp.—Arnold Gartner (assignor to himself and M. O. Luttgen), New York City.

First, I claim the drum, A, provided with yielding beaters, D, and rigid flyers, E, in combination with the adjustable curved aprons, C, extending from the rests, F, substantially as and for the purpose set forth.

Second, The lips, c, extending from the ends of the beaters, D, over the boxes, b, substantially as and for the purpose described.

63,500.—Bed Bottom.—Cyrus F. Gillette, Sparta, Wis.

I claim, in a bed bottom having the cord passing around a series of pulleys, b b, the arrangement of the slats, B B, placed above the pulleys, when in combination with the shaft, C, as specified.

63,501.—Corn Husker.—John W. Glass, Richland, Indiana.

I claim the bars, A B, constructed as described, and provided with the hook, D, and rest, C, with plate, m, leather, g, and loop, d, when constructed and used as and for the purposes herein fully set forth.

63,502.—Paint Mills.—Samuel J. Goodwin, Rockton, Ill.

I claim the revolving grinding nut, when constructed with a beveled rim at its lower portion, substantially as described.

63,503.—Die for Making Cans.—James L. Gray, Baltimore, Md.

First, I claim expanding dies, A A', and stamp heads, D D2, constructed and operating substantially as described,

Second, The rings, J, in connection with the expanding dies, A A', substantially in the manner and for the purpose described.

63,504.—Soldering Machine.—James L. Gray, Baltimore, Md.

First, I claim a rotary bed, B, in combination with a yielding holder, g, or their equivalents, operating substantially as and for the purpose described.

Second, The spurs, b, in connection with the yielding holder, g, substantially as and for the purpose described.

Third, In combination with the rotary bed, B, and yielding holder, g, I claim the soldering iron support, substantially as and for the purpose described.

Fourth, The within described machine for centering, supporting and rotating preserve cans, said machine having its parts constructed, arranged, and operated substantially as set forth.

63,505.—Preserve Can.—James L. Gray, Baltimore, Md.

First, I claim a preserve can which has formed on its ends grooved flanges the grooves of which are adapted for receiving the edges of the cap and bottom plates, and strengthening the ends of the cans, substantially as described.

Second, A can which has one or both of its edges turned inward and crimped so as to leave a v-shaped groove or grooves, substantially as and for the purposes described.

63,506.—Flour Bolt.—Henry Gross and Jesse B. Rumsey, Tiffin, Ohio.

First, We claim the cam wheels, a 1, and spring, d, or their equivalents, so arranged in combination with a bolt or rail which vibrates upon its shaft, substantially as herein specified.

Second, The arrangement of the rod, H, spring, F, lever, F, and sleeve, G, with reel and its pins, substantially as and for the purpose specified.

63,507.—Bridge.—Remig Grotz, Chicago, Ill.

First, I claim the mechanical device, consisting of a combination of levers and weights as described, said levers being connected with and acting upon the upright shafts to which the gates or barriers and the lanterns are secured, the whole constructed and operating substantially as and in the manner herein described and specified.

Second, The lip at the curved end of the bridge, constructed and operating as described, in combination with the said mechanical device, as and for the purposes set forth

63,508.—Apparatus for Making Vinegar.—Theodore Grundmann, Milwaukee, Wis.

I claim the arrangement of a series of level troughs, C, provided with holes, a, through which the liquid to be acidified and also a current of air, is conducted, and provided further with plates, b b, whereby the liquor is detained and its course lengthened without interrupting the rapid current of air all made and operating substantially as herein shown and described.

The box, B, wherein the aforesaid troughs are placed, said box being so arranged that it may be easily taken apart and put together, and being provided with holes, d and c, for creating a circulation of air and with dampers, e, for regulating the same, all made and operating substantially as herein shown and described.

63,509.—Washing Machine.—A. W. Hall, New York City.

I claim the tumbling box or cylinder, A, constructed with a series of longitudinal corrugations on convex ribs, operating in combination with smooth stones or balls of other suitable material, substantially as herein set forth, for the purpose specified.

63,510.—Bag Ties.—Daniel B. Hall, Bucksport, Maine, assignor to himself and Howard Tilden, Boston, Mass.

I claim the bag tie constructed of the strap, A, the plates, B, or their equivalent, and provided with the openings, e e e e, either with or without the eyelets, substantially as described, and to operate as set forth.

63,511.—Apparatus for Carbureting Gas and Air.—Durell Hall, New York City.

First, I claim the coiled condensing pipe, I, used in the gas chamber of the vessel, A, and provided with a check valve when used in combination with the pipe, J, and the receiving tanks, K, as and for the purpose specified.

Second, The arrangement of the heater, C, provided with pipes, D and E, with the vessels, A and B, the branching air pipe, G, and the supply pipe, F, as and for the purpose specified.

Third, The arrangement of the receiving tank, K, provided with its guide, e, and discharge pipe, L, with the pipes, J and I, as and for the purpose specified.

63,512.—Surface Conductor for Electrotyping.—Samuel Hallock, New York City.

I claim a surface conductor for electrotyping, arranged and operating substantially as herein described.

63,513.—Watch Pendant Keys.—J. A. Hamann, New York City.

First, I claim the pendant, A, having secured to it the spring catch, a, in combination with the key, C, and shouldered pin, F, constructed and operating as described, for the purpose specified.

Second, The key, C, with elongated notch, b, in combination with the spring catch, a, secured within the pendant, A, substantially as described, for the purpose specified.

63,514.—Car Coupling.—J. H. Harris, Virginia, Ill.

First, I claim the crank shaft, L, connected to the levers, H H, for the purpose of elevating and lowering the bumper of a car, also to uncouple the same for the purposes and substantially as herein described.

Second, I claim the cylinder, E, provided with notches and pinties, G G, the levers, H H, and crank shaft, L, in combination with the bumper, P, substantially as described.

63,515.—Churn.—George W. Hawk, Chicago, Ill.

I claim the combination and arrangement of the churn, A, and its cover, the platform, B, the bottoms or cams, a b, the standard, E, the crank, F, wheel, G, and tranverse slotted bar, J, when constructed and operating substantially as set forth.

63,516.—Wagon.—Henry S. Heermance, Claverack, N. Y.

First, I claim the application of india rubber between a wagon body and the cross bars or bolsters upon which it rests, substantially as and for the purposes described.

Second, The application of india rubber between the standards, C C, and a wagon body, substantially as and for the purposes described.

63,517.—Umbrella Supporter.—Henry S. Heermance, Claverack, N. Y.

First, I claim the combination of the clamp, D, ball and socket joint, g c, and standard or support, a, in the construction of an umbrella support, substantially as and for the purpose set forth.

Second, The combination of the joints, j k, and the ball and socket joint, g c, in an umbrella support, substantially as and for she purpose described.

Third, The combination of the joints, j k, and m, substantially in the manner and for the purpose described.

63,518.—Steam Generator.—Thomas Holt, Trieste, Austria.

I claim the hot air chambers or sections, C, inclosing the steam and water tube, B, and inclosed within the boiler, A, constructed and arranged as herein set forth for the purpose specified.

63,519.—Swift and Reel.—G. W. Horton, Belvidere, Ill.

First, I claim the construction and arrangement of the disk, B, B, pivoted to the block, D, and having secured thereto the main bar, C, on which works the slide, d, connected to the arms, A, by the pivoted braces, b, as herein set forth for the purpose specified.

Second, In combination with the above I claim the indicating wheel, E, as herein described.

63,520.—Friction Wheel.—Truman Hotchkiss, Stratford, Conn., assignor to Alfred B. Ely, Newton, Mass.

I claim the loose collar and wheels, constructed and operating substantially as described.

63,521.—Machine for Coiling Spring.—Swift McG. Hunter, Terryville, Conn.

First, I claim the upright arm, e, with its holding pins, m m, in connection with the rock shaft, d, the latch, b, and the spring, c, arranged and operating as described, in combination with the sliding bar, F, the shaft, A, and the clutch, E, substantially as herein set forth.

Second, I claim also the upright holding rod, l, in combination with the spring, k, the arm, e, and the arbor, n, arranged and operating substantially as herein described.

Third, I claim also the sliding bar, F, in combination with the spring, g, stud, l, and brake, f, and the brake wheel, H, on the driving shaft, A, arranged and operating substantially as described.

63,522.—Sleigh.—W. H. Huyck, Chariton, Iowa.

I claim the knees, C, composed of two parts, a a, and secured together, one of the parts being bent in a horizontal position, and the other part forming a soculder upon which the beam, D, rests, as herein set forth, for the purpose specified.

63,523.—Machine for Shrinking Tires.—Caleb Jackson, York, Ill.

I claim an improved tire shrinking machine, formed by the combination of the operating lever, I, shaft, H, and pivoted levers, F, with each other, with the stationary part, A, and movable parts, B, of the machine, substantially as herein shown and described, and for the purpose set forth.

63,524.—Pipe Cutter.—John V. Jebson, Brooklyn, N. Y.

I claim the use of a scraper, C, in combination with a cutter, B, when the two are arranged in a tool to cut and scrape a pipe or tube, as set forth.

63,525.—Regulator for Watches.—Augustine Jewett, Boston, Mass.

I claim the notched index, C, in combination with the regulator of a watch, when such index is arranged so as to slide or to be moved upon the bridge plate or the balance of the watch, substantially as described and for the purpose specified.

I also claim the combination with the above of the set screw, G, arranged and operating upon the index, substantially as and for the purpose described.

I also claim the regulator pins, a, when attached to the regulator arm, so as to be adjustable therein, substantially as and for the purpose described.

63,526.—Lifting Apparatus.—Wilson L. Jones, Baldwin City, Kansas.

I claim the rack beam, E, having platform, D, operating in combination with the cog cylinder, F, provided with a shiftable lever, J, and detent, K substantially as described for the purpose specified.

63,527.—Apparatus for Bleaching Cane Juice. Wm. A. Jordon, New Orleans, La.

I claim the purifying of sulphur gas through water in the manner specified and shown for the purpose of bleaching and clarifying cane juice in a thorough manner by means of the improved perforated revolving cylinder with paddles or buckets combined inclosed in box, F, in the manner herein described and shown by the accompanying drawings.

63,528.—Manufacture of Petroleum Soap.—Stephen K. Kane, Allegheny City, Pa.

I claim in the process of making soap combining petroleum or other hydrocarbon oil, benzine or other product of such oils with animal grease, or fat, or vegetable oil either with or without the admixture of rosin so as to form a chemical union therewith before adding the lye for saponifying, substantially as hereinbetore described.

Second, The process of making soap by first dissolving rosin in hydro-carbon oil, benzine or other fluid products of such oils; then mixing the solution with melted animal fat or grease or vegetable oil so as to form a chemical union therewith and lastly saponifying the mixture thus formed with lye either with or without the application of heat, substantially as hereinbefore described.

63,529.—Machine for Molding Pottery.—Anton Keil and John Tresch, New York City.

First, We claim the cam, e, on the shaft, C, for the purpose of raising the plate, g, and flask, D, substantially in the manner herein shown and described.

Second, The combination of the curved flange, h', on the plate, g, with the pin, f, on the crank, e, for the purpose of gradually lowering the plate, g, and flask, D, substantially in the manner herein shown and described.

Third, The construction of the flask, D, so that the plates, d', may be spread apart or closed at will, substantially as and for the purpose herein shown and described.

Fourth, The plate, K', on the pin, K, in combination with the spiral spring and the spring catch, l, for the purpose of raising the ready molded pot, substantially as herein shown and described.

Fifth, The manner of opening and closing the flask, D, by means of the ring, F, and catch, m'', substantially as and for the purpose herein shown and described.

Sixth, The combination of the frame, A, so that one or more flasks and cores may be arranged thereon, substantially as and for the purposes herein shown and described.

63,530.—Grain Cradle.—C. P. Kelsey, Livingstonville, N. Y.

I claim the sockets, E, applied to the fingers, C, cross bars, D, and braces, F, for the purpose of rendering the fingers capable of a longitudinal adjustment, substantially as and for the purpose set forth.

63,531.—Shirt Stud.—Patrick Kenny, New York City.

I claim the perforated plates, A and B, countersunk on opposite sides forming shoulders in the centers of the plates on which bear pins, D, around which the connecting loops, C, pass, holding the plates together with an unbroken flexible connection, in the manner described for the purpose specified.

63,532.—Boring Machine.—Charles B. Knapp, Waterloo, Wis.

First, I claim the pawl, N, hung to the framework, A, in connection with the ratchet teeth of the carriage, I, and operating substantially as described for the purpose specified.

Second, The guide bar or rail, J, arranged to slide at the front end of the carriage and operating in combination with the arm, Y, of the framework, A, substantially as and for the purpose specified.

63,533.—Pianoforte Mover.—D. I. Langworthy, Jamestown, N. Y.

I claim the piano mover consisting of the platform, A, to whose under side the spring lever catches, E, are secured, and bearing the clamps, J, and handles, I, folding supporting frame, B, provided with rollers, H, and having the lower end of the stay rods, c, pivoted thereto, when all are constructed and operating as herein shown and described.

63,534.—Weed Cutter.—C. G. Lathrop, San Jose, Cal.

First, I claim a weed cutter, made and operating substantially as herein shown and described.

Second, The V-shaped horizontal cutter, I, provided with knives, H, at its ends, substantially as and for the purposes herein shown and described.

Third, The circular revolving colter, G, arranged in front of the plow beam in combination with the cutters, I and K, all made and operating substantially as herein shown and described.

Fourth, The adjustable draft attachment, E and F, in combination with the cutters, G I and K, as set forth.

Fifth, A weed cutter so constructed that either the knives or the wheels on which the whole device is supported can be adjusted up and down so that the cutters can be brought more or less into the ground.

63,535.—Seat for Vehicles.—G. Lattin and A. F. Hubbell, Coldwater, Mich.

I claim the "bent reclining seat back" for vehicle seats, indicated at T, constructed and fashioned by the combined bending and reducing process substantially as herein described and set forth.

63,536.—Scaffold.—Horace Littlefield, Lewis, Iowa.

