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Improved Gang Plow.

This machine consists of a frame supported upon three wheels—two in the front and one in the rear. The front wheels are attached to a swing or hinged axle, A, Fig. 1. It will be observed that one of these wheels is attached to the front side of the axle, A, and the other to the back, in such a manner that when the axle is turned down in a horizontal position, to lower the plows to the ground, the wheel that runs in the furrow will be as much lower than the other as the depth of the furrow may require. This axle swings upon the hinge, B, Fig. 1, and is connected with the hind wheel by means of a lever (not shown) and connecting rods, to the end of which are attached a chain, C, which passes under the wheel, D, and is made fast to the vertical shaft, E, by an eye-bolt. The depth to which the plows penetrate the ground is regulated by the small side lever, G, fitted with a roller, upon which rests the long lever, H; the lever, G, is secured in the required position by a notched quadrant, I. By these details the driver has entire control of the depth of the furrow without moving from his seat or stopping the machine. The caster wheel, J, supports the plows by means of the connecting chain, C, Fig. 1, and allows them to swing round at the ends of the furrow. By means of the handle, K, the plows may be guided to the required position for starting or backing.

Fig. 2 is a front view of the axle when the plows are in operation. The tongue is perfectly free to work up or down, which prevents all possibility of up or down draft on the horse's neck; it is adjusted sidewise by a bar furnished with holes in the front end, to give the required land to the plows. The front axle is secured in its vertical position by the pawl or catch, M (as shown in Fig. 1). To liberate the axle the pawl may be raised by placing the foot on the back part of it.

In reference to the caster wheel, it will be seen that it runs upon the bottom of the furrow, and its connection with the front axle is shortened or lengthened by a turn buckle, which is fitted with a right and left-handed thread attached to the chain, C, for that purpose.

Every experienced plowman knows that when the ground is hard, weight is required to keep the plow to its work. With this machine part of the driver's weight is used for that purpose, and when the soil is in such a condition as not to require it, the weight can be transferred to the caster wheel by screwing up the tightener until the caster wheel relieves the plows of the unnecessary weight. The front chains, N, are to prevent the axle swinging too far back.

Some of the main advantages claimed for this machine are, that the plows lift point first, which greatly facilitates the operation of raising them out of the

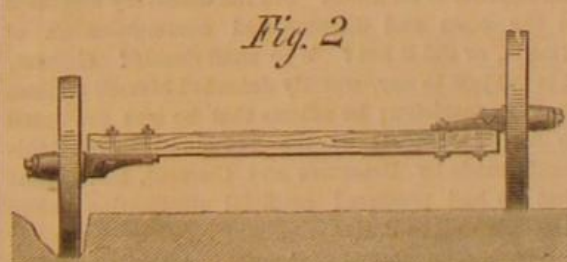
ground when in motion. The driver can control the depth of cut without stopping or moving from his seat. The tongue being perfectly limber the plows will yield freely to any unevenness of the ground. Its general accessibility in all parts is such as to recommend it to agriculturists.

This plow was patented through the Scientific American Patent Agency, by F. S. Davenport, on



DAVENPORT'S GANG PLOW.

February 9, 1864. For further information address



Goodrich & Newton, Agricultural Machine Manufacturers, Jerseyville, Ill.

New Mineral.

A new mineral of lead has been discovered in Chill, containing 10 per cent of iodine. Iodine has lately become very valuable, on account of its extensive use in photography, and of the discovery, by Dr. Hoffman, of a new dye, having this element among its constituents. It is said that one cargo of the new mineral will represent a fortune. As a further illustration of the progress that mining adventure is making in South America, a mine of bismuth ore has recently been opened in Bolivia, about two-thirds up the highest of all the peaks of the Andes—the Iljampu Mountain. Bismuth also, has lately increased in value; and 15,000 feet above the level of the ocean, only slightly beneath the line of perpetual snow, men are setting to work to obtain it.

A COMPANY proposes erecting a factory at Norwalk, Conn., for the manufacture of gingham; 500 looms will be run, employing 300 hands.

Patent Zinc Smelting.

An invention has been provisionally specified by Mr. A. Reynolds, of Bagillt, Flintshire, which consists in the arrangement of a furnace (such as a blast furnace), a flue, and condenser, as hereafter described, so that zinc, otherwise called spelter, can be smelted from its ores in it, instead of in the retorts that are ordinarily employed. The zinc passes off in vapor with the smoke, at the top of the blast furnace, and in order to retain the zinc in the metallic form air must be carefully excluded at the top of the furnace, or, preferably, coke must be placed in the flue, or charcoal may be employed instead. The coke may be heated by the smoke, or it may be heated otherwise, so as to reduce the zinc to the metallic form. The inventor leads the flue into a chamber, or series of chambers, for condensing the zinc from the smoke. This condensing chamber may be either a large room or a series of spaces, or of pipes, or otherwise, and may be cooled externally by water. The smoke, after leaving the condenser, may still carry some zinc with it, which should be removed by passing the smoke through a condenser with water in it, or otherwise. The blast furnace may be of the same construction as that

generally used for smelting lead slags. The coke in the flue would be placed near the part where it leaves the blast furnace, and the flue would be a little larger in this part than in others, to prevent stopping the draught. It would be better to throw in the zinc ore at stated intervals through a door at the top of the furnace, and to moderate the blast while the zinc is passing off.—*London Mining Journal*.

[This is essentially the same plan as that now pursued in this country.—Eds. Sci. Am.]

Economic Magnesium Light.

In a communication to the Paris Academy of Sciences, Prof. Carlevaris, of Mondovi, Italy, stated that when magnesium wire was ignited in atmospheric air, or in pure oxygen, the most luminous effects were not manifest till a certain quantity of oxide had been formed, and was raised by the heat produced to an excessively high temperature. The light in this case, as in the combustion of carburated hydrogen, as in that of hydrogen in contact with platinum, and as in the Drummond arrangement, is derived from the solid particles raised by the flame to a great heat—a heat which dissolves and volatilizes platinum, but leaves the oxide of magnesium solid, fixed and intact. To raise this oxide to the temperature necessary to give the greatest light, it should be presented to the flame in as small a quantity and in as large a volume as possible, which is done by employing a spongy oxide thus obtained:—A piece of chloride of magnesium is exposed to the flame of the oxyhydrogen blowpipe, in contact with a piece of carbon. The chloride of magnesium is rapidly decomposed, leaving the spongy oxide, which gives the light in ques.

tion; or, by simply replacing the chloride with the carbonate of commerce, the same effect can be produced.