I claim a portable scaffold that is made substantially as and for the purpose herein shown and described.

63,537.—Soda Fountain.—T. A. Long, Meadville, Pa.

I claim the arrangement of the pump, B, the chamber, E, the pipe, C and D, constructed substantially as described in combination with the casing, A, for the purposes set forth.

63,538.—Coal Stove.—John J. Low, Cleveland, Ohio.

I claim the corrugated or fluted cylinder, G, as constructed and arranged in relation to the apertures, m m, at its base, and to the passages, n n or p, substantially as and for the purposes herein specified.

I also claim an interior perforated lining, H, in combination with said corrugated or fluted cylinder, and apertures at its base constructed and operating substantially as and for the purpose herein specified.

I also claim in a cylinder coal-burning stove the passage of the products of combustion into the lower base, D, at the sides thereof thence forward under the hearth, and finally back through the middle of the base beneath the ash pan to the exit flue or pipe, substantially as and for the purposes herein specified.

63,539.—Coal Stove.—John J. Low, Cleveland, Ohio.

I claim the perforated curved upper tier blocks, D D, arranged in connection with the blocks, C C, constructed as shown so as to form the air chamber, l l m, substantially as and for the purposes herein specified.

I also claim the arrangement and construction of the whole body of the stove lining, D C C, in connection with the apertures, a or n, in the manner and for the purposes herein set forth.

63,540.—Inking Apparatus for Printing Machines.—John K. Lowe, Cleveland, Ohio.

I claim the combination of the group of rollers, D C E, and the group of rollers, G H I, with the roller, F, as and for the purpose specified.

63,541.—Carriage for Children.—Tindal A. Madison, Terre Haute, Ind.

First, I claim the combination of the revolving axle, a, with the bolts, d d, or their equivalents, for the purpose of alternately attaching the axle, a, to the carriage wheels, causing them to revolve together and attaching the axle, a, to the side bars, c c, causing the carriage wheel to revolve alone.

Second, The combination of the revolving axle, a, the elastic cord, f f, and the friction pulley, g, or their equivalents, for the purpose described. Also the combination of the axle, a, and the spring, n, for the same purpose.

Third, The combination of the axle, a, the regulating cord, l l, and the friction pulley, m, or their equivalents, acting in concert with the elastic cord, f f, or the spring, n, for the purpose described.

63,542.—Plastering Trowel.—Tindal A. Madison, Terre Haute, Ind.

First, I claim the construction of a plasterer's trowel with the brace, b, to hold the trowel to any given pitch or angle to the surface being covered.

Second, The combination of the gages, n, and thumb screws, d, with the trowel blade, a, and the brace, b, to adjust the trowel to the putting on of the covering material of any thickness required.

63,543.—Device for Lubricating Spindle.—Thomas Marsh, (assignor to himself and D. L. Fales,) Central Falls, R. I.

I claim the oil reservoir C, and conducting tube D, distinct from the bolster in combination with a channel a, cut in the side of the spindle bearing and a suitable absorbent for conducting the lubricant arranged substantially as described for the purposes specified.

63,544.—Boat Detaching Tackle.—G. B. Massey, New York, N. Y.

I claim the vertical rods C, hinged to the boat at their lower end, and pro-

vided with the hooks e, at their upper ends in combination with the blocks D, connecting bar B and lever L, arranged to operate as herein shown and described.

63,545.—SUGAR JUICE EVAPORATOR.—Silas B. Maulsby, Muncie, Ind.

First, I claim the strainer gate B, constructed as herein described and represented and employed to connect the pans together as well as to arrest the passage of the scum, as set forth.

Second, The adjustable elbow tube G, applied and operating in combination with the pans A, in the manner and for the purpose set forth.

63,546.—PROP STICKS FOR PIANOFORTES.—Chas. E. McDonald, Brooklyn.

First, I claim the combination with the hinged prop or props C, and lid or top B, of a weight or weights D, for action in the manner and for the purposes substantially as herein set forth.

Second, The combination, with the hinged prop or props C, lid or top B, and weight or weights D, or a catch or catchers E, so constructed and applied as on closing the lid the weight or weights are automatically released and left free to exercise a lifting action on the props substantially as specified.

63,547.—PIANOFORTES.—Wm. H. McDonald, Brooklyn, N. Y.

I claim the combination with the hinged or pivoted prop C, to the lid B, of a spring or elevating device controlled by a spring and made capable of attachment to or detachment from the case for operation of the prop or props at either end of the latter, substantially as specified.

63,548.—CAR BODY FRAMES.—S. Merrick, New Brighton, Penn.

I claim in the construction of frames of car bodies the iron arched trusses B, the angle trusses C, and the horizontal iron plates c, in combination with the main sills A, the stanchions a, and the cross sills d, arranged substantially as and for the purposes herein described.

63,549.—HAT BLOCKING MACHINE.—S. S. Middlebrook, Sandy Hook, Conn.

First, I claim the construction and arrangement of the vertical shaft A, levers D, cross head C, rubber ring a, perforated disk F, with its edge grooved to receive the metallic rod d, surrounding said levers D, as herein set forth for the purpose specified.

Second, The conical corrugated rollers G H, the teeth of which mesh into each other swinging frame I, bearing the oblique shaft g, and pivoted at its outer end h, to the frame, adjusted by means of the set screw i, when constructed and arranged to operate as herein set forth for the purpose specified.

Third, The rubber ring M, upon the table L, of the frame K, sliding cross head l, and block N, when constructed and arranged to operate as herein set forth.

63,550.—APPARATUS FOR MOLDING AND VULCANIZING ARTICLES OF RUBBER.—John R. Moffitt, Chelsea, Mass.

I claim the construction of the cylinder with a steam chamber, the outer surface of which is made capable of receiving molds or mold boxes of various sizes, substantially as set forth.

Also combining with the cylinder the grooved wheels with swinging fellies, and the groove ways in the uprights substantially as set forth.

Also the employment of the friction rings or rolls running in the grooves substantially as set forth.

Also in combination with the mold cylinder and each mold thereof, the hollow steam heated platen or follower.

Also in combination with the platen or follower the bar o, having the mold blocks z, and the platen or follower connected therewith and operated thereby substantially as set forth.

Also the combination of the shafts t w, eccentrics v, and lifters r, for raising the platen substantially as described.

Also combining with each hollow steam heated platen or follower the jointed or movable steam piped for conducting steam into and from the platen, substantially as shown and described.

63,551.—MARKING ATTACHMENT FOR PLOWS.—Charles Morris, Stockton Township, N. J., assignor to himself, George Richards and Stanley C. Hylton, Philadelphia, Pa.

I claim the combination and arrangement of the plough beam A, with the clamp B H, the jointed and reversible bar D K, and the chain M operating substantially as described.

63,552.—CANE, UMBRELLA, PISTOL, DAGGER AND CAMP STOOL COMBINED.—Duncan Morrison, Portland, Maine.

I claim the combination and arrangement in the hollow of the top of the cane, of the pisiol and dirk operated and secured as described, with the umbrella and seat in the stock the two parts of the cane being separable and capable of being united, all as and for the purposes set forth.

63,553.—PROCESS OF ENAMELING HARD RUBBER, GUTTA PERCHA.—Ansil, W. Munroe, Rahway, N. J. and Isaac, C. Munroe, Brooklyn, N. Y.

We claim enameling rubber or its allied gums, substantially as described.

63,554.—SPIRAL HAY FORK.—Henry Neumeyer, Millerstown, Penn.

I claim the vertical tines A, shank B, roller or pulleys D, and one or more spiral tines F, in combination with the rope E, support G, lever stop H, and spring I, substantially as described for the purpose specified.

63,555.—GAFF FOR SHIP SPAR.—G. C. Pattison (assignor to himself and Benjamin G. Harris), Baltimore, Md.

I claim guard hooks or plates, combined with the inner end of gaffs or other swinging spars, substantially in the manner and for the purpose herein set forth.

63,556.—STEAMING ON HAT BODIES.—Starr Polley, Brooklyn, N. Y.

First, I claim the levers, B, standing in a conical or pyramidal position during the stretching of the hat body, and provided with damp for holding the body thereon, all constructed and arranged substantially as and for the purpose herein set forth.

Second, I claim the longitudinal corrugations, G* and B*, in the acting faces of the lever and clamps of a hat stretching machine adapted to operate relatively to each other, and to the hat body, as herein described and set forth.

Third, I claim the spring connection, m, arranged relatively to the clamps, G, and levers, B, and their connections, substantially as and for the purpose herein set forth.

Fourth, I claim the carrier, N N, and hat block, O, operating relatively to the pyramidally arranged stretching levers, B, which previously stretch the hat body substantially as and for the purposes herein specified.

63,557.—DRILLING OIL AND OTHER WELLS.—Nelson Pontious, Hallsville, Onio.

First, I claim the clamping arms or jaws, I I, clamping the rope of drilling tools, in combination with the ratchet wheel, F, with which said jaws turn substantially as described.

Second, I also claim the combination of the pawls, L L, the walking-beam, the horizontal ratchet wheel, F, the cams, Q Q, for raising the pawls, L, above the ratchet wheel, F, automatically, and the slotted connecting rod, substantially as described.

Third, I also claim the vertical ratchet wheel, M, and its pawl, in combination with the slotted connecting rod, O, and cams, Q Q, substantially as described.

Fourth, I also claim the orifice, G, through the ratchet wheel, F, and through the bed plate, E, and walking-beam, B, in combination with the hinged clamping arms or jaws, I I, substantially as described.

63,558.—SPIKE AND NAIL.—Aurthur Prentiss, Prentiss Vale, Penn.

I claim spikes and bolts for railroads and other purposes, whether round, square, octagonal or otherwise in form, constructed in two separate pieces, the one provided with roughened side or sides, substantially as described, and to be used conjointly either with or without the timber preservative, as and for the purposes set forth.

63,559.—MACHINE FOR CUTTING STALKS IN THE FELD.—George Pye and F. S. C. Souther, South Boston, Mass.

First, We claim the machine for cutting corn, cane, and other stalks, in the field, constructed arranged and operating substantially as herein described.

Second, We claim also the transverse sliding knives, F F, operated by the cranks, d d, in combination with the pinions, g g, and the concentric toothed rims, h h, on the driving wheels, A A, constructed and operating substantially as and for the purposes herein described.

Third, We also claim the rocking frame, C C, and cross bar, E, in combination with the axle, B, constructed and operating substantially as and for the purposes herein described.

63,560.—BALANCED SLIDE VALVE.—David Pyke, Philadelphia, Pa.

First, I claim the adjustable valves, D D', constructed as described, and the spindle, E, and its nut, t, the whole being arranged in respect to each other as specified.

Secondly, The combination of the two valves, D and D', their studs or bolts, m and m', those of one valve having left-handed, and those of the other valve right handed threads, and the nuts, n, having threads adapted to those of the said bolts or studs.

Thirdly, The upper valve, D, and lower valve, D' the former having a larger area than the latter when the two valves are used in connection with a cylinder having a valve chest on its side, as described for the purpose specified.

63,561.—SELF-OILING SPINDLE FOR SPINNING MACHINES.—F. J. Rabbeth, Ilion, N. Y., and J. E. Atwood, Willimantic, Conn.

First, We claim the bolster, tube and step, B B1 B2, with an oil cup, C, at its upper end, provided with a passage, a, and slot, e, the whole constructed as and for the purpose set forth.

Second, In combination with an oil cup mounted on or surrounding the bolster, the perforated whirr, or whirr sleeve, D', and outer perforated cap, E, for action, as specified.

Third, In combination with the spindle tube, the set screw, F, and packing k, operating to restrain the spindle to its place, and prevent the escape of oil as herein specified.

63,562.—GATE LATCH.—C. W. Rhoads, Indianapolis, Ind., assignor to himself, S. C., and E. O. Frink and H. A. Moore.

claim the combination of the several devices made, constructed and arnged, substantially as and for the purpose herein set forth.

63,563.—TIE FOR BALES.—Stephen O. Ryder, New York City.

I claim the key or pin, c, constructed with an annular tooth or rib, c", in combination with the loop, a', and slot, c', arranged at the opposite ends of the tie or band, substantially as herein set forth for the purpose set forth.

63,564.—MAGAZINE FIRE-ARM.—Peter Sheckler, Orangeville, Ill.

I claim, First, The slot, n, in the rear of the stock for holding the spring plate, E, for the purpose described as specified.

Second, The left-hand block, T, in combination with the breech, Q, for operating the spring guides, U, substantially as described for the purpose specified.

Third, The right-hand block, T, in combination with the breech, Q, and hammer, W, substantially as and for the purpose specified.

63,565.—TRUSS.—Jacob A. Sherman, New York City.

I claim, First, A truss spring formed of two or more parts hinged together and retained, at the desired angle, to each other, substantially as specified, so as to regulate the pressure of the spring, as set forth.

Second, I claim the ball joint, l, for attaching and adjusting the pad, in combination with the screw, o, passing through said ball, and taking the inner surface of the cavity as set forth.

Third, I claim the plate, m, formed with radiating levers or fingers to which the padding is connected so that they yield and adapt the pad to the surface of the herl.ia, as set forth.

63,566.—MEAT AND VEGETABLE CHOPPER.—Eli Smith, Claremont, N. H.

I claim the sides, b b, as constructed, in combination with knives or choppers, e e e, rod, d, and handle, A, as and for the purpose set forth.

63,567.—MEDICAL COMPOUND.—George H. Smith, New Orleans, La.

I claim the composition herein described when the same is compounded of the ingredients herein specified in the proportions as given, for the purpose set forth.

63,568.—BOOTS AND SHOES.—T. Briggs Smith, Boston, Mass.

I claim a pegged boot or shoe in which pegs formed from a twisted polygonal metallic wire and of uniform size throughout their length are substituted for wooden or other pegs heretofore employed.

63,569.—BOOTS AND SHOES.—T. Briggs Smith, Boston, Mass.

I claim a peg or fastening, of uniform size throughout its length, formed from twisted angular wire, substantially as hereinbefore described and shown.

63,570.—MACHINE FOR TWISTING WIRE.—T. Briggs Smith, Boston, Mass.

I claim, First, The adjustable die, T, constructed and operating as described.

Second, The drawing wheel, R, hung in the revolving frame, K, and arranged and operated in the manner specified.

Third, The drum, W, hung in the revolving frame, K, and constructed and operating as set forth.

Fourth, The combination of worm wheel, Y, operated as described, with shaft, X, ratchet, 1', and spring, n, in the manner and for the purpose specified.

Fifth, An improved machine for imparting a regular and adjustable twist to wire, constructed, arranged and operating substantially in the manner described.

63,571.—WOOD TURNING LATHES.—Mathias Spenli, Detroit, Mich.

I claim, First, The arrangement of the cutter heads, F F' moving in opposite directions in combination with the head, H, carrying the guide wheel, substantially as and for the purpose described.

Second, The vibrating slotted lever, f, and bolt, e, in combination with the heads, H F, so that the speed of the head, H, in relation to the heads, F F', can be regulated for the purpose specified.

Third, Connecting the oscillating spindle stock, J, with the stirrup supporting the axle of the guide wheel, so that said guide wheel and spindle stock move simultaneously toward and from each other, as and for the purpose set forth.

Fourth, A lathe for turning lasts in which a right and left last are turned simultaneously from a single pattern, when constructed and operating substantially as described.

63,572.—MACHINE FOR MAKING WOODEN EAVES TROUGHS.—A. T. Sterns, Dorchester, Mass.

I claim, First, The arrangement upon the frame, A, of the cylindrical saw, D, oblique saw, H, molding cutters, I J, cutters, K L M, friction rollers, C C and G G, substantially as herein set forth for the purpose specified.

Second, Operating the hollow cylindrical saw, D, by means of driving belt, D', extending from the drum on the shaft, F, around the said saw holding it against the friction rollers, G G, which form its bearings as herein shown and described.

63,573.—HEEL STIFFENER.—Edgar M. Stevens, Chelsea, Mass., assignor to Alfred B. Ely, Newton, Mass.

I claim a molded heel stiffening of rubber or similar elastic material having its upper edge turned over outwardly as and for the purposes set forth.

63,574.—WOOD LATHES FOR TURNING IRREGULAR FORMS.—A. R. Stewart, Douglas Harbor Canning, New Brunswick.

I claim the double carriage, f and f', with their shafts and cutter wheels and traverses arranged and operated substantially as herein shown and described.

Second, I claim the screw, H, the clamp nut, L, and the swinging frame fig. 5, in combination with the double carriage, f and f', operating substantially as herein shown and described and for the purposes set forth.

63,575.—BILLIARD CUE TIP AND FASTENER.—Edgar B. Stocking, Binghamton, N. Y.

I claim the combination of the slits in the underside of tips of rubber or leather and a screen the head of which fits said slits and the body of which is square and fitting a ferrule movable and having a square opening in its center and acting as a wrench and a fixed nut in the billiard cue as above described and for the above named purposes.

63,576.—SLEIGH RUNNER.—Charles Stoddard, Hancock, N. Y.

First, I claim forming the sleigh runner in two parts, A and B, with a dovetailed groove formed in and between them, substantially as herein shown and described and for the purpose set forth.

Second, Forming the shoe, C, with a central projecting dovetailed flange, c' substantially as herein shown and described, and for the purpose set forth.

63,577.—ICE BOAT.—J. B. Stoddard, Baltimore, Md.

I claim the arrangement of the projecting prow, A, and over hanging bow, B, in combination with the paddle wheels with serrated peripheries, substantially as and for the purpose set forth.

63,578.—SINK TRAP.—J. E. Taber, Fall River, Mass.

I claim the valve consisting of the two equally divided jaws, B, forming a cone there joint being at right angles with the top of the trap pivoted at their upper inner ends thereto whereby they close by their own gravity, substantially as described for the purpose specified.

63,579.—WASHING MACHINE.—William A. Terry, Prarie du Chien, Wis.

I claim the combination and arrangement of the lever, K, gear wheel, I, pinion wheel, G, and vertical roller shaft, D, with each other with the supporting standard or frame, F, and with the hinged part of the cover, E, substantially as herein shown and described.

63,580.—CHURN.—Amaletha E. Thorn, Fletcher, Ohio.

First, I claim the churn barrel or chamber, C, provided with the vertical perforated partitions, G, in combination with the plate, A, guide pins, E E', pitman, S, crank, P, shaft, p, and propelling handle, n, or their mechanical equivalents, all arranged and operating substantially as herein described and for the purpose specified.

Second, The air valve or valves, k, in the tubes, K K', or one of them, in the described combination with the elements of the preceding clause.

63,581.—SAW.—E. W. Tilton, Oshkosh, Wis.

I claim forming a concave substantially in the manner herein shown and described for the purposes specified.

63,582.—BURGLAR ALARM.—Jacob G. Trout, Philadelphia, Pa. Antedated March 20, 1867.

I claim the combination of body back and front, F F, nipple, a, rod or hammer and handle, B b, spring, C, right angle groove, l l, screw, e, and all as described and for the purpose set forth.

63,583.—METHOD OF RAISING BENTS IN BUILDINGS.—John Van Gaasbeck, Mount Vernon, N. Y.

First, I claim the two-flanged plates, A B, pivoted together and furnished with suitable appliances, whereby they may be attached to the post of a bent and to the sill, in the manner herein set forth for the purpose specified.

Second, The arrangement of the extremity, a, of the plate, A, with reference to the inner surface of the plate, B, and of the flanged sides of said plates that the said extremity and sides shall serve as guides for directing the tenon on the post into the mortise in the sill, substantially as set forth.

Third, The construction of the plate, B, with the slotted ear, d, whereby the clamping chain, F, or its equivalent, may be adjusted to clamp the plate, B, to posts of any desired size, substantially as herein set forth.

63,584.—DEVICE FOR GATHERING APPLES.—H. F. Wadhams, South Dansville, N. Y.

I claim the canvas, B, secured to the body, A, of the tree to the medium of the belt, A*, straps, a, and secured or held in position by the stakes, C D, all arranged in the manner substantially as and for the purpose set forth.

63,585.—BOAT AND DAVIT TACKLE.—Edgar Wakeman, Brooklyn, Cal.

First, I claim uniting the davit tackle to the boat by means of a hook link, B, in combination with correspondingly-shaped hook strap or bracket, C, when said link or hook strap are jammed and held together by means of a cam or lever, substantially as described.

Second, Uniting and detaching the boat to and from the davit tackle by means of a lever or cam, in combination with the hook link, B, and stop, C, substantially as described.

63,586.—PLOW.—William R. Walpole (assignor to himself, William G. Wood, and John G. Walker), Chicago, Ill.

I claim the combination of the plates, E and F, cam and handle, K H, the standard, D, shovel, S, and rod, c, arranged and operating substantially as and for the purposes specified.

63,587.—TRAVELING BAG.—Zachariah Walsh, Newark, N. J.

I claim the arrangement upon the frame, a, or the plate, B, one or both, of a bent edge adapted to clamp the material at the point of its departure from the frame, the recess adapted to receive the hem being outside of the line of rivets, as herein described and represented.

63,588.—SAD IRON.—J. T. Warren, Stafford, N. Y.

First, I claim the combination of the adjustable heating plug, C, with the hollow shell, A, whereby the smoothing surface of the shell may be heated to a greater or less degree by adjusting the plug at a greater or less distance from the bottom of the aforesaid shell, substantially as herein set forth.

Second, The thumbscrew, b, and supporting frame, D, combined in relation with each other and with the handle, B, heating plug, C, and shell, A, substantially as herein set forth for the purpose specified.

63,589.—COMPOSITION FOR DESTROYING INSECTS.—William Weaver, Phœnixville, Pa.

First, I claim a composition of salt and soda ash to be applied to fruit trees, as and for the purpose set forth.

Second, The above composition, in combination with slacked lime and sulphur, for the purpose specified.

63,590.—SAFETY ATTACHMENT FOR POCKET BOOKS.—Theodore A. Weber, New York City.

I claim the device for the purpose described consisting of a hook, b, spring, d, lever, c, and case, B, in combination with the pocket book, A, substantially as and for the purpose specified.

63,591.—OIL CAN.—J. A. Whitman, Auburn, Me.

I claim the collar, C, forming a cup upon the tube, B, at such a point near its upper end that the oil contained in said cup shall, when the oil can, A, is reversed, flow down the said tube and off its point without overflowing the said cup, as herein set forth.

63,592.—SASH FASTENING.—Jonathan R. Whittemore, Chicopee Falls, Mass.

I claim the cam, H H H, slide, C, and self-acting cam, E E and F, when used in combination substantially as described.

63,593.—SASH FASTENER.—John Wiard (assignor to A. E. Taylor), New Britain, Conn.

First, I claim the bolt, a, provided with pin, d, sliding in the elbow-shaped slot, g, of bolt, e, constructed and operating substantially as described for the purpose specified.

Second, The elbow-shaped slot, g, of bolt, e, through which slides the pin, d, of the bolt, a, and operating in the manner described for the purpose specified.

63,594.—FENCE.—Samuel S. Williams, Sheridan, N. Y.

I claim in combination with the iron staple-shaped post, as my improvement and invention, the ring or square-shaped fastening in the upper end of the post as described.

Second, And in combination with the past and ring in the same, I claim as my improvement and invention the cross bar and manner of fastening the same by means of hooks on the end of the cross bar, as described.

Third, And in combination with the post and ring, I claim the cast or wrought iron holder and brace and the mode of receiving and holding the boards and rails therein, as described.

Fourth, And in combination with the post and brace, I claim the mode and manner of anchoring or fastening the foot of the post in the stone base by turning the end thereof, as described.

63,595.—STEAM BLOWER.—S. R. Wilmot, Bridgeport, Conn.

I claim the steam jet herein described, made of sheet metal and with small slits entering its cavity from the exterior edge of the jet, substantially as specified.

63,596.—CHURN.—George W. Wilson, Freeport, Ill.

I claim the wheel, E, provided with the triangular boards, C C and D, whereby the chambers, F, are formed on each side of the wheel, substantially as and for the purpose specified.

63,597.—LAND ROLLER.—James Winans, Plymouth, Mich.

I claim the two frames, A A, connected together by means of the bars, C C', and bolts, d d, which said bolts act as pivots for the frames, allowing them independent motion, substantially as specified.

63,598.—TABLE CUTLERY.—Walter D. Woods (assignor to himself and Ebenezer F. Woods), Bennington, N. H.

I claim the combination of the blade, the wooden body, B, of the handle, and the metallic encompassing lining, C, cast on the tang, a, and the body, B, in manner and so as to form the bolster, substantially as described.

I also claim the extension of the bolster into and through the tang, when cast upon it and making part of metallic lining to encompass the tang and the wooden body of the handle, as explained.

63,599.—SASH SUPPORTER.—John E. Wootten, Cressona, Pa.

I claim the plate, D, attached to the sash, the pin, E, arm, F, and coiled spring, m, in combination with the plate, G, and its projection, h, on the sash frame, the whole being constructed, arranged and operating as and for the purpose herein set forth.

63,600.—LOCOMOTIVE ATTACHMENT.—John E. Wootten and Henry Hazel, Cressona, Pa.

First, We claim the ram, B, hinged to the bumper beam of a locomotive and arranged to operate substantially as and for the purpose herein set forth.

Second, The combination of the ram, B, connecting rods, c c', lever, f, and vertical shaft, D, the whole being arranged on a locomotive substantially in the manner and for the purpose described.

Third, The said connecting rod made in two parts and connected together by a yielding coupling, all as set forth.

Fourth, The combination of the ram, B, and brace, N, with the pin, b, by which the said ram is hinged to the locomotive.

63,601.—CARRIAGE STEP.—John H. Yager, Trenton, Ohio.

I claim the combination of the two step sections, A and D, the one fixed and the other movable, when arranged together, substantially as and for the purpose described.

63,602.—WATER ELEVATOR.—E. L. and W. R. Yorks, Honeoye, Falls, N. Y.

First, I claim the combination in water elevators of the double-acting levers, E K, geared together and connected by any suitable spring arrangement, as herein set forth.

Second, The combination of the tension spring, L, with the double-acting levers, E K, so arranged that the action of the spring is simply to expand and contract to operate the levers and to avoid friction, as specified.

Third, The screw blanks, M, in combination with the spiral tension spring, L, for compensating for the loss of elasticity, as set forth.

Fourth, The friction wheel, N, combined with the levers, K E, operating in the manner and for the purpose specified.

Fifth, The stops, K K, combined with the levers, E K, and the clutch, D, as set forth.

REISSUES.

2,535.—SHINGLE MACHINE.—Charles S. Burt, Dunleith, Ill., assignee by mesne assignments of H. H. Low. Patented March 16, 1858. Reissued March 6, 1866.

First, I claim a vertically movable counterbalanced bolt gate, in combination with a circular saw, D, when so arranged and operating that while the saw is stationary the bolt shall be fed up to it, in the manner and for the purpose above described.

Second, The combination of a vertically moving and counterbalanced bolt frame, G, and a head block, K, substantially as and for the purpose hereinbefore described.

Third, Providing a vertically moving bolt frame, G, head block, K, and contrivances for moving said block up to or away from the saw, when arranged and constructed substantially as described.

Fourth, So constructing a machine for sawing straight or tapering slabs from bolts with a circular saw that the table or frame on which the bolts are secured shall be returned, by a movement upward or downward as the case may be, to a position which will admit of the adjustment of the bolt after each cut, substantially as and for the purpose above set forth.

Fifth, The combination of the vertically movable counterbalanced gate and treadle with the head block, K, lever, I, pawls, M, and racks, J, arranged and operating substantially as described.

2,536.—LOCOMOTIVE STEAM ENGINE.—Alba F. Smith, Norwich, Conn. Patented April 5, 1864.