MANUFACTURE OF ULTRAMARINE.

We take the following extracts from a long article in the last Smithsonian Report, translated from *Aus Der Natur*. The translation was evidently made by a German, as instead of "soda" he gives us the original "natron." His "sulphuric acetical natron" we take to be sulphate of soda, and "sulphuric natron" the sulphide of sodium. The acid that escapes in roasting we suppose must be sulphurous, and not sulphuric acid, as translated:—

THE ANCIENT LAPIS LAZULI.

The idolatry of classical antiquity finds its chief antagonism in the natural sciences. It would be easy to show how many illusions, nestling in the heads of the admirers of the olden time, have been dispelled by modern chemistry alone; and, although our present purpose is to deal with two objects of subordinate importance, yet these also serve to show how very broad is the line of separation between our own times and the remote ages, to whose languages and ideas so much of the time and training of our youth are commonly devoted.

The colors of *azure* and *purple* were among the most highly prized as well as the most highly prized productions of antiquity. The former was sold for its weight in gold, and the latter was especially reserved for the noble and the powerful; its use was, in some ages, even forbidden to all beneath those of the highest rank on pain of death. Science and art have wrought here a striking change; being no longer limited to the direct gifts of nature, we are able, from the most apparently unpromising raw material, to furnish for the use of the whole community what could then be but scantily produced for the ruling few. The contrast is certainly suggestive.

As early as three hundred and fifteen years before the Christian era, Theophrastus drew a distinction between natural and artificial *azure*, the latter of which, he tells us, was manufactured in Egypt. It seems most probable, however, that the terms natural and artificial indicate in this case only the greater or the less degree of care with which the color was prepared from the beautiful stone which we call *lapis lazuli*, to which the ancients gave the name of *sapphire*. While in some cases the stone was merely reduced to a fine powder, in others, probably, the coloring matter was more carefully separated, as is done in our own day.

The *lapis lazuli*, or *sapphire*, is found in the least accessible parts of Little Bucharest, Tibet, China and Siberia, in layers or strata of granite or limestone. Of old, as at the present day, it was polished and wrought as a gem, and it is almost the only member of the large family of gems that has an intrinsic value. This distinction it owes to the fact that, in combination to its great beauty, it yields for the use of the painter one of his most beautiful colors, which, moreover, is unaffected by air or heat; that color is *ultramarine*.

DISCOVERY OF THE MODERN PROCESS.

As lately as the commencement of the present century, *ultramarine*, or *azure blue*, was not simply a fine powder of the gem, but the result of a long and troublesome process. The stone was first broken into small pieces, and even this first step in the process was no easy one, the stone being exceedingly hard. The pieces, of the size of a hazelnut, were cleaned by means of lukewarm water, then made red-hot, and afterward slaked in a mixture of water and acetic acid. The cohesion of the particles is so great that this process must be repeated from six to ten times before the mineral can be transformed into a fine powder. It is afterward rendered still finer by trituration with the muller stone of the painter, having been first mixed with water, honey and dragon's blood, then treated with the lye of the ashes of the grapevine, and finally dried. The powder is next compounded into a mass with turpentine, rosin, wax and linseed oil, melted together, and kneaded under water. By this process the fine powder is washed out, and in time sinks as a sediment in the liquid. The mineral yields not more than one-fourth of its weight of coloring material.

Up to a very recent time Italy continued to be the chief, as it had been the original, manufactory of ul-

tramarine, and thence the finest shades were derived. The tediousness, the difficulty, and, consequently, the costliness in both time and money of the old process of producing *ultramarine* from the *lapis lazuli*, naturally excited great desire among scientific chemists to find some cheaper and readier artificial means of producing that color, doubly precious to the painter for its beauty and its permanency; but so invariable, from different causes, were the failures of all attempts in that direction, that the solution of the problem was well nigh despaired of, when hope was as suddenly as accidentally revived. In 1818 it happened that in France a sandstone furnace for the melting of soda was taken down, and a beautiful colored substance, never seen there before, was discovered. It was remarked that formerly the furnace for the melting of soda had been constructed, not of sandstone, but of brick. The mass of matter thus discovered was examined by Vauquelin, who observed in its appearance and composition points of great resemblance with *ultramarine*; but still no clue offered itself to guide him through the perplexities of the investigation. Similar observations were made in the soda manufactories, as, for instance, by Hermann, in Schoubeck, who had thrown away above a hundred weight of the colored mass, found in a similar furnace when the latter was pulled down; and by Kuhlmann, at Lille. We shall not venture to decide whether or not the "blue material" mentioned by Goethe in his "Italian Travels" (1781), as being taken from limekilns in Sicily and used for the adornment of altars and other objects, was homogeneous with this product of the soda furnace, and whether both were, in fact, an artificially and accidentally produced *ultramarine*.

The question still remained unanswered, how was this substance in the case of each furnace produced? In what did it originate? At length, in 1828, the solution of this important question was found and published by Professor C. Gmelin, of Tuebingen. During eighteen years he had been occupied with researches on the *lapis lazuli* and its kindred minerals, the products of the volcanic eruptions of Vesuvius. Reflecting on the recent circumstance, he was led to believe that, notwithstanding there had been so many unsuccessful attempts, the production of an artificial *ultramarine* was not an impossibility. Further study of the natural coloring substance disclosed to him the sulphurous portion of the components, and, holding that clue, he at length succeeded in producing a most brilliant *ultramarine*.

While at Paris, in 1827, and previous to the publication of his discovery, he unreservedly communicated his ideas on the artificial production of *ultramarine* to several chemists, especially to Gay Lussac. And, behold! on the 4th day of February, 1828, Gay Lussac made a report to the French Academy that Guimet, at Toulouse, had succeeded in manufacturing *ultramarine* of all kinds. Did the discovery originate in the open and disinterested communication of Gmelin, or did it not? Who shall decide? Guimet, it is but just to say, warmly defended himself against such a suspicion; he affirms that he was prompted to his experiments by the examinations of *lapis lazuli*, made by Desormes and Clement, and claims that he had produced artificial *ultramarine* before Gmelin's visit to Paris.