First, I claim in locomotives transmitting motion from the crank shaft, A, to the driving or bearing wheels, R, through the medium of the wheels, U T, of unequal sizes, supported independently of the bearing wheels and maintained in fixed positions relative to each other and to the main framing of the engine so as to be unaffected by the inequalities of the road, substantially as and for the purposes herein specified.

Second, I claim the frictional gearing of the wheels, U T, or equivalent wheel of unequal size intervening between the engine and the driving wheels of a locomotive so arranged as to be both out of contact with the rails, substantially as and for the purposes herein specified.

Third, I claim in connection with the above, mounting the bearings of the crank axle, A, in the same pedestals with the bearings of the driven axle, t, substantially as and for the purposes herein set forth.

Fourth, I claim the employment in locomotives of a slight clip or catch, Z, arranged relatively to separate hand levers, J J, or their equivalents, connected each to the same starting and controlling mechanism, substantially in the manner and for the purpose herein specified.

Fifth, I claim in locomotives so constructing and arranging the tanks, W W', that they are of little width but greatly extended in longitudinal and vertical dimensions and are rigidly framed together and to the framing, Q Q, or its equivalent, substantially as and for the purposes herein set forth.

Sixth, I claim in locomotives so constructing and arranging said tanks, W W', that they are of little width but greatly extended in longitudinal and vertical dimensions and are mounted outside of the working gear, substantially as and for the purposes herein set forth.

2,537.—EXPLOSIVE COMPOUND.—The United States Blasting Oil Company, New York City, assignees of A. Noble. Patented Aug. 14, 1866. (Div. A).

We claim nitrine or crystallizing nitro-glycerin produced by the admixture of glycerin, sulphuric acid and nitric acid free or nearly free from hyponitric acid.

2,538.—Process of Producing an Explosive Compound.—The United States Blasting Oil Company, New York City, assignees of A. Noble. Patented Aug. 14, 1866. (Div. B).

We claim as a new explosive compound the mode or process substantially as herein described, of mixing together glycerin, sulphuric acid and nitric acid free or nearly free from hyponitric acid, and for the purpose specified.

2,539.—Refining Hydro-carbon Oils and Utilizing Waste Products Therefrom.—Henry Pemberton, Allegheny City, Pa. Patented Aug. 2, 1859. Reissued Jan. 1, 1867.

I claim, First, Recovering the sulphuric acid from the residuum of the process of refining coal oil, petroleum and other hydrocarbonats by treating the residuum with water which unites with the acid and replaces and liberates the tarry matter and then separating the tarry matter from the sulphuric acid and water by subsidence.

Second, Agitating water and the residuum of the process of refining coal oil, petroleum and other hydro-carburets together for the purpose of expediting the union of the acid and water and the liberation of the tarry matter.

Third, Purifying the dilute sulphuric acid recovered from the residuum which results from the refining of coal oils, petroleum and other hydro-carburets, by repeated processes of concentration, and dilution with water, whereby the coloring matter is separated, and may be removed substantially as hereinbefore described.

Fourth, The use of sulphuric acid recovered from the residuum resulting from the refining of coal oil, petroleum and other hydro-carburets, for the decomposition of salt in the production of sulphate of soda as a step in the manufacture of soda ash.

2,540.—Bee Hive.—A. T. Wright, New Vienna, Ohio. Patented June 16, 1863.

I claim the combination of a series of vertical frames f f, with the boards which separate or divide them when the same are clamped together in such a manner as to form a hive with close sides, top and bottoms, substantially as herein specified.

2,541.—Driving Rein Holder.—B. B. Hotchkiss, New York City, assignee of Milton Whipple. Patented Sept. 4, 1866.

I claim the spring device herein described adapted to operate in holding and releasing the driving reins, substantially in the manner and for the purposes herein specified.

2,542.—Punching Apparatus.—Norman C. Stiles, West Meriden, Conn. Patented Jan. 26, 1864. Reissued Dec. 26, 1865.

First, I claim the eccentric wrist pin, a, and turning part, b, or its equivalent, constructed and combined as described, to operate the punch at different levels, substantially as and for the purpose herein set forth.

Second, I claim the V-shaped faces, g, in the slide, E, in combination with the jaws, G, cast solid, with the stock, A, and with the triangular gib, b, all constructed and arranged as and for the purpose specified.

Third, I claim the touch off device, k H, arranged in combination with the clutch pin, m, substantially as shown and described, so that said clutch pin is thrown in either direction by the direct action of the cam.

Fourth, I claim the loose catch pin, m, applied in combination with the band wheel, C, and shaft, B, and with the adjustable operating means adapted to move it in and out by a positive motion, in the manner and for the purpose substantially as specified.

Fifth, I claim the button, l, in the shaft, B in combination with the spring catch, k', clutch pin, m and n, and cam, H, arranged substantially as described, so that the cam is released automatically after the punch or cutter has completed its stroke.

Sixth, I claim the yielding coupling pin, n, in combination with the clutch pin m, and touch off device, k, H, constructed and operating in the manner and for the purpose substantially as specified.

Seventh, I claim the yielding fulcrum pin, j, arranged in combination with the cam, H, clutch pin, m, and band wheel, C, substantially as and for the purposes set forth.

DESIGNS.

2,608.—Center Piece.—Henry Berger, New York City.

2,609.—End Frame of a Car Seat.—George Buntin, East Boston, Mass.

2,610.—Inkstand.—Horace Harris, Newark, N. J.

Note.—Fifty-one patents in the above list were obtained through the New York department of the Scientific American Patent Agency, exclusive of quite a number through our Washington agency.—Eds.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

109.—Meter for Gas and Liquids, also Applicable as a Motive Power—Homer H. Stuart, Jamaica, N. Y. Jan. 16, 1867.

290.—Carding Engine.—Seldon L. Crockett and Benjamin T. Mills, Lowell, Mass. Feb. 12, 1867.

296.—Sewing Machine.—Elias Howe, Jr., New York City. Feb. 12, 1867.

476.—Wheel for Carriages and other Vehicles.—John Raddin, Lynn, Mass. Feb. 21, 1867.

504.—Breech-loading Fire-arm.—Isaac M. Milbank, Greenfield Hill, Conn. Feb. 23, 1867.

570.—Cutting Veneers.—John B. Wilson, New York City. Feb. 28, 1867.

574.—Apparatus for Sewing and Ornamenting Textile Fabrics and other like Goods, and in the Appliances Connected Therewith.—George J. Richardson, Philadelphia, Pa. March 1, 1867.

613.—Manufacture of Packing for the Joints of Steam Engines, Pumps, etc.—Morris Bottcher, Newark, N. J. March 5, 1867.

614.—Feed-water Regulator for Steam Boilers.—John W. Doughty and Benjamin F. Olmsted, Newburgh, N. Y. March 5, 1867.

649.—Scissors or Shears.—Perez C. Clapp, Boston, Mass. March 7, 1867.

651.—Process whereby Leather, or Animal Tissue of any Nature, is made Hard, Semi-elastic, and Transparent.—William Henry Towers, New York City. March 7, 1867.

Foreign Patents.

American inventors should bear in mind that, as a general rule, an invention which is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. In England the law does not protect the right of a foreign inventor as against the first introducer of an invention from abroad. For twenty years past the great majority of patents taken out by Americans in foreign countries have been obtained through Munn & Co's agency. Patents are secured with the utmost dispatch in Great Britain, France, Prussia, Belgium, Russia, Austria, Italy, The Netherlands, Spain, Sweden, Australia, and other foreign countries. Models are not required, but the utmost care and experience are necessary in the preparation of applications. Patentees who intend to take out Foreign Patents should send to us for a Pamphlet of full advice. Address

Munn & Co., No. 37 Park Row, N. Y.

In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions,—smaller, if possible. Send the model by express, pre-paid, addressed to Munn & Co., 37 Park Row, N. Y., together with a description of its operation and merits; also, remit the first Government and stamp fees, $16. On receipt thereof we will prepare the patent papers and send them to the inventor for examination, signature, and oath. Our charge for preparing the drawings and all the documents, with attendance to the business before the Patent Office, is $25, for the simplest cases, up to $35, and more, according to the labor involved. Our charges are always very moderate. When the patent is allowed, $30 more is paid the Government, making a total of $61 for the simplest case.

The model should be neatly made of any suitable materials, strongly fastened, without glue, varnished or painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable.

When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions, mode of preparation, uses, and merits.

The average time required to procure a patent is six weeks. We frequently get them through in less time; but in other cases, owing to delay on the part of the officials, the period is sometimes extended to two or three months, and even more. We make a special point to forward our cases as RAPIDLY AS POSSIBLE.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

The general rule is, that whatever is really embraced in the original invention, and so described or shown that it might have been embraced in the original patent, may be the subject of a reissue.

Reissued patents expire at the same time that the original patent would have done. For this reason, applications for reissue will be acted upon immediately after they are completed.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts.

One or more divisions of a reissue may be granted, though other divisions shall have been postponed or rejected.

In all cases of applications for reissues, the original claim is subject to re-examination, and may be revised and restricted in the same manner as in original applications.

But in all such cases, after the action of the Patent Office has been made known to the applicant, if he prefers the patent originally granted to that which will be allowed by the decision of the Office, he has the privilege of abandoning the latter and retaining the old patent.

The documents required for a Reissue are a Statement, Petition, Oath, Specification, Drawings. The official fee is $30. Our charge, in simple cases, is $30 for preparing and attending to the case. Total ordinary expense, $60. Reissues may be applied for by the owners of the patent.

By means of Reissue, a patent may sometimes be divided into several separate patents. Many of the most valuable patents have been several times reissued and subdivided. Where a patent is infringed and the claims are doubtful or defective, it is common to apply for a Reissue with new claims which shall specially meet the infringers.

On making application for Reissue, the old or original patent must be surrendered to the Patent Office, in order that a new patent may be issued in its place. If the original patent has been lost, a certified copy of the patent must be furnished, with affidavit as to the loss. To enable us to prepare a Reissue, the applicant should send to us the original patent, remit as stated, and give a clear statement of the points which he wishes to have corrected. We can then immediately proceed with the case. Address MUNN & CO., 37 Park Row, New York. We have had great experience in obtaining Reissues.

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the subject admits. A Caveat consists of the Petition, Oath, Specification, and Drawings. The Government fee for filing a Caveat is $10, and our ordinary charge to prepare the documents and attend to the whole business from $10 to $15. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words, and fees, $25 in full. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

Advertisements.

The value of the Scientific American *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

RATES OF ADVERTISING.

Back Page.....75 *cents a line.*
Back Page, for engravings.....$1.00 *a line.*
Inside Page.....40 *cents a line.*
Inside Page, for engravings.....60 *cents a line.*

BUERK'S WATCHMAN'S TIME DETECTOR.—Important for all large Corporations and Manufacturing concerns—capable of controlling with the utmost accuracy the motion of a watchman or patrolman, as the same reaches different stations of his beat. Send for a Circular. J. E. BUERK, P. O. Box 1,057, Boston, Mass.

N. B.—This detector is covered by two U. S. patents. Parties using or selling these instruments without authority from me will be dealt with according to law. 16 19*

STEEL LETTER CUTTING, BY [16 9*] H. W. GORDON, Lynn, Mass.

THE Inventor of an Improved Sewing Machine wants a capitalist to organize a stock company, or join him in manufacturing. Address X. X., Station D.

PLATINUM—For all Laboratory and Manufacturing purposes. Platinum scrap and ore purchased. H. M. RAYNOR, Office 748 Broadway, N. Y. 16 3*

A Valuable Invention—Double Action Wagon Brake. Patented Nov. 20, 1866. For State and County rights address [16 8*] I. M. GROSS, Easton, Pa.

ONLY $3 FOR A SET OF 30 STUBBS Twist Drills, from 1-16 to 12-64. Address American Twist Drill Company, Lowell, Mass. 1*

$17 FOR COUNTY RIGHTS on THREE Patents (or $7 single), including model and 50 books. Send stamp for circular. M. L. BYRN, Box 4,669 Post-office, New York City (office 82 Cedar street.) 1*

PATTERN MAKER WANTED—At the Mansfield Machine Works, Mansfield, Ohio. One who thoroughly understands his business can have a first-class position. 16 3

FOR SALE—A Manufacturing Business, already introduced, with tools patterns, and the entire Patent Right. Apply on the premises, No. 9 Jane street, New York. 1*

FOR SALE—THE PATENT RIGHT for the best Cotton Bale Tie and Mender in the United States. Address WILLIAM D. FIELD, [16 4*] 418 Benefit street, Providence, R. I.

FOR FIRST-CLASS SHAFTING WITH Patent Self-oiling Boxes and adjustable Hangers, also Mill Work and special machinery, address [16 tf] BULLARD & PARSONS, Hartford, Conn.

VAN AUDEN RAIL-CHAIR CO., POUGHKEEPSIE, N. Y. Manufacturers of Superior Swaged Chains. Manufacturers of Iron, 8 inches by ½ and ¾, will please address as above, giving best terms for larger orders. 16 2*

FOR SALE—STATE, COUNTY, TOWN, and Shop Rights for Sayer's Patent Hand Stave Jointer. It is illustrated in No. 13, current volume, of this paper. Address J. F. SAYER, [16 2] Pope's Mills, St. Lawrence Co., N. Y.

IMPROVED PATENTED ENDLESS OR Band Saw Machine; can be worked Faster than any other in use; they work smoother by an adjustable gate, and Saw Breaking!! entirely prevented. Molding Machines, Shafting, and Pulleys constantly on hand. Manufactured by FIRST & PRYIBIL, [16 4*] 175 and 177 Hester street, N. Y.

FOREIGN SALE OF INVENTIONS—The advertiser wishes to be commissioned for the sale of any useful invention "abroad" (in England, France, etc.) Can give best of references and will take letters of introduction to the first manufacturing firms on the other side. Persons wishing to sell any good invention to advantage, address X. L., "Press" office, Phila. 1

FOR SALE—A New and Splendid Double Cylinder, Flexible Beam, Seventy-five Horse-power Engine and Boiler, just completed by the Hoiske Machine Co., 528 Water street, lately noticed in the Scientific American. This Engine is of superior workmanship, made from improved patterns remarkably compact, and thoroughly good in every respect. The Engine stands in a space 7x8 feet, 5 feet high, and is adapted to either marine or stationary purposes. Fly wheel, governor, and Cameron's steam pump attached, all complete. The boiler is an upright, 241 tubes, 2½-inch. The Engine and Boiler may be seen in operation daily, as above, and will be sold at a bargain if applied for without delay. 16 3

EXPERIENCED FOREMAN WANTED—For machine works building saw-mill machinery. A man of character, thoroughly acquainted with the business, may find a permanent situation, with liberal weekly pay. Address E. H. STEARNS, Erie, Pa. 16 tf

TO MANUFACTURERS OF MOLDED PAPER ARTICLES. A patented hollow paper article of great value. Something entirely novel and of general utility. The inventor wishes to negotiate with parties for its manufacture. Address J. W. B. COVINGTON, 16 2] P. O. Box 778, New York City.

LARGE PROFITS

CAN be Made in the Stencil Business.—Tools and Stock of the Best Quality furnished by M. J. METCALF & SON, 16 1—P.] 101 Union street, Boston, Mass.

FUEL ECONOMIZED AND POWER increased by the use of Carvalho's Steam Super-Heater. It is simple, durable, and effective, and is guaranteed to prevent "priming" in boilers; save a very large percentage of fuel, and furnish pure steam of any required temperature. Pure, dry steam is 25 per cent more efficient than the ordinary article. Address for circular, references, etc., HENRY W. BULKLEY, 16 5] 70 Broadway, N. Y.

LOUIS KRATZER'S COMBINATION WATER POWER. Patented June, 1866. This patent consists of a combination of water wheels by which overshot, breast-shot, and undershot are represented and used. These wheels are connected by proper gearing to one main receiving shaft. A small pinion wheel attached to the said main shaft and running between two large and free working cogged wheels and being turned from two sides, will exclude all danger of breaking. Our combination insures a free movement both to wheel and water, and as the water is used three times, a considerable increase of power. The advantages of this invention are very plain. The whole machinery, especially the water wheels, will be made of cast iron being the most durable and cheapest, and can be put up in less than half the time that wooden ones require. This patent right will be sold by Counties, States, or the whole right of the United States. For further particulars apply to or address HENS & ZIMMER, Sole Agents, 137 Delancy street, New York, or the Inventor, LOUIS KRATZER, 10 E. Monument street, Baltimore, Md. P. S.—Call or send for a circular. 1*

LABORATORY OF INDUSTRIAL CHEMISTRY, Directed by Prof. H. DUSSAUCE, Chemist. Prof. H. DUSSAUCE, having been for twelve years in the laboratories of the French Government, and just returned from Europe, has acquired a great deal of knowledge of Chemistry applied to Arts and Manufactures, Metallurgy, etc., which renders him able to assist any one needing information or advice in that part of the Science applied to Industry.

Persons not acquainted with Chemistry can be instructed in the way to make their own analyses of commercial substances, and to recognize their degree of purity. He will indicate them the apparatus to use in such analyses, and where to purchase the same. In a word, he will make Chemistry accessible to every one.

During his last tour in Europe he became possessor of Plans of Factories, Drawings of Apparatus, and Recipes for every kind of Manufacture. He will send them to any one wishing to establish chemical fabrications. He can also give advice and information when wanted by manufacturers.

FABRICATION OF VINEGAR.—Prof. H. Dussauce is ready to furnish the most recent methods of manufacturing vinegar by the slow and quick processes, with and without alcohol, directly from corn. Also, process to manufacture vinegar and acetic acid by the distillation of wood. Methods of assaying vinegar.

PETROLEUM, Plans of oil factories, drawings of apparatus, with complete processes to manufacture, refine, deodorize, and discolorize petroleum. Also, processes to prepare lubricating oils and greases. By particular processes, benzine, aniline and colors of coal tar have been obtained from petroleum, and he can indicate their preparation.

SOAPS.—Plans of Factories, drawings of apparatus, recipes to prepare every kind of lyes, and the following soaps:—Hard, Soft, Castile, Fancy, Rosin, Family, Wax, Palm and Cocoa, Toilet, Powder, Transparent, Silicated. Assays of alkalies, lyes, limes, acids, greases, oils, soaps.

MATCHES.—Drawings of apparatus; process to manufacture phosphorus; preparation of the bi-oxide of lead; processes to make common matches; matches taking fire without noise; matches without sulphur; candle matches; matches with amorphous phosphorus; matches and rubber without phosphorus.

☞ The following are the other manufactures on which he can be consulted:—Gilding, silver plating, gas, colors of lead and zinc, ceramicus arts, distillation, wines, beers, liquors, sugar, candles, varnishes, inks, calico printing, dyeing, bleaching, tanning, etc., chemical products in general.

For consultations, advices, information, drawings, plans analyses, commercial assays, experiments, etc., address Prof. H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1*

WOODWORTH PLANERS A SPECIALTY.—New patterns, with the very best improvements. The largest mills are adopting them. Government prefers them to all others. Send for cuts. E. C. TAINTER, Worcester, Mass.

I bought the letters and orders of our late firm, J. A. FAY & CO, Worcester, Mass., and am prepared with better facilities than ever to fill your orders promptly. Central, corner of Union street, Worcester, Mass. 15 3*

AMERICAN Army.—For a Statement of its present and prospective condition, see Phrenological Journal for April. 20 cents, $2 a year. Newsmen should have it.

SPRINGS.—BARNES' Patent level tempered Clock Springs, also coiled and small springs of every description, made from the best sheet cast steel by 15 5* WALLACE BARNES, Bristol, Conn.

REV. Dr. CHAPIN.—See April No. Phrenological Journal for Portrait, Character, and Biography. By first post, 20 cents, or $2 a year. Newsmen have it.

BAIRD'S PRACTICAL AND SCIENTIFIC BOOKS.

LIST NO. 7.

MOLESWORTH—Pocket-book of Useful Formulæ and Memoranda for Civil and Mechanical Engineers. By Guilford L. Molesworth, Member of the Institution of Civil Engineers, Chief Resident Engineer of the Ceylon Railway. First American, from the Tenth London edition.....$2.

CONTENTS:

Civil Engineering—surveying, leveling, setting out, etc.; earthwork, brickwork, masonry, arches, etc.; beams, girders, bridges, etc.; roofs, floors, columns, walls, etc.; railways, roads, canals, rivers, docks, etc.; water-works, sewers, gas works, drainage, etc.; warming, ventilation, light, sound, heat, etc.

Mechanical Engineering—gravity, mechanical centers and powers; mill-work, teeth of wheels, shafting, belting, etc.; alloys, solders, and workshop recipes; steam boilers and steam engines; water wheels, turbines, etc., and windmills; paddle and screw steamers; miscellaneous machinery.

Weights and Measures, English and Foreign—logarithms of numbers; triangles, trigonometry, and tables of sines, etc.; properties of ellipse, parabola, circle, etc.; mensuration of surfaces and solids; tables of areas, and circumferences of circles; weights and properties of materials; squares, cubes, powers, roots, and reciprocals of numbers; engineering memoranda and tables; supplement by J. T. Hurst, C. E., containing additional engineering memoranda and tables; tables by Lewis Olrick, C. E.

MILES—A Plain Treatise on Horse-shoeing, with illustrations. By William Miles, author of the "Horse's Foot."....$?.

MORTIMER.—The Pyrotechnist's Companion. By G. W. Mortimer. Illustrated. 12mo., cloth, $1 25

NAPIER.—Manual of Electro-Metallurgy: Including the Application of the Art to Manufacturing Processes. By James Napier. From the Second London Edition, Revised and Enlarged. Illustrated by Engravings. In one volume, 12mo., price.....$1 50

NAPIER.—Chemistry Applied to Dyeing. By James Napier, F. C. S. Illustrated. 12mo.....$3 00

NICHOLSON.—Bookbinding. A Manual of the Art of Bookbinding: Containing full instructions in the different branches of Forwarding, Gilding, and Finishing. Also, the Art of Marbling Book-edges and Paper. By James B. Nicholson. Illustrated. 12mo., cloth.....$2 25

CONTENTS:—Sketch of the progress of bookbinding; sheet work, forwarding the edges, marbling, gilding the edges, covering, half binding, blank binding, boarding, cloth work, ornamental art, finishing, taste and design, styles, gilding, illuminated binding, blind tooling, antique, coloring, marbling, uniform colors, gold marbling, landscapes, etc.; inlaid ornaments, harmony of colors, pasting down, etc.; stamp or press work, restoring the bindings of old books, supplying imperfections in old books, hints to book collectors, technical lessons.

NORRIS.—A Handbook for Locomotive Engineers and Machinists. By Septimus Norris, C. E. New edition. Illustrated. 12mo., cloth.....$2 00

NYSTROM.—On Technological Education and the Construction of Ships and Screw Propellers for Naval and Marine Engineers. By John W. Nystrom, late Acting Chief Engineer, U. S. N. Second Edition, revised with additional matter. Illustrated by 7 engravings. 12mo.....$2 50

☞ The above, or any other of my Practical and Scientific Books sent by mail free of postage, at the publication price.

☞ My new and Revised Catalogue of Practical and Scientific Books sent free of postage to any address.

HENRY CAREY BAIRD, Industrial Publisher, 1t. 406 Walnut st., Philadelphia.

PARTNER WANTED—FOR THE GEORGIA COTTON PLANTER. To take charge of the manufacture of the above labor-saving machine which is in great demand, for the whole Southern Coast; the other portions of the Cotton States are being supplied. Capital required about $5,000; or, in lieu of capital, an Agricultural Manufacturing firm preferred. One half of the Patent Right for sale for $10,000. Apply to [15 2] A. PACKHAM, Carroll county, Ky.

PICTORIAL DOUBLE NO.—Prof. Agassiz, the Reverend Drs. Chapin, Sawyer, Osgood, Bellows, Frothingham, Hedge, Collyer, Ryder, Clarke, Emerson, Bartholomew, Ballou, and Hepworth. Also, ex-Gov. Blair and Philo Parsons, of Michigan. Woman's Rights; Shaker Communities and Religion; Aboriginal Legends of North America; Our National Army to-day; Can We Think of Two Things at Once? Pope's Essay on Man; in April number of PHRENOLOGICAL JOURNAL, now ready. Only 20 cents, or $2 a year. Newsmen have it. Address FOWLER & WELLS, 15 2] No. 389 Broadway, New York.

LAKE SUPERIOR MINER—Established in 1855. The oldest and most reliable Copper Mining Paper on the Lake. Terms $2.50 per annum. Published at Ontonagon, Mich. 15 3

NINE FOOT BORING MILL.—WE have in the hands of the workmen two of these most substantial tools which will weigh from 18,000 to 19,000 lbs., one of which is sold to the Messrs. Roots, of Connersville, Ind., to whom we refer any person who may wish to purchase that kind of tool, or any other for the machinist's use. For further particulars address STEPTOE, McFARLAN & CO., Cincinnati, Ohio, manufacturers of machinists tools and wood-working machinery. 15 4*

WATER POWER AND MANUFACTURING SITES. The Holly Manufacturing Company of Lockport, N. Y., will rent water power, and lease or sell two sites adjacent to their own works, for manufacturing purposes. The water power offered is abundant, having 60 foot fall, and is not subject to variations by freshet or drought, being supplied from Lake Erie and the great chain of lakes connected therewith, thus providing a never-failing supply of water. The building sites offered are in the heart of the city of Lockport, having the Erie Canal on one side and the New York Central Railroad on the other, and are large enough for an extensive manufacturing business. Full information as to this rare opportunity for parties who desire to engage in manufacturing will be given on application by letter or in person, the latter recommended. Lockport, April 3, 1867.

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports, etc., on the useful arts. 1 tf

AMES' Celebrated Portable and Stationary STEAM ENGINES, All Sizes, and Superior to all others. Also, PAYES' PATENT TRIP HAMMER. Write for Circular. [15 12*] H. M. AMES, Oswego, N. Y.

WATER WHEELS.— The Helical Jonval Turbine is manufactured by [5 tf] J. E. STEVENSON, 40 Dey street, New York.

TO RAILROAD MEN, CAPITALISTS AND OTHERS.

For Sale, several valuable Patents in the United States of America, viz:

First, For the manufacture of Railroad Frogs and Filled wing Rails.

Second, For bracing the ends of Railroad Rails with steel and for other purposes.

Third, Reversible Forge Rolling Machine for re-rolling and repairing Rails, and forging all kinds of Malleable metals.

Fourth, A new Railroad track, with nut lock latch, etc.

The value of thes Patents has been fully tested by "The Steel, Iron & Railway Works Co.," Toronto, wh have purchased the Patent rights for the Province of Canada, at whose works on Strachan Avenue, Toronto, the machinery connected with the working of the Patents can be seen in operation.

Address, JOHN L. BLAIKIE, Esq., Toronto, Canada.

Refference is permitted to

George L. Reid, Esq., Engineer Great Western Railroad of Canada, Hamilton, Canada.

E. P. Hannaford, Esq., Engineer Grand Trunk Railroad, Montreal, C. E.

C. J. Brydges, Esq., General Manager, Grand Trunk Railroa', Montreal, C. E.

Frederick Cumberland, Esq., Manager Northern Railroad of Canada, Toronto, C. W.

Toronto, C. W. March 19, 1867. 14 13

CAN We Think of Two Things at Once? See answer in April No. Phrenological Journal. Only 20 cents, or $2 a year. Newsmen will get it.

$20 PER DAY.— Agents wanted in every State to introduce Purington's Alarm Money Drawer. For terms address [5 13] A. S. TURNER, Willimantic, Ct.

TO MANUFACTURERS OF COTTON SPINNING MACHINERY, and others.—For Sale, the American Patent Right for HAMER'S Patent SPRING and PLATE, To be used in Carding, Drawing, and other Cans. It prevents the Sliver becoming uneven, stretched, torn, or broken. It causes the Sliver to be gradually raised up from the bottom of the can to near the top of the delivery. Offers for State Rights, or Sole Right for the United States to be mad to WILLIAM HAMER, [5 5*] Little Lever, near Bolton, Lancashire, England.