Whether the method of Guimet is essentially different from that of Gmelin cannot be determined, for, while the latter published his discoveries with every particular, Guimet, on the contrary, has kept his method a secret to the present day. In so far as profit is concerned, Guimet, it must be confessed, has maintained the advantage over Gmelin, and France over Germany; for Guimet forthwith made his discovery lucrative to himself and others. As early, even, as the same year, 1828, he had erected a manufactory at Paris for the production of artificial *ultramarine*, which he sold at two dollars and sixty-six and a half cents per pound, while the natural article was a little more than double that price. Guimet succeeded in having his product adopted for the painting of the beautiful ceiling of the museum of Charles X., and thenceforth his fortune was made. In 1834 the price had risen to from four to five and one-third dollars per pound, but in 1844 had again fallen, and ranged from two and one-sixth to two and one-third per pound, though the best quality for oil painting was still sold at six dollars and forty cents. The cheapness of the

ordinary article enhanced the demand, and the product of Guimet's factory speedily rose from twenty thousand to one hundred and twenty thousand pounds, of which twenty thousand pounds were exported to foreign countries. Not only did Guimet amass immense wealth; he was the recipient also of many public honors. From the French "Society for the Encouragement of Industry" he received a premium of five thousand francs, and medals from various French industrial exhibitions; and this as early as 1834, when the real importance of this eminent discovery could have been scarcely appreciated. In 1851, at the London exhibition, Guimet received the large gold medal.

In 1842, the celebrated French chemist, Dumas, in his "Manual of Chemistry," had expressed the opinion that chemical purity of materials might very well be dispensed with in the manufacture of artificial *ultramarine*, and that common clay might be used, provided it did not contain too much iron. Professor Engelhardt, of the Polytechnic School, Nuremberg, while translating the work of Dumas into German, was especially impressed by that statement, and was induced thereby to make new experiments, but his labors were terminated by death before he had obtained any positive and satisfactory results. His assistant and successor, Leykauf, continued the deceased professor's experiments, and was fortunate enough to succeed, where all previously had failed. By means of potter's clay, Glauber's salt, and coal, he manufactured the most beautiful *ultramarine*, in the renowned manufactory of Leykauf, Heine & Co., at Nuremberg; and in a very few years the firm counted its wealth by millions. Nowhere else has this branch of industry acquired such an extension—being conspicuous even among the diversified activities of Nuremberg, and justifying, therefore, a brief description in this article.

THE NUREMBERG MANUFACTORY.

In the vicinity of the Nuremberg railroad depot the attention of the observant traveler is pretty sure to be attracted by a stately and spacious mass of buildings of white and red sandstone. The long rows of structures, with their streets and yards, cover a space of some eighteen acres. Surrounded as the whole is by a rampart, one might at first fancy himself to be looking upon a fortress. But the smoke from numerous tall chimneys would speedily correct this error and betray the abode of ingenious and successful industry. It is to be regretted that visitors are rigidly excluded from the interior of this industrial hive; a useless exclusion, as the manufacture of *ultramarine* can no longer by any possibility be considered a secret. The visit of the King of Bavaria, in 1855, to this equally interesting and important factory, so far lifted the veil that we possess something like a reliable description, instead of the strange surmises which were previously in circulation with respect to it. On a first glance at the exterior we perceive that the vast erection has been built piecemeal, additions having been made from time to time to meet the necessities of the increasing business. It required the long period of seventeen years to render the whole what it now is—a structure heterogeneous, indeed, in appearance, but really possessing the highest conceivable adaptation to the purposes for which it was designed.

Three rows of the buildings are devoted solely to the preparation of the raw material, the motive power consisting of two steam engines conjointly possessing a 38 horse-power. So various and well contrived are the stampers, crushing and sifting machines, etc., which are set in motion by these various works, that a small amount only of human labor is required to furnish abundant raw material to employ elsewhere a vast number of hands.

Groups of buildings surrounding those just mentioned contain water-works, and consist of five divisions of vaulted galleries, supported by iron pillars. Near these are the drying stoves. Close by these three principal divisions are the buildings for storing, packing and weighing, and the clerks' offices and repairing shops. Here is a scene of continual activity, the human labor being greatly aided by a high-pressure steam engine of 20 horse-power. The communication between these various and extensive buildings is facilitated by a railroad 6,000 feet, or considerably above an English mile in length, crossing from east to west, and from north to south, and

similar tram roads of timber connect the buildings in the upper stories. The iron railroad leads to the depot of the public railroad; thus placing the factory in easy and speedy communication with the principal high roads of Germany. The weight annually carried on this little railroad amounts to nearly 2,000 tons; about one-tenth of which consists of the manufactured article.

About 200 laborers are constantly employed in this establishment, and it is greatly to the credit of the proprietors, Zeltner & Heyne, that they have established a savings bank, a sick fund, and a fund for the support of widows and orphans.

We have spoken of the remarkable fall in the price of ultramarine. Competition and improved machinery and modes of operating have effected so much in that respect, that the whole price of the best article at the present time does not exceed that paid for the mere grinding only eighteen years ago. This continual fall of price necessarily compels a corresponding expansion of the manufacture and sale to compensate for the deficit in profit. On this account scarcely a year passes without the addition of new buildings to this vast establishment. Considerably more than 5,000 tons are manufactured here yearly, at the average cost of from 25 to 37 cents per pound. The cheapness and exceeding beauty of the color cause it to be profitably and largely exported to France, in spite of the absurdly heavy import duty levied upon it there.

What we have said of this single manufactory, vast as it is, gives but a very inadequate idea of the extent and importance of the ultramarine manufacture in Germany. At the Industrial Exhibition at Munich no fewer than seven extensive manufacturers received medals, and two were honorably mentioned.

THE PROCESS.

With regard to one point in the procedure, there is a vast difference between the French and the German manufacture. In the latter, Glauber salt or a mixture of that salt and natron is always used; in the former, only soda. The German mode is the more economical, because the sulphuric acetic natron is, by the agency of the coal, converted into sulphuric natrium, and thus the sulphur can be wholly or partially dispensed with if soda be added at the same time. It is true that a somewhat greater quantity of coal will be required, but there can be no comparison between its price and that of sulphur. As to the result, it does not seem that the one or the other method is very greatly preferable.

There is great difference in the proportions of the several components of this mixture; but the following may serve as a general rule:—

GERMAN METHODS.

First.

	Parts.
White potter's clay, free from water.....	100
Glauber salt, free from water.....	85 to 100
Coal.....	17

Second.

White potter's clay, free from water.....	100
Glauber salt, free from water.....	41
Soda, free from water.....	41
Sulphur.....	13
Coal.....	17

FRENCH METHOD.

White potter's clay, free from water.....	100
Soda, free from water.....	100
Sulphur.....	60
Coal.....	11

The next operation to be performed is that of what is called the over glowing of this mixture. It is placed in melting pots of potter's clay, formed to withstand intense heat, and slowly dried till burned. Absolute exclusion of air being indispensable, it is especially requisite that the melting pots be so tempered that they will neither burst nor become softened in the intense heat requisite to burn the mass within them. They may vary from 4 to 12 inches in height, with the like diameter. When filled they are packed one on the other in a furnace resembling in form a fluted brick-kiln. They occupy the whole center of the surface, while the space on each side of them is used for the burning of similar pots. The furnace being properly filled, the mouth is walled up, and the firing commences. The burning continues during from seven to eight hours up to three days, according to the size, construction, and contents of the furnace. Fuel must be added till the mass is thoroughly incorporated and begins to melt. Upon this operation everything depends. If it be not properly conducted, the best and most accurately proportioned raw material will not yield a profitable result. The temper-

ture must be of a certain height, which is to be ascertained beforehand by trials in a small testing oven. It approaches a bright red or incipient white heat, and must be kept at the same point during a specified time; and it must be made to heat the whole mass as thoroughly as possible. When the furnace is cooled, the glowing mass is taken out and cooled with water, and then repeatedly washed and drained to remove any salt still remaining. The now dried and spongy mass is next removed to the mill and broken and pulverized to the utmost possible degree of fineness; the powder is repeatedly washed with water, and after being thoroughly dried, again ground and nicely sifted. It has now reached the first stage of ultramarine, or what is called green ultramarine, and is ready for sale or for transmutation into the blue colored or proper ultramarine. Hitherto, however, the green ultramarine has been in no very great request, as compared with the blue. It varies through several shades, from apple green to blue green; and in beauty it is far excelled by the copper color and even by the cobalt. Its chief, if not its only recommendations, are its cheapness and innocuousness; and those qualities, important as they undoubtedly are, seem insufficient to counterbalance its want of brilliancy.

The next important operation is the transmutation of the green into the blue color. Here there is but one cause for anxiety. To obtain a perfectly beautiful blue, we must previously have a perfectly beautiful green. The latter is roasted with sulphur, air being freely admitted during the process. It sometimes happens that the change of color takes place without any interference. The sulphuric natrium contained in the mass causes spontaneous ignition on the admission of air, and when it ceases to glow we have still sulphuric acid present, and the green color is thus self-changed into a beautiful blue.

As to this process also of transmuting the green color into blue, the French and Germans have their peculiar methods. The Germans use small iron cylinders for roasting; the French small hearth ovens, into which, however, the flame cannot enter. Hitherto cylinders of potter's clay have not been adopted, though we doubt not that they would serve just as well, and be even more durable. The cylinder being filled with from twenty-five to thirty pounds of green ultramarine, a vane is set in motion so that the contents of the cylinder may not be burnt without being first thoroughly roasted within. A pound of sulphur is now passed through an upper opening into the cylinder, and while the wind vane continues in motion the sulphur is gradually consumed. The addition of sulphur may be continued as long as the color improves in purity and brilliancy, but care must be taken not to continue it too long. After the color has been thus roasted it must once more be washed, dried, ground and sifted.

The French method of roasting possesses this advantage, that, by allowing a freer access of air, the green mass is the more speedily transmuted into blue. But, on either the French or German method, a large quantity of sulphuric acid escapes, which renders the factory a nuisance to its neighbors, while, were that quantity of sulphuric acid preserved, it would suffice for the production of all the Glauber salt used in the manufacture.

Manufacturing Peat for Fuel.

In performing this invention, Mr. R. M. Holloway, of the Strand, first breaks up and destroys the cellular spongy conformation of the peat, and although this could be effected by such machinery as the farmers' ordinary clod crusher, or by the pugging mill, or by other suitable means, yet, for the sake of economy, he prefers to effect this operation by apparatus of the following construction:—He constructs a circular or ring-like inclosure by means of rough poles, piling, or hurdles; the ground within, or the bottom of which, he provides with a ring-like or circular trough, or, for the convenience of removal, with two or more sectional troughs, which may be formed of wood or of iron, and within this inclosure, and upon the said trough or troughs, when supplied with raw peat, he causes cattle to be driven round, so that, by their weight and the action of their feet, the part of the operation of manufacturing peat, which consists in mashing and breaking down the peat, may be effected. After this part of the operation has been effected, the peat so treated is to be removed and loosely pressed

together, and molded into such pats or small-sized "sods" as may be desired, which may be effected by hand, for which purpose young boys and girls may be employed. This being effected, the peat is placed on tables to dry in the open air; and, in order that the atmosphere may have free access to all parts, he constructs these tables in the following manner:—The legs of each table are of wood, or of iron, and they should be three feet in height. On the tops of these tables is a framework of strong laths, or of posts of wood, or of bar-iron, or other suitable material, covered with a lattice-work of laths, or with a netting of wire of twine, or any other suitable material, which is secured to the framework aforesaid. These tables should be from two feet to four feet wide, as may be convenient, and of any suitable length, according to the circumstances of the place or size of the works. The peat, when sufficiently dry for removal from the tables, should be placed in store-houses with open-work sides, whether of woodwork or otherwise, or with ventilating passages, so that the process of air-drying may be effectually carried on and completed.

Water Power in Warehouses.

We have on several occasions alluded to the application of turbines to hoisting purposes in Manchester and other Lancashire towns, which have the advantage of a high-pressure water service; and Mr. Pearce, of Bradford, has now adopted another very ingenious arrangement in the shape of a water-engine, which was put down by Messrs. Rumbottom & Co., of Blackburn. The engine is supplied with water from the corporation mains on a pressure of 60 or 70 lbs. to the square inch. The water enters a pair of water engines, each of which possesses a pair of cylinders and pistons. The cylinders oscillate upon transoms, and the effect of this oscillation is to reverse the valvular arrangement, thereby causing a continuous rotary motion, which puts the hoist in action. The engine has been applied with success to printing machines, to a mortar grinding machine, and other apparatus requiring a motive power on a small scale. The experiments made on this occasion were quite satisfactory. The hoisting of three sheets of wool or opa, each weighing about 5 cwt., did not occupy more than seven minutes, and the quantity of water consumed in the process was about 120 gallons. A series of experiments followed, and, including the sheets raised in the first experiment, no fewer than fifteen sheets of wool, weighing in the aggregate 3 tons 15 cwt., were raised from the ground floor to the highest story in the warehouse in the short space of forty-five minutes. The entire quantity of water consumed was only 570 gallons, the cost of which was about 6½d.