LE COUNT'S IMPROVED HOLLOW LATHE DOG is light, equal in strength to Steel, at one sixth the cost. Set of 12 Dogs, from ⅜ to 4 inches, $17.80. Also, Hollow Machinists' Clamps. Can be had of all dealers. Send for circular. [5 8*] C. W. LE COUNT, South Norwalk, Conn.

SOLID Emery Wheels—Silicate or Vulcanite. N. Y. Emery Wheel Co., 94 Beekman st., N. Y. 15 10*

AMERICAN STEAM BOILER.—Patent Steam Fire Boxes. Water Circulator and Sediment Collector. Patent Pneumatic Ventilator. Combustion, Heat, Ventilation, and Drying. JOS. A. MILLER, C. E. J. E. STEVENSON, Gen'l Agt., 40 Dey st., N. Y. 15 5*

TO ENGINE BUILDERS.— Ross' Celebrated Patent Oil Cups for Cylinders or Engines, Brass and Iron body, Globe & Check Valves, Gage Cocks, Whistles, etc., on hand and made to order. Price list sent on application. B. E. LEHMAN, [5 tf] Lehigh Valley Brass Works, Bethlehem, Pa.

THE IMPROVED NUTMEG GRATER— Patented January, 1867. Every person in the country wants one. For State and County Rights address the Patentee. L. V. BADGER, [5 3] Drawer 6140, Post-office, Chicago, Ill.

ENGINES and BOILERS, of all SIZES, on hand. 3,000 feet shafting, new, 10¼ cts. per lb. Hangers, Pulleys, Belting, Crushers, Fittings, and Machinery of all descriptions bought and sold at DAVIS' MACHINERY YARD. [5 3*] 120 to 124 Hudson st., Jersey City, near the ferry.

THE "McGOWAN" AND "BUCKEYE" Patterns Double-acting Hand and Power Pumps. Patented 1863. For railroads, factories, mills, etc. Manufactured by McGOWAN BROTHERS, 94 and 96 Elm St., Cincinnati, Ohio. Send for circular. 15 13

MACHINE BELTING.—Superior Oak-tanned Leather Belting, all sizes, on hand and for sale cheap. ALBERT POTTS, [5 5*] N. E. cor. Third and Willow sts., Philadelphia.

PORTRAIT, Character, and Biography of Prof. Agassiz in April No. Phrenological Journal. 20 cents, or $2 a year. Newsmen have it.

BEET SUGAR MAKING.—AN EXPERIENCE of twenty-five years as makers of the most improved cane sugar machinery and refining machinery, as well as the possession of complete drawings of the MOST SUCCESSFUL EUROPEAN BEET-SUGAR FACTORIES, with details of the machinery and processes employed, enable the undersigned to give correct estimates and to execute orders for such work with fidelity and promptness MERRICK & SONS, [3 10s 3is] Southwark Foundery, Philadelphia.

THE BISHOP GUTTA PERCHA COMPANY—The original and only manufacturers in the United States of pure Gutta Percha Goods, Gutta Percha Insulated Submarine Telegraph Cables, Insulated Telegraph Wire, Water, Beer and Soda Pipe, Chemical Vessels, Tissue Sheet for hatters, Artificial Flower Makers, etc. Factory, Nos. 208, 210 and 212 East 25th street. Office and salesroom, No. 113 Liberty street (west of Broadway), New York. SAMUEL C. BISHOP, [3 4*] General Agent.

GRIST MILL AND FACTORY SITE near New York, for sale cheap. Address [5 3] H. D. BEACH, Tom's River, N. J.

JOSEPH C. CLAYTON, COUNSELLOR-AT-LAW, ADVOCATE IN PATENT CAUSES, Intelligencer Building, Washington City, D. C. 13 10*

MILL-STONE DRESSING DIAMONDS Set in Patent Protector and Guide. Sold by JOHN DICKINSON, Patentee and Sole Manufacturer, and Importer of Diamonds for all mechanical purposes; also, Manufacturer of GLAZIERS' DIAMONDS, No. 64 Nassau street, New York City. Old diamonds reset. N. B.—Send postage stamp for descriptive circular of the Dresser. 9 12*

PATENT SHINGLE, STAVE, AND Barrel Machinery, Comprising Shingle Mills, Heading Mills, Stave Cutters, Stave Jointers, Shingle and Heading Jointers, Heading Rounders and Planers, Equalizing and Cut-off Saws. Send for Illustrated List. FULLER & FORD, [9 8* tf—C.] 282 and 284 Madison street, Chicago, Ill

A MESSIEURS LES INVENTEURS— Avis important. Les inventeurs non familiers avec la langue Anglaise, et qui préfereraient nous communiquer leurs inventions en Français peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications serons reçus en confidence. MUNN & CO., Scientific American Office, No. 37 Park Row, New York.

500 AGENTS Wanted in a new business. [11 13* N.] H. B. SHAW, Alfred, Me.

$25 A DAY! Fifteen new articles for Agents. [11 13*N.] O. T. GAREY, Biddeford, Me.

ROLLING MILL ENGINES—WITH Sault's patent Frictionless Slide Valve, link motion reverse gear, shafting, hangers, mill gear, etc. Address [11 23* tf] M. & T. SAULT, New Haven, Conn.

PATENTEES TAKE NOTICE. Having made large additions to our works, we can add one or two machines to our list of manufactures. The machines must be strictly first class, and well protected. BLYMYER, DAY & CO., Manufacturers of Agricultural Machines and Tools Mansfield, Ohio. 9 tf

THE CELEBRATED "SCHENCK" WOODWORTH PLANERS, WITH NEW AND IMPORTANT IMPROVEMENTS, Manufactured by the SCHENCK MACHINE CO., MATTEAWAN, N. Y. JOHN B. SCHENCK, President. T. J. B. SCHENCK, Treas. 11 tf

1866.—TOPLIFF'S PATENT PERPETUAL LAMP WICK, received First Premium at N. Y. State Fair, and special premium, Book of Transactions. Needs no trimming. Rare inducements to Agents. Sample sent for 20 cents; two for 30 cents. MURPHY & COLE, 81 Newark ave., Jersey City. 3 tf 6

HARRISON STEAM BOILER.

NO MORE DESTRUCTION OF LIFE AND PROPERTY BY STEAM BOILER EXPLOSIONS.

GREAT REDUCTION IN PRICE.

From the rapid manner in which the HARRISON STEAM BOILER is coming into use, but little need be said of its conceded merits.

They may be summed up briefly as follows:—

Absolute safety from explosion, as it cannot be burst under any practicable steam pressure.

Less first cost.

Economy in fuel equal to the best in use.

Facility of transportation.

It occupies but about one third the ground area of ordinary boilers, with no increase in hight.

In consequence of recent improvements in its manufacture, this Boiler can be furnished to the public AT LESS COST than heretofore, and is now much the cheapest article in the market.

For Price and Circular apply to JOSEPH HARRISON, JR., Harrison Boiler Works, [5 12*] Gray's Ferry Road, Philadelphia. Branch Office, 119 Broadway, New York, Rooms 9 and 10 I. B. HYDE Agent

R. BALL & CO., SCHOOL STREET, WORCESTER, MASS., Manufacturers of Woodworth's, Daniell's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood. Send for our Illustrated Catalogue. 1 25*

WOOD, LIGHT & CO.—MANUFACturers of Machinists' Tools and Naysmyth Hammers, Lathes from 4 to 30 feet long, and from 15 to 100 inches swing. Planers from 24 to 60 inches wide and from 4 to 46 feet long. Upright Drills. Milling and Index Milling Machines. Profile or Edging Machines. Gun Barrel Machines Shafting, Mill Gearing, Pulleys and Hangers, with Patent Self-oiling Boxes. Works, Junction Shop, Worcester, Mass. Warehouse at 107 Liberty street, New York. 10 tf

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOADLEY & Co., Lawrence, Mass. 1 tf

SPOKE AND HANDLE MACHINE,— For turning Spokes, Yankee Ax, Plow, Pick, Adze, and Hammer Handles, Whiffletrees, and irregular forms generally. Capacity 180 Spokes and 200 Hammer Handles per hour. For cut and description, address the Subscriber, Manufacturer and Patentee, at Warren, Trumbull county, Ohio. [7 10*] E. R. WISELL.

RICHARDSON, MERIAM & CO., Manufacturer and Dealers in DANIELS'S AND WOODWORTH PLANERS, Boring, Matching, Molding, Mortising and Tenoning Machines, Scroll, Cut-off, and Slitting Saws, Saw Mills, Saw Arbors, Spoke and Wood-turning Lathes, and other woodworking Machinery. Warehouse, 107 Liberty street, New York. Manufactory, Worcester, Mass. 10 tf

THE EUROPEAN INVENTOR'S AGENCY CO., 96, Newgate street, London, E. C. MR. T. BROWN, C. E., Manager.

This Company undertake the purchase, sale, or licensing of Patents in any part of the World, on Commission only. No business as Agents for procuring Letters Patent undertaken.

Information for Inventors or Owners of Patents, or for those desirous of purchasing Patents, will be freely given.

The Offices of the Company are at the disposal of Inventors and those interested in Inventions; also, for the convenience of those having no London address their letters can be addressed to the offices.

Further particulars on application. 1 18*

TURBINE WATER WHEEL, VALENTINE & CO., Ft. Edward, N. Y. This is thoroughly proved a first-class wheel. New Improvements, prices moderate. Agents wanted in every Co. Circulars gratis. 13 4*

PRESSURE BLOWERS—Equal in Force to Piston Blowers, and a perfect substitute for both Fan and Pistons—running more easily than either. Adapted for Blast, and Cupola, and Heating Purposes, Forges, Steamships, Boilers, Ventilation, etc., etc. Prices according to sizes, ranging from $25 to $1,500. Address, for Circular B. F. STURTEVANT, [3 tf] 72 Sudbury street, Boston, Mass.

BLYMYER, DAY & CO., Mansfield, Ohio, Manufacture **Blacksmith's Drills and Screw Cutters,** for hand use. **Drag and Circular Sawing Machines,** 1, 2, and 4 horse. **Cutting Boxes.** The Eureka. **Corn Shellers.** Star Pattern. **Cider Mills.** The Eureka. **Sulkey Revolving Rake.** New thing and best extant. **Garden Cultivator.** Crawford's Patent. **Cane Mills.** Victor Pattern. **Evaporators.** Cook's—for Sorgo or Maple. **Amalgam Bells.** For Church, School, and Farm. **Refrigerators.** New Principle. Pure **Sorgo** and **Imphee Seed.** Selected varieties. Send for Circular. 12 eow3*]

PAPER-MILL MACHINERY. Megaw's Improved Rotary Pump for paper mills, steam engines and boilers, manufactured by [9 eow 4*] MEGAW & BILLANY, Wilmington, Del.

TO MANUFACTURERS OF TEXTILE FABRICS.—Dutcher's Patent Temples, adapted to weaving all kinds of goods; also, Thompson's Patent Oil Cans for oiling Machinery—neat and economical; also, Patent Shuttle Guides which will protect the weaver and save the owner the cost of the guides every year. Furnished by E. D. & G. DRAPER, [6 11* eow] Hopedale, Mass.

WOOD-WORKING MACHINERY, The SUBSCRIBER is Agent in New York for J. A. Fay & Co., C. B. Rogers & Co., Ball & Williams, Richardson, Merriam & Co., H. B. Smith, Gray & Woods, Lane & Bodley, D. Doncaster, and all other manufacturers of Wood-working Machines. S. C. HILLS, No. 12 Platt st. d

FOR SALE.— The most complete set of Machinery in the United States for the manufacture of Wood, Pocket, and Dressing Combs. There are no goods of this kind in the market, and there is great call for them.

The parties owning the machinery being engaged in other business is the reason for selling the machinery. Enquire at 92 Church street, N. Y., or at the Carpetbag Factory, Middletown, Orange County, N. Y.

Also, Button-mold Machinery, unequaled by any others; there is great call for these goods, also. [14 4*] MATTHEWS BROTHERS.

FURNACE FOR SALE.— The Subscriber offers for sale a valuable Furnace Property, called Bath Furnace, situated in Rockbridge County, Virginia, containing about 7000 acres. There is a fine and permanent water power, abundance of the best ores, good wood, and manganese. The buildings are of no value, but its ores, etc., and its convenience of transportation—being within two miles of Goshen, on the Virginia Central Railroad—renders it a truly desirable and valuable investment. A map and description of the property can be seen at the office of R. W. Templeman & Co., Baltimore, or by addressing me at Buffalo Forge, Rockbridge County, Va. [14 4] D. C. E. BRADY.

CUTLERY MACHINERY Made at the Thomas Iron Works, Worcester, Mass. 14 6*

A MACHINE SHOP IN A VERY DEsirable and central location in the city of Chicago, doing a good business, with a steady growing demand for its manufacture, is offered for sale; capital required from $20,000 to $30,000. For further particulars and reasons selling, address Post Office Box 1,129, Chicago, Ill. 14 4*

STEAM ENGINES.—COOK, RYMES & Co.'s celebrated first-class stationary, portable and hoisting engines constantly on hand, at their warerooms, 107 Liberty street, New York. 14-8

AIR SPRING FORGE HAMMERS ARE made by CHAS. MERRILL & SONS, 556 Grand street, New York. They will do more and better work, with less power and repairs, than any other Hammer. Send for a circular. 4 tf



CHASE'S IMPROVED Dollar Microscope, illustrated full size in Scientific American, Jan. 26. Most valuable, amusing, interesting, instructive, and useful thing in the world for old and young, adapted to counterfeit money, cloth, flowers, pictures, living insects, etc., etc. Sent by mail on receipt of $1, with directions, etc. Agents wanted. Address O. N. CHASE 9 La Grange street, Boston, or, [15 tf] FOWLER & WELLS, New York.

MALLEABLE IRON CASTINGS of every description made to order. Address [14 20*] OLNHAUSEN & CRAWFORD, Pittsburgh, Pa.