PUTTING UP ENGINES BY PIECE WORK.—An engineering firm in Greenock, Scotland, have intimated to their workmen that in future the giving out, putting on board, and fitting up of new engines in new steamers shall be paid by piece, instead of by day's wages. At a meeting of operative engineers, held on the afternoon of Saturday, it was unanimously agreed that no man should work with the firm in question, as the system would, in all likelihood, keep orders from the town, as the work would be inefficiently done under the proposed arrangement.

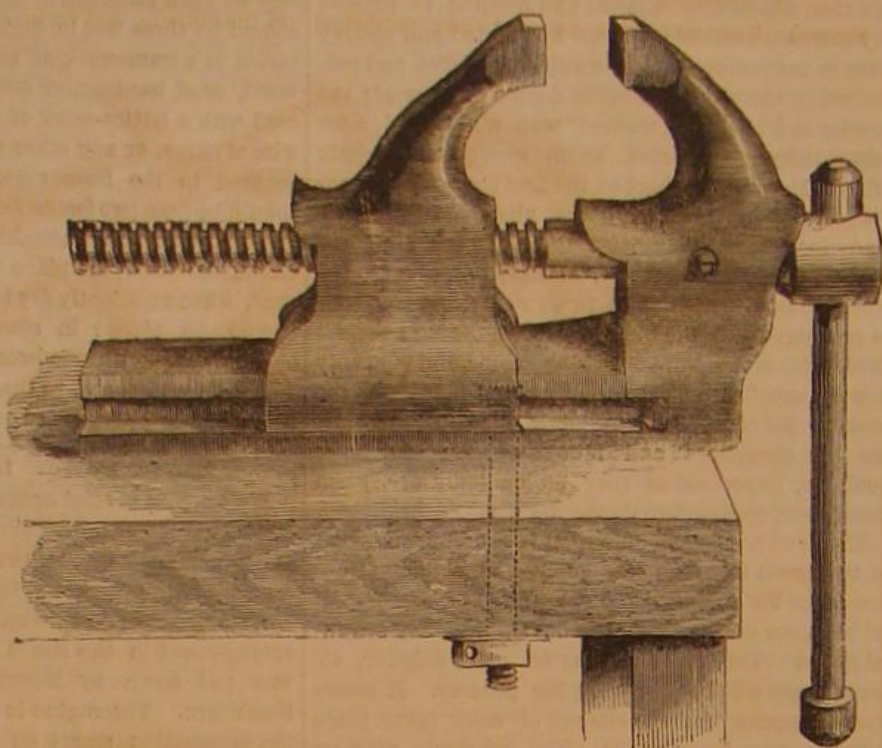
THE COMET—Biela's double comet, which in 1816 occasioned extensive fears, ultimately allayed by the publication of Arago's treatise, is again nearing the earth. Two comets were seen in England on the 27th ult., but they were much brighter than Biela's and their position was not in accordance with its calculated place. The comet will, according to the astronomers, continue to approach until the end of February next, when it will be 18,000,000 miles distant, and invisible in this latitude.

Our readers will observe the advertisement of Messrs. Stimers & Allen on the advertising pages of this number. These gentlemen have recently established an office for the transaction of all business connected with steam engineering at No. 45 William street, and solicit the favors of the mercantile community.

A TRAIN of nearly 120 coal cars, each containing from five to ten tons, passed through Elizabeth N. J., on the night of the 7th instant. They were all drawn by one engine, and the exhaust of the same sounded like the explosions of a six-pounder rifle.

Improved Traversing Vise.

In introducing this vise to the manufacturing community, the proprietors claim that it is one of the most convenient, durable and popular in the market. For ease of adjustment, or the facility with which it can be adapted to work of various kinds; also the means afforded for turning it at any required angle so as to accommodate long jobs, it is asserted that this vise has peculiar claims to consideration. It is made of the best cast iron with steel jaws, furnished with a square-threaded screw, and a solid nut let into the back jaw. The holding-down bolt fits in a slot below, like that commonly made in a foot-lathe rest, and the vise can be set and the nut screwed up so as to hold the former at any point; the vise can also be easily blocked up to raise it without removing it, when peculiar jobs have to be executed. They are made in various styles, and are manufactured by the Union Vise Company, No. 57 Haverhill street, Boston, Mass., where all further information can be obtained. Patented Jan. 3, 1865.

**BRAINARD'S PARALLEL TRAVERSING VISE****Improved Velocipede.**

This invention is a carriage to be propelled by the passenger or rider himself, and it is driven by levers and treadles worked by the hands and arms, the levers being attached to the cranked axle behind, in the usual way. This vehicle is designed to supersede the old-fashioned velocipede entirely. It attains a much higher speed and is easily controlled. It can be run, it is said, at from eight to twelve miles per hour. It was first invented in England, and is patented in that country and the United States. It is made of wrought iron, in different sizes and styles, and is designed both for youths and adults. A young child can work one of these machines, adapted to its size, unaided, and propel it at a high velocity. It is highly popular in England, and is called by the proprietors a gymnasium in miniature, since it calls most of the muscles in the body into action.

It was patented in the United States, through the Scientific American Patent Agency, on September 13, 1864, by Joseph Goodman, and assigned to C. P. Button, of New York. For further information apply to J. R. Pomeroy, No. 192 Broadway, or at No. 248 Canal street, where a working model can be found. The patent for the United States is for sale.

New Method of Photo-relievo Printing.

A method of producing, by means of the printing press, transcripts of photographic negatives with any approximation to delicacy, definition, detail and true photographic half-tone, is a process which must interest every one; first, by its elegance and ingenuity, and next, with its economic importance. In our last Mr. Walter Woodbury gave a succinct account of the method by which he is able to effect his object, and on Saturday last we had the pleasure, in company with about a dozen gentlemen, distinguished in connection with photography, art and science, assembled for the purpose, at our private residence, of witnessing the operation. Mr. Woodbury demonstrated, as far as improvised apparatus would permit, the

method of securing impressions on paper and glass, by pressure only, from an intaglio plate, obtained by the process described, by the aid of a photographic negative.

The new system of printing consists in a combination of the principle upon which intaglio or copper-plate printing is based, and that upon which the image

in carbon printing is obtained. An image in which the shadows are in relief, and the whites depressed, is obtained by exposing bichromated gelatine under a suitable negative to the action of light, and afterward to water. The details of the process may be varied, but we need not enter into them here, as the principle is well known. From the gelatine an electrotpe is obtained with the lights in relief, and the shadows depressed, as in an engraved copper-plate. This is the block or cliché from which impressions

**THE "RANTOONE."**

have now to be obtained by mechanical means. It must be borne in mind that the intaglio so obtained represents by degrees of depth the gradations of the image. This intaglio is now to be filled with a thick solution of gelatine, containing indian ink, or other coloring matter mixed with it; when slightly set, and the surface cleaned, as in copper-plate printing, it is placed in contact with paper, the surface of which would be best prepared with gelatine, albumen, or collodion, to prevent it being absorbent; the block is then brought into firm contact by steady heavy pressure. The set gelatine and color will be thus delivered on to the paper, much in the same way that the cook delivers a shape of jelly from its mold. The gelatine and color so delivered on to the paper will in all respects resemble a carbon print. The deepest shadows will consist of a thick opaque layer forming blacks, each gradation from these to white consisting of a thinner layer of the translucent material.

We have said that in demonstrating on Saturday Mr. Woodbury was confined to the use of improvised apparatus and material, his press, etc., from a misunderstanding, not having come to hand. A brief description, however, of these improvised arrangements may better aid those disposed to experiment in this direction, than would an account of the working of more perfect appliances. The intaglio plates, one in copper produced by electro-deposit, and one in type metal produced by pressure, Mr. Woodbury brought with him. The electrotpe mold, which was most suited for printing on paper, was in tolerably deep intaglio, the greatest depressions being about the depth of a thin card; the whole presenting somewhat the effect of an engraved copper-plate, but with less crisp or sharply cut lines. The type-metal cliché was much less deeply impressed, and was prepared with a view to printing on glass. In order to print a little gelatine was first covered with water for a few hours; when the gelatine had imbibed thoroughly the water, it was melted by heat and a little of the prepared indian ink used for carbon printing added and mixed. A little of this gelatine, kept in a fluid state by warmth, was poured on the center of the intaglio mold, covering about one-eighth of its surface. A piece of fine, hard photographic paper was placed on the gelatine, and a stout piece of plate-glass was then laid on the paper. In the absence of a press, a twenty-eight-pound weight was then placed on the glass, and left for a minute or two to allow the gelatine to set. The pressure was then removed, and the print lifted up; the gelatine slightly set, leaving the intaglio as jelly delivers from a mold, and adhering to the paper, giving a print in varied gradations, just in proportion to the thickness of the layer of colored gelatine. After taking a few impressions it is found desirable now and then to slightly grease the mold to insure the print delivering perfectly without adhering or leaving any of the colored gelatine behind.

A considerable degree of excellency has even now in the infancy of the process been obtained, and we are very sanguine that results will shortly be secured which will give the process an immediate practical economic value wherever large numbers are required. Mr. Woodbury thinks that with three or four presses going, which could be easily worked by one person, the prints could be produced at the rate of about one hundred and twenty per hour. It will be readily seen that in this respect this method might compete without much disadvantage with copper-plate printing. If, instead of merely using an ordinary water color in combination with the gelatine, a vitreous color were employed, we have a ready means of producing a print in enamel color which, transferred to glass or China vessels, might be burnt in without difficulty. Other pictorial and decorative applications will readily suggest themselves as the process comes into use, increasing its value and interest.

Another application of the same principle, and that to which we believe Mr. Woodbury, at the outset of his experiments, attached the most importance, is the production of transparencies in porcelain, the image being produced by the various degrees of relief, and, consequently in semi-transparent material, in degrees of transparency or opacity. From the intaglio molds already described it will be seen, such images in porcelain could be easily produced.—*London Photographic News*, Aug. 25.

A STEAMER of 200 tons is about leaving Hamburg, under the command of Captain Hagemann, on an exploring tour to the Arctic Ocean, and is said to be the pioneer of an expedition upon a large scale. The expedition will proceed to the eastern coast of Spitzbergen, possibly also to Gillis Land, from which point the actual object of exploration will be entered upon. This is to ascertain by careful examination of the seas between Spitzbergen and Nova Zembla, whether Dr. Petermann's conjectures as to the direction of the gulf stream are correct. The funds for the exploration have been partly raised by subscription among the Senate and citizens of Hamburg.

TO MACHINE WORKS AND RAILROAD COMPANIES.—We call the attention of persons desiring the services of a first-class mechanical superintendent to the advertisement headed "Situation Wanted," in this number. The person is well known by us as every way capable of filling the post he seeks.

Correspondence

Hard Rubber Violins.

MESSRS. EDITORS:—I would like you to inform me if any of the patentees of hard rubber or gutta-percha goods have tried the manufacture of violins and bows of this material, and, if so, why they did not succeed; what were the objections to the same, as dampness will not have any effect on them, and nothing but heat will, I think. This is a good point in their favor. Provided the sound is all right, they could be finished up finely. As to the bows, I can see no objections. I would like to see the experiment tried, or to get a violin and bow of this material.

E. I. HUGHES.

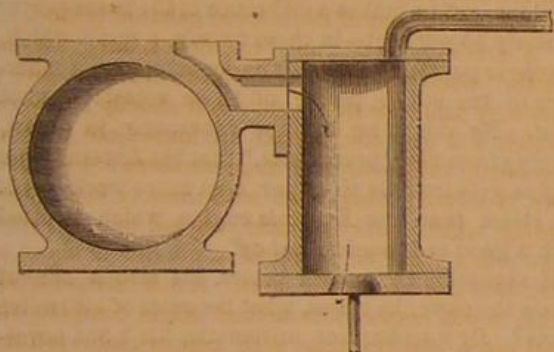
Pittsburgh, Sept. 5, 1865.

[Hard rubber flutes have been made, but we never heard of a violin of this material. Something besides hardness is required. Resonance would be wanting in hard rubber; it seems to us that the sound and quality of it would be harsh and dissonant.—Eds.]

Condensing Engine without an Air Pump.

MESSRS. EDITORS:—I send the following description, which may be interesting as a novelty and also useful in cases where water is abundant and steam of moderate pressure is used:—

Upon the exhaust of a high-pressure engine I screwed a vertical pipe of more than twice the area of the exhaust passage, and half filled with long wires; the top end of the pipe was closed and an injection entered into it, the water running from a height above the pipe, so that it would at all times run into



it when the injection cock was open; the bottom end of the pipe had a large valve opening downward; the exhausted steam condensed on the cool wires and the bottom valve closed, forming a partial vacuum in the pipe and the cylinder; at the end of the stroke the valve opened and the water dropped out. This apparatus increased the velocity of the engine several revolutions and was not expensive to apply to the machine.