FOR ENGINE BUILDERS' AND STEAM Fitters' Brass Work, address F. LUNKENHEIMER, [10 26*] Cincinnati Brass Works.

SPOKE-LATHES, TENONING AND Spoke-Polishing Machinery of approved Patterns manufactured by J. GLEASON, [10 10*] 1030 Germantown Avenue, Philadelphia, Pa.

NITRO-GLYCERIN.— UNITED STATES BLASTING OIL CO.—We are now prepared to fill all orders for Nitro-Glycerin, and respectfully invite the attention of Contractors, Miners and Quarrymen to the immense economy in the use of the same. Address orders to JAMES DEVEAU, Sec., [2 52*] 32 Pine street, New York

GOULD MACHINE COMPANY, Of Newark, N. J., and 102 Liberty street, New York. IRON AND WOOD-WORKING MACHINERY, STEAM ENGINES, BOILERS, SAW MILLS, ETC. 14 tf

ANDREWS'S PATENT PUMPS, ENGINES, etc.— CENTRIFUGAL PUMPS, from 90 Gals. to 40,000 Gals. per minute, capacity. OSCILLATING ENGINES (Double and Single), from 2 to 250 horse-power. TUBULAR BOILERS, from 2 to 50 horse-power, consume all smoke. STEAM HOISTERS to raise from ½ to 6 tuns. PORTABLE ENGINES, 2 to 20 horse-power. These machines are all first-class, and are unsurpassed for compactness, simplicity, durability, and economy of working. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO., 1 tf No. 414 Water street N. Y

WHEELER & WILSON, 625 BROADway, N. Y.—Lock-stitch Sewing Machine and Buttonhole do. 1t

FIRST-CLASS MACHINISTS' TOOLS. PRATT, WHITNEY & CO., Flower street, Hartford, Conn., Manufacturers of Engine Lathes, (15) fifteen inches to (8) eight ft. swing; Power Planers, (16) sixteen inches to (5) five feet wide, and of any length desired, and special machinery. Also only makers of Engine Lathes with Slate's Patent Taper Attachment, conceded by all who have used it to be most perfect and simple in its construction and almost indispensable for good workmanship. For a circular and price list address as above. 3 26*

SHAW & JUSTICE'S POWER HAMMER is Moderate in Price, is driven with one-tenth the power used by other Hammers, and will not cost the one-hundredth part of what is usually spent in repairs. Its power is far in excess of any Hammer known. Manufactured by PHILIP S. JUSTICE, 14 North 5th street, Phila., and 42 Cliff-st., New York. Shops 17th and Coates-sts., Philadelphia. 16 tf

JUST PUBLISHED—THE INVENTOR'S and MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents; Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO. 37 Park Row, N. Y.

PATENT POWER AND FOOT-PUNCHING PRESSES, the best in market, manufactured by N. C. STILES & CO., West Meriden, Conn. Cutting and Stamping Dies made to order. Send for Circulars. [14] tf

MODELS, PATTERNS, EXPERIMENTAL and other Machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos. 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN Office. 1 tf

MASON'S PATENT FRICTION CLUTCHES, for starting Machinery, especially Heavy Machinery, without sudden shock or jar, are manufactured by VOLNEY W. MASON, [14 tf] Providence, R. I.

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

WROUGHT-IRON WELDED TUBE of all sizes, for Steam, Gas, or Water purposes. Brass work and Iron Fittings of every kind to suit the same; also, PEASE'S Improved Gas-Pipe Screwing and Cutting off Machines, for both Hand and Steam power, to screw and cut off from ⅛ to 4-in. pipe, and all other tools used by Steam and Gas-Fitters. Manufactured and for sale by CAMDEN TUBE WORKS, Second and Stevens streets, Camden, N. J. 6 13*

STEAM ENGINES—OF ANY POWER desired for manufactories, of superior construction, with patent frictionless slide valve and variable expansion. Address M. & T. SAULT, New Haven, Conn. 11 23*tf

LENOIR GAS ENGINES—Without Boiler or Fire. From ½ to 4-horse for hoisting, pumping, etc. For sale at the Co.'s Works, 455 East 10th st., N. Y. 14 8*

LATHE CHUCKS—HORTON'S PATENT—from 4 to 24 inches. Manufacturer's address, E. HORTON & SON, Windsor Locks, Conn. 5 25*.

ERICSSON CALORIC ENGINES OF GREATLY IMPROVED CONSTRUCTION.—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton Gins' Air Pumps, Shafting, Pullers, Gearing Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON, [1 tf—D] 164 Duane street, cor. Hudson, New York.

TO STOVE FOUNDERIES—Valuable Patent for sale. Wilson's combined funnel elbow and damper. See Scientific American of March 9, 1867. Address WILSON & WOOD, [2 5*] Wilmington, Del.

MODE of Creation, Atlantic Gold Fields, Giving while Living, Fishes in Convention, Carboniferous and Glacial Periods, Signs of Health, in April No. Phrenological Journal; 20 cents, $2 a year. Ask your Newsman for it.

FOR SALE.— Foundery, Machine Shop and Planing Mill, at Waukegan, Ill., thirty-five miles north of Chicago, on the Lake Shore, with a good supply of patterns suited to the times, including patterns for four sizes Stationary Engines, Shop-right Patterns and Flasks for Leonard's Seamless Thimble Skeins, suitable Machinery for Finishing and for Sash, Blinds, and Doors, Planing and Resawing Lumber, with sufficient Power. Will be sold low to a cash customer. Apply to the subscribers, TIFFANY & LUCAS, [2 5*] Waukegan, Ill.

$200 A MONTH IS BEING MADE with our IMPROVED STENCIL DIES, by Ladies and Gentlemen. Send for our free Catalogue containing Samples and Prices. Address [14 tf—R.] S. M. SPENCER & CO., Brattleboro, Vt.

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, N. Y. 1 tf

WOOD & MANN STEAM ENGINE CO.'S CELEBRATED PORTABLE AND STATIONARY STEAM ENGINES AND BOILERS, from 4 to 35 horse-power. Also, PORTABLE SAW MILLS.

We have the oldest, largest, and most complete works in the United States, devoted exclusively to the manufacture of Portable Engines and Saw Mills, which, for simplicity, compactness, power, and economy of fuel, are conceded by experts to be superior to any ever offered to the public.

The great amount of boiler room, fire surface, and cylinder area, which we give to the rated horse-power, make our Engines the most powerful and cheapest in use; and they are adapted to every purpose where power is required.

All sizes constantly on hand, or furnished on short notice. Descriptive circulars, with price list, sent on application. WOOD & MANN STEAM ENGINE CO. Utica, N. Y. Branch office 96 Maiden Lane N. Y. City. 1 32*

STATIONARY ENGINES Built under the BABCOCK & WILCOX PATENTS.

An entirely novel arrangement of valve gear, guaranteed to give a more regular speed, and to consume less fuel per horse-power than any engine in use Call or send for a circular. HOWARD ROGERS, [1 30*] 50 Vesey street, New York.

PORTABLE AND STATIONARY Steam Engines and Boilers, Circular Saw Mills, Mill Work, Cotton Gins and Cotton Gin Materials, manufactured by the ALBERTSON & DOUGLASS MACHINE CO., New London, Conn. 1 tf

BARNES' Patent SHINGLE MACHINE.—State and county Rights of this unsurpassed machine for sale. It will cut shingles, box stuff, veneering, staves, laths, etc., more rapidly than any other machine, with less power, and can be changed from one to the other instantly. Address H. D. BARNES & CO., [11 8*] Fair Haven, Conn., for machines or information.

SHEET AND ROLL BRASS. German Silver, Brass, and Copper Wire, etc. Especial attention to particular sizes and widths for Machinists and Type Founders. Manufactured by the THOMAS MANUFACTURING COMPANY, Thomaston, Conn. 1 24*

TAYLOR, BROTHERS & CO.'S BEST YORKSHIRE IRON.—This Iron is of a Superior Quality or locomotive and gun parts, cotton and other machinery, and is capable of receiving the highest finish. A good assortment of bars in stock and for sale by JOHN B. TAFT, sole agent for the United States and Canadas. No. 18 Batterymarch-st., Boston. 1 40*—R.

THE BEST POWER HAMMER MADE is the Dead Stroke Hammer of Shaw & Justice. Sizes suited for manufacturing awl blades or engine shafts; consume but little space, and require but little power. Manufactured by PHILIP S. JUSTICE, 14 North 5th street, Phila., and 42 Cliff-st., New York. Shops 17th and Coates-sts., Philadelphia. 14 tf

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven, Ct. 14 tf

CAN I OBTAIN A PATENT?—For Advice and instructions address MUNN & CO., 37 Park Row, New York for TWENTY YEARS Attorneys for American and Foreign Patents. Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN $3 a year. 30,000 Patent cases have been prepared by M. & Co.

IMPORTANT. MOST VALUABLE MACHINE for all kinds of irregular and straight work in wood, called the Variety Molding and Planing Machine, indispensable to competition in all branches of wood-working. Our improved guards make it safe to operate. Combination collars for cutters, saving 100 per cent, and feed table and connection, for waved moldings and planing, place it above all others. Evidence of the superiority of these machines is the large numbers we sell, in the different states, and parties laying aside others and purchasing ours, for cutting and shaping irregular forms, sash work, etc.

We hear there are manufacturers infringing on some one or more of our nine patents in this machine. We caution the public from purchasing such.

All communications must be addressed "Combination Molding and Planing Machine Company, cor. 1st ave. and 24th-st., New York, where all our machines are manufactured, tested before delivery, and warranted.

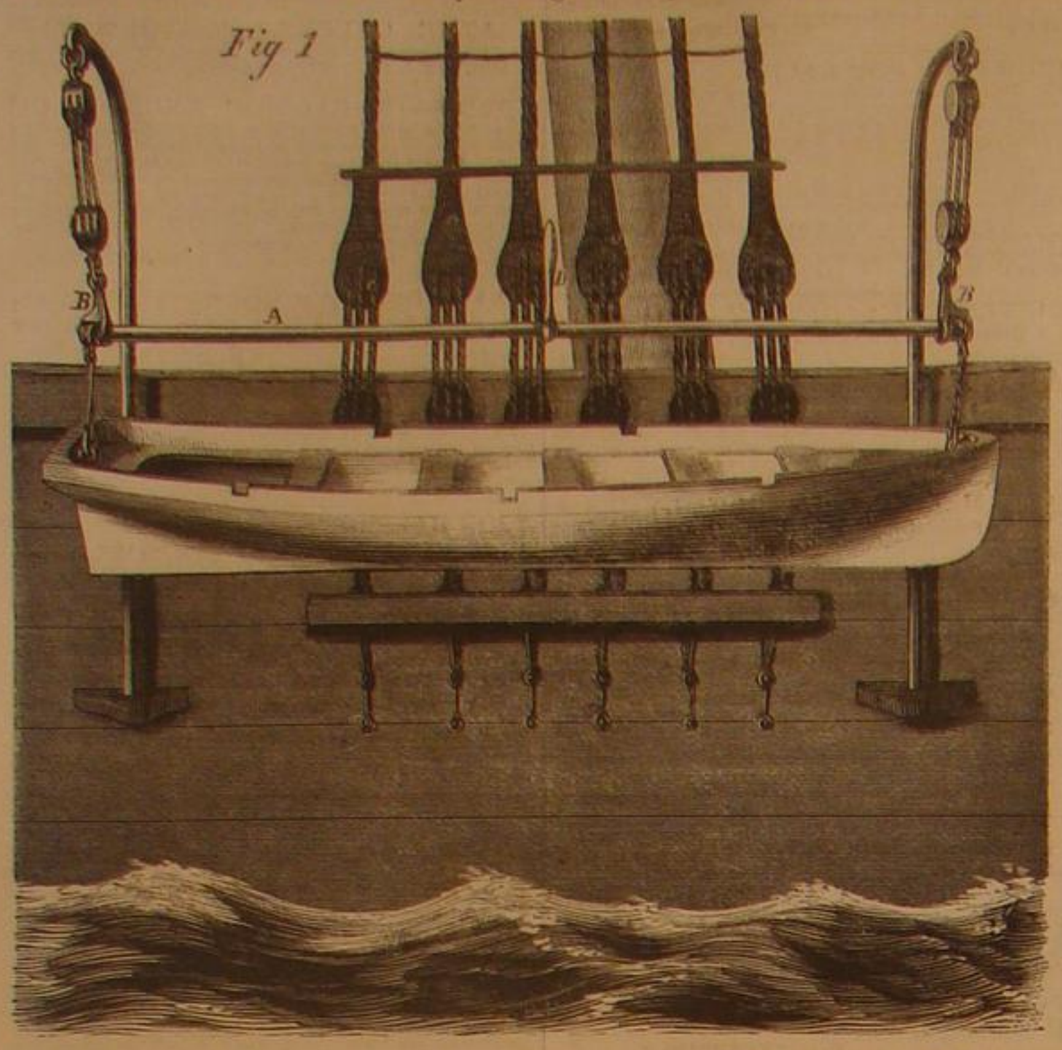
Send for descriptive pamphlet. Agents solicited. [14 tf

OIL! OIL!! OIL!!! For Railroads, Steamers, and for machinery and Burning. PEASE'S Improved Engine Signal, and Car Oils, indorsed and recommended by the highest authority in the United States and Europe. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American", after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No 61 and 63 Main street, Buffalo N. Y.

N. B.—Reliable orders filled for any part of the world. 1 tf

Improved Boat-Detaching Apparatus.