T. McDONOUGH.

Newburgh, N. Y., Sept. 1, 1865.

Query.

MESSRS. EDITORS:—"Which is the left side of a round pudding?" I am reminded of the above by an article in your last number, describing a process of extracting corks from bottles. The left side of a round pudding is that which is not eaten; but can you tell us which is the "right side" of a round bottle? The right end was probably meant by your correspondent.

CRITIC.

Boston, Mass., Aug. 26, 1865.

[Our critic is not familiar with bottles. The top is the right side—the other end is the wrong side (up).—Eds.]

Washing Recipe.

MESSRS. EDITORS:—Seeing an article in your paper of the 2d inst., headed "Improvements Suggested," in which the writer states that chemistry instead of mechanics should be referred to in making washing easy, I thought I would send you a recipe which my wife has used for more than a year, without damage to the clothes. If you will give it a place in your paper it may be the means of preventing a great many lame backs and sore fingers from hard rubbing:—To 16 quarts of rain water add 3 lbs. of sal soda and $\frac{3}{4}$ lbs. of a lb. of unslacked lime. Set it over the fire until it is just warm, then stir it well and set it away for use. Take one pint of the fluid to two pails

of water, and boil the clothes in it. The dirtiest of them will come out white and clean with very little rubbing. There is no danger of its rotting the clothes, as we have thoroughly tested it. It is within the reach of all, and costs only about two or three cents for a common washing.

A SUBSCRIBER.

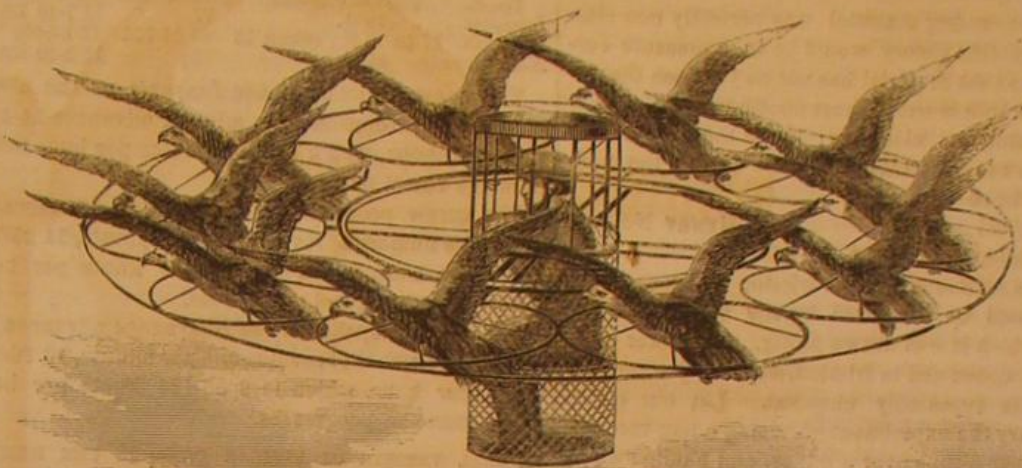
Milwaukee, Wis., Sept. 5, 1865.

A Natural Flying Machine.

MESSRS. EDITORS:—You have of late published

which may be comprehensible to a draughtsman, and, if remodeled by him, may be presentable (with the explanation) to the public, if you see fit to introduce them.

I have drawn the figure to admit the use of ten birds, estimating that each could carry twenty pounds, as it is stated that eagles often carry off lambs and kids in their talons. The circle could easily be enlarged, or another circle could be added on the outside, and each bird might swing in all di-



several articles on the subject of flying machines, and are, it is therefore to be presumed, disposed to invite discussion of the question, believing, doubtless, that the time will come when man will subject the air, as he has the other elements, to his control. I venture to submit for publication a plan, to me apparently simple and feasible, that occurred to me many years ago, but that I have never found opportunity to put to the test of experiment. It is to do what man has already done upon the earth—make use of the powers of the inferior animals given to him to be his servants to effect his purposes. There are many birds noted for strength of wing and endurance in flight. The brown eagle and the American swan particularly suggest themselves. I propose to obtain a number of such birds (swans would probably be the most easily entrapped, but it might be a question whether they would bear our summer heats); ascertain by experiment their power of raising and sustaining additional weight to that of their own bodies, and attach them by jackets fitted around their bodies and cords to a frame work, which shall sustain a basket large enough to hold a man standing or sitting, so that the greater part of his body shall be below the points by which the basket is to be swung, precisely as a chronometer is swung with free play in all directions. The frame work should be hollow, as well to give the greatest strength with least weight as to afford passage way for cords which should lead from the man occupying the car to a light apparatus fitted upon the back or wings of each bird, by which the driver could, at pleasure, compress the wings to compel a descent or release them for flight. A similar arrangement of cords might regulate the direction of flight, by drawing the head of the bird to one side or the other.

I have attempted to give a sketch of my plan,

rections within its circle, as does the basket car in the center.

Baltimore, Aug. 30, 1865.

Transmitting Power.

MESSRS. EDITORS:—I notice a mechanical question asked by T. J. Cornell, Esq., of Decatur, Ill., in the issue of last week, and answered by yourselves, which seems to me to be treated too lightly. Very many of the readers of the SCIENTIFIC AMERICAN rely upon the opinions of its editors, and take them for law and in this case might be led into an expensive error. About eight years since I was running three saws by water power; the building being small and inconvenient, I wanted to move them to another at about one hundred feet off, but hesitated on account of this very question; to wit, "Does it take more power to move a load when the power is twenty feet from the load than when it is two feet?" A question which all practical men maintain and all scientific deny. I propounded the question to the venerable President of Union College and to its distinguished Professor of Engineering. Both of course ridiculed it, and gave the usual scientific answer, that "the loss would be but the weight of the connection," which influenced me to make the change; but to my sorrow I found this weight so great that it used up the power of the wheel, so that I could not drive one saw with sufficient speed—though the volume of water and height of head remained the same, and the wheel undisturbed. As I could not increase either, I had to move back again, when away went the wheel with all three saws and a surplus.

Your correspondent can prove the correctness of my experience and assertion, that any given power can be used up or lost, by increasing the length of the connection between that power and load—by

taking a rope (say a clothes line) one hundred yards long, and attaching to one end a weight of about one hundred pounds (say a bag of grain) and at the other a man; let the man try and drag the bag, and after failing in which, let him drop the rope on the ground, and go to the big end, and take hold at two feet, and pull in the opposite direction, letting the hundred yards of rope drag—to balance the dragging in the first instance. He will find, though he may keep his hand down on a level with the bag, that he can drag it quite readily.