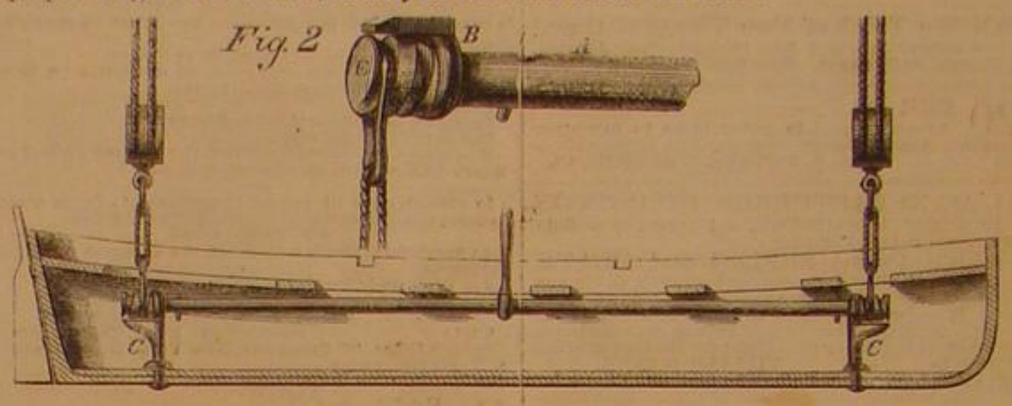
The terrors of traveling by sea can be greatly mitigated by taking proper precautions for the salvation of human life. In cases of foundering by leaks, or otherwise, the possession of a sufficient number of boats to convey the crew and passengers away from the wreck is not always enough to inspire confidence or to insure safety. The swamping or staving of boats in lowering is too common an occurrence, and not seldom the cause is to be found in the improper tackling by which the launching is effected. A boat when lowered from a ship should strike the water on an even keel and be instantly disengaged from its fastenings, both bow and stern at the same instant. There have been several devices contrived for this purpose but some of them are not certain and unfailing in their operation.



We give two engravings which represent two arrangements of the same plan for securing the safe launching of boats from ships under circumstances of danger. Fig. 1 shows a boat suspended at the davits ready for lowering, and Fig. 2 the section of a boat with the apparatus secured to its bottom inside, and a view, enlarged, of the disconnecting bar. This bar, in which the principle of the device is mainly located, is simply a bar, A, of metal, of a proper length for the boat, slung to the lower blocks of the fall by proper swivels, B, or supported on similar bearings, C, in the boat. The ends of the rod, A, are formed into spirals, or deep threads, one right hand and the other left hand. In these spiral scores rest loops attached to links connected to the boat, or to the lower blocks of the tackle. These loops, when the bar is turned, run in these scores as a nut turns on a screw. The bar has a handle, D, by which it is partially rotated.

Now it will be seen that the loops resting, as at E, in a score nearly at the end of the bar, a partial turn of the handle, D, will throw them off, both at the same instant. Either the bar in the boat passing under the thwarts or that one suspended to the fall can be used, the operation in both cases being the same. The bar can be secured by any simple means so that it may not be tampered with.

Letters patent were granted for this invention to G. B. Massey, of New York City, Feb. 19, 1867. For further information apply to Donald McKay, East Boston, Mass., or to Massey, Shaffer, & Co., 68 Broadway, New York City.



MASSEY'S BOAT-DETACHING APPARATUS.

Iron and Stone Cement.—A German chemist prescribe six parts of Portland cement, one part nicely powdered lime, burnt but not slacked, two parts of sand, and one part of slacked lime, mixed with the necessary quantity of water, used as a filling between stone and iron, both being previously damped. After forty-eight hours the cement will be nearly as hard and durable as stone.

HOW TO OBTAIN PATENTS.

The first inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them: they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

We (MUNN & CO.) have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century*. Many thousands of inventors have had benefit from our counsels. More than one-third of all patents granted are obtained by us.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person, at our office, or to advise them by letter. In all cases they may expect from us an *honest opinion*. For such consultations, opinion, and advice, *we make no charge*. A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential*. Address MUNN & CO., 37 Park Row, New York.

Extensions.—The applicant for an extension must file is petition and pay in the requisite fee at least ninety days prior to the expiration of his patent. There is no power in the Patent Office to renew a patent after it has nce expired. The preliminary business to extend a patent should be commenced at least six months prior to the expiration.

Many valuable patents are annually expiring which might readily be extended, and, if extended, might prove the source of wealth to their fortunate possessors.

All the documents connected with extensions require to be carefully drawn up and attended to, as any failure discrepancy, or untruth in the proceedings or papers is liable to defeat the application.

In case of the decease of the inventor, his administrator may apply for and receive the extension: but no extension can be applied for or granted to an assignee of an inventor. Parties desiring extensions will address MUNN & CO., 37 Park Row, N. Y.

Preliminary Examination.—This consists of a *special search*, made at the U. S. Patent Office, Washington through the medium of our house in that city, to ascertain whether, among all the thousands of patents and models there stored, any invention can be found which is similar in character to that of the applicant. On the completion of this special search, we send a *written report* of the result to the party concerned, with suitable advice. Our charge for this service is $5.

If the device has been patented, the time and expense of constructing models, preparing documents, etc., will, in most cases, be saved by means of this search: if the invention has been in part patented, the applicant will be enabled to modify his claims and expectations accordingly.

Parties desiring the Preliminary Examination are requested to remit the fee ($5), and furnish us with a sketch or photograph, and a brief description of the invention.

Where examination is wanted upon more than one invention, $5 for each must be sent, as each device requires a separate, careful search. Address MUNN & CO., 37 Park Row New York

Quick Applications.—When, from any reason, parties are desirous of applying for Patents or Caveats, in GREAT HASTE, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions for them. We can prepare and mail the necessary papers at less than an hour's notice, if required.

Interferences.—When each of two or more persons claims to be the first inventor of the same thing, an "Interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public

Our Book of Instructions, containing the Patent Laws, Official Rules, 150 engravings, valuable tables for calculations, and full instructions concerning the cost of patents, method of procedure, forms for assignments, etc., is *sent gratis* on application.

Address all letters (post-paid),

MUNN & CO.,

No. 37 Park Row, New York City.

Office in Washington, Cor. F and 7th streets.

CIRCULAR SAWS,

WITH

EMERSON'S PATENT MOVABLE TEETH.

These Saws cut More and Better Lumber in the same time, and with Less Power, than any other Saw n the world, with Less Expenditure of Labor and Files to keep in order, and never Wear Smaller. Also,

EMERSON'S PATENT GAUGING AND SHARPENING SWAGE,

For Spreading the Points of Saw Teeth. Send for New Descriptive Pamphlet, with Price List.

AMERICAN SAW COMPANY,

2 Jacob street, near Ferry street, New York. 15 3

Receipts.—When money is paid at the office for subscriptions, a receipt for it will be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-* acknowledgment of their funds.

City Subscribers.—The Scientific American will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

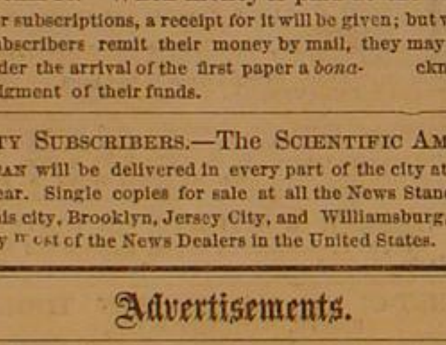
Advertisements.

A limited number of advertisements will be admitted in this page on the following terms:—Seventy-five cents a line, each insertion, for solid matter; one dollar a line for space occupied by engravings.

AGENTS WANTED.

$200 Per Month and Expenses Paid Male or Female Agents, to introduce a New and Useful Invention, of absolute utility in every household. Agents preferring to work on Commission can earn from $10 to $20 per day. For full particulars, inclose stamp, and address W. G. WILSON & CO., Cleveland, Ohio.
16 os4*]

"EXCELSIOR" REIN HOLDER.



Patented March 12, 1867.

Letter A of the above cut represents a dash. B represents reins, and C a new Patent Rein Holder attached to a dash with the Reins placed in the Holder.

The advantages of this new article will at once present themselves to the minds of the reader, some of which are, preventing your reins from being under your horses' feet, damaged and soiled; also, having your reins just where you want them instead of being twisted or tangled around the dash or seat. By attaching one to the standard of your hay rack, you can save time enough in one day to pay for it.

Being made of spring wire, it clasps the reins very firmly; can be attached to any kind of dash seat, or place that you might want to use one; cannot get out of order; is light and ornamental.

For Terms of Territorial Rights, address the Patentee, E. C. PATTERSON, Rochester, N. Y.

Territory in Michigan address G. A. PATTERSON, Detroit, Mich.

☞ Parties purchasing territory will be entitled (FREE OF CHARGE) to as many "Holders" as they pay dollars for the Right, and as they retail at $1 each, all of the purchase money can be got back without further investment.

LUMBER can be Seasoned in from Two to Four Days, by Bulkley's Patent, at an average cost of $1 per M. For circulars, with information, address, C. H. BULKLEY, No. Case Building, Cleveland, O.15 3os*]

Wild Moss Mills, Carrollton, Mo., March 14, 1867.

ALONZO WARREN, Esq., Boston, Mass.:

Dear Sir—The first-class, high finished, hollow shaft, globe coupling Turbine Water Wheel purchased of you last summer has been running three months. Went together like a clock; runs strong and steady: economical in using water; journals work cool; answers all recommendations. I am well pleased—satisfied enough to pay for this unsolicited notice of its merits through the Scientific American. Respectfully yours,

16 3os J. F. LAWTON.

TURBINE WATER WHEELS.



The REYNOLDS PATENT embodies the progressive spirit of the age. Simplicity, Economy, Durability, Accessibility all combined. The only Turbine that excels Overshots. Awarded the Gold Medal by American Institute.

Shafting, Gearing and Pulleys furnished for all kinds of Mills, made on Mechanical Principles, under my personal supervision, having had long experience. Circulars sent free.

GEORGE TALLCOT,

4 os 13* tf—H] No. 96 LIBERTY STREET, NEW YORK.

The wheel mentioned below has a working head of 18 feet, and when driving the amount of machinery specified used 34 cubic feet of water per second.

Mr. Watkinson sends us the following:

January 1st, 1864, at Union Manufacturing Company's Factory, Conn., 34 feet, No. 2, Reynolds' Wheel drives the following machinery:—

18 feet head this day:		
3 Lappers, 36-in.; 3 Beaters: 2,000 turns	12	H. P.
4 Mason (self-acting) Mules, 1,052 spindles	5	"
10 Gambrell Patent cards, 36-in., with workers and strippers, 150 turns of main cylinder	6	"
2 Brown's Slubbers, 86 spindles: flyer 800 turns	2	"
3 " Fine Speeders, 186 spindles; flyer 1,400 turns	2	"
3 Drawing Frames, 5 Doublers, etc.	1	"
92 Ring Frames, spin'g; 1,984 spindles, 5,000 turns	15	"
31 Gingham Looms, speed 110	8	"
Shafting	10	"
Total	61	H. P.

(Attest), E. B. WATKINSON, Union Manufacturing Co.

The wheel is one of our substantial iron working wheels, not designed for testing, but such as we build every day for our customers. The useful effect, it will be seen, is over eighty-seven per cent.

EUROPEAN AGENCY for the Exhibition and Sale of American Patents and Manufactures.

BLANCHARD & McKEAN.

No. 82 Boulevard de Sebastopol, Paris, France.

GEO. A. BLANCHARD.] 10 os13* [J. A. McKEAN.

MACHINERY.—

We are prepared to furnish

FIRST-CLASS MACHINISTS' TOOLS OF EVERY DESCRIPTION, ON SHORT NOTICE AND REASONABLE PRICES.

SAMPLES of the TOOLS manufactured by us may be seen at our Wareroom, and we invite an inspection of their Workmanship and Design by those in want of superior Machinery.

NEW YORK STEAM-ENGINE CO.

Office and Wareroom

7 os 13* 222 Pearl street, New York.

PATTERN LETTERS To put on Patterns, for castings. KNIGHT BROS., Seneca Falls, N. Y. 12 6*

Zur Beachtung für deutsche Erfinder.

Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder, mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten.

Erkundigungen über die, zur Erlangung von Patenten nöthigen Schritte, können in deutscher Sprache schriftlich an uns gerichtet werden und Erfinder, welche persönlich nach unserer Office kommen, werden von Deutschen prompt bedient werden.

Die Patentgesetze der Vereinigten Staaten,

nebst den Regeln und der Geschäftsordnung der Patentoffice, und Anleitungen für die Erfinder um sich Patente zu sichern, sind in Buch-Format von uns in deutscher Sprache herausgegeben, und werden gratis an alle versandt, welche darum mündlich oder schriftlich einkommen.

Man adressire

MUNN & CO.

37 Park Row, New York.

Scientific American.

ENLARGED FOR 1867.

This is the oldest, the largest and most widely circulated journal of its class now published. It is the constant aim of the Editors to discuss all subjects relating to the industrial arts and sciences, in a plain, practical, and attractive manner.

All the latest and best Inventions of the day are described and illustrated by Splendid Engravings prepared expressly for its columns by the first Mechanical Engravers in the country.

It would be impossible within the limits of this Prospectus, to enumerate the great variety of subjects discussed and illustrated. A few only can be indicated, such as Steam and Mechanical Engineering, Fire-arms, Mechanics' Tools, Manufacturing Machines, Farm Implements, Hydraulic Engines, Wood-working Machines, Chemical Apparatus, Household Utensils, Curious Inventions, beside all the varied articles designed to lighten the labors of man in the Shop, Factory, Warehouse, and Household

The Scientific American has always been the Advocate of the Rights of American Inventors. Each number contains a weekly list of Claims of Patents, furnished expressly for it by the Patent Office, together with notes descriptive of American and European Patented Inventions.

Patent Law Decisions, and questions arising under these laws, are fully and freely discussed by an able writer on Patent Law.

Correspondents frequently write that a single recipe will repay them the whole cost of a year's subscription.

With such advantages and facilities, the columns of the Scientific American are of special value to all who desire to be well informed about the progress of Art, Science Invention, and Discovery.

Published Weekly, two volumes each year, commencing January and July,

Per annum	$3 00
Six months	1 50
Ten copies for One Year	25 00

Canada subscriptions, 25 cents extra. Specimen copies sent free Address

MUNN & CO., Publishers,

No. 37 Park Row, New York City