If the connecting material was perfectly non-elastic, the scientific theory would be in a measure correct, but as that material has not as yet been discovered, the practical world must continue to lose power in overcoming its elasticity; hence the shorter the connection the less elasticity there is, and the more effective will be the power.

J. V. HENRY NOTT.

Guilderland, N. Y., Sept. 4, 1865.

[There is no doubt that the friction of a bag on the ground would be increased by the sagging of the rope by which it was drawn along, and power may be rapidly consumed in friction, especially where the direction is repeatedly changed. Let our correspondent try the experiment of raising a bag vertically by passing a rope over a pulley, and hauling alternately on ten feet of the rope and on a hundred feet, and see if he perceives much difference. So in transmitting his power, if he had had one open belt a hundred feet long, touching nothing but its two pulleys, we suspect he could have run his three saws.—Eds.]

THE CONGRESSIONAL REPORT ON ISHERWOOD'S MACHINERY.

[From the New York World.]

In every attempt which has been made to find out the actual performance of the screw-propeller machinery which Isherwood has proportioned and thrust into nearly all our new naval vessels, he has managed to so engineer the reports and statements of the work done by his machinery that the truth has been wholly disguised. The case in point, and the one which it is now proposed to analyze, are the bogus tables which Isherwood furnished the Naval Committee, who were instructed to examine into the performance of the steam machinery planned by the Steam Bureau of the Navy Department. These tables, officially furnished to the committee, and published by them in their report, were received without a doubt as to their truthfulness. In order that the incorrectness of these tables may be understood, extracts are given below (copied from the Congressional Report), together with the same particulars of the machinery of other naval propeller vessels, planned before Isherwood's reign commenced, and of several British naval vessels.

NAVAL SCREW-PROPELLED VESSELS WITH ISHERWOOD'S MACHINERY.

Vessel.	Pitch of Propeller.	Revolutions.	Speed of Ship.
<i>Iroquois</i>	19 ft.	77	11 7-10 knots
<i>Dakota</i>	17 to 19 ft., mean 18	80 28-100	12 knots
<i>Kearsarge</i>	19 ft.	73½	11 2-10 knots

The screw propeller of the *Iroquois*, at the above number of revolutions per minute, advances 14 4-10 knots per hour, which is 2 7-10 knots per hour faster than the vessel progresses.

The screw propeller of the *Dakota* advances, at the above number of revolutions per minute, 14 25-100 knots per hour, which is 2 25-100 knots per hour faster than the vessel progresses.

The screw propeller of the *Kearsarge* advances, at the above number of revolutions per minute, 13 76-100 knots per hour, which is 2 56-100 knots per hour faster than she progresses.

On page six, of Congressional Report, the maximum speed of these vessels is stated to be 12½ knots per hour.

The *Nyack*, etc., propeller, according to the revolutions given by Isherwood, advances 12 1-100 knots per hour; the speed of the vessel he states to be 12½ knots; thus she is going 38-100 knots faster than her propeller—the forward part of propeller of course dragging.

The *Penobscot*, etc., propeller, according to revolutions given by Isherwood, advances 10 7-10 knots per hour, 1-10th of a knot faster than vessel the forward part of propeller being dragged through the water.

This performance is like that of the man who at-

tempted to lift himself up by standing in a tub and pulling on the handles.

It is known that the *Nyack*, in smooth water, makes with 35 pounds of steam 78 revolutions, and goes 10 knots, which gives a slip of 13 per cent, about what it should be.

It is also known that the *Penobscot*, a sample of her class even if she could make 90 revolutions, would not go 10, nor even 9½ knots per hour, under steam alone. The *Lackawanna* class will be discussed presently.

SEVERAL NAVAL VESSELS WITH MACHINERY OF THE USUAL PROPORTIONS, BY VARIOUS STEAM ENGINE FACTORIES, EXTRACTED ALSO FROM ISHERWOOD'S TABLES.

Vessel.	Pitch of Propeller.	Revolutions.	Speed of Ship.
<i>Iroquois</i>	19 ft.	77	11 7-10 knots
<i>Dakota</i>	17 to 19 ft., mean 18	80 28-100	12 knots
<i>Kearsarge</i>	19 ft.	73½	11 2-10 knots

The screw propeller of the *Iroquois*, at the above number of revolutions per minute, advances 14 4-10 knots per hour, which is 2 7-10 knots per hour faster than the vessel progresses.

The screw propeller of the *Dakota* advances, at the above number of revolutions per minute, 14 25-100 knots per hour, which is 2 25-100 knots per hour faster than the vessel progresses.

The screw propeller of the *Kearsarge* advances, at the above number of revolutions per minute, 13 76-100 knots per hour, which is 2 56-100 knots per hour faster than she progresses.

SEVERAL VESSELS OF SIMILAR CLASS IN THE BRITISH NAVY.

Doris—Screw-propeller, 30 feet pitch, 51 49-100 revolutions per minute; speed of ship, 12 4-100 knots.

Flying Fish—Pitch of propeller, 20½ feet, 81 8-10 revolutions per minute; speed of ship, 11 17-100 knots.

Curacoa—Pitch of propeller, 20 feet 1 inch, 64 revolutions per minute; speed of ship, 10 7-10 knots.

Dauntless—Pitch of propeller, 16 feet 4 inches, 70½ revolutions per minute; speed of ship, 10 1-100 knots.

Doris (propeller) goes 3 16-100 knots faster than ship.

Flying Fish (propeller) goes 5 33-100 knots faster than ship.

Curacoa (propeller) goes 1 97-100 knots faster than ship.

Dauntless (propeller) goes 1 35-100 knots faster than ship.

RECAPITULATION OF THE SLIP OF ALL THE VESSELS.

Lackawanna, etc., (Isherwood), no slip, forward portion of screw dragging.

Nyack, etc., (Isherwood), vessel goes 3 per cent faster than screw, forward part dragging.

Penobscot, etc., (Isherwood), 7 5-10 per cent slip, forward part dragging.

Iroquois (the usual proportion), 18 per cent slip.

Dakota (usual proportion), 16 per cent slip.

Kearsarge (usual proportion), 18 per cent slip.

Doris (English), 20 per cent slip.

Flying Fish (English), 32 per cent slip.

Curacoa (English), 14 8-10 per cent slip.

Dauntless (English), 11 8-10 per cent slip.

Slip, it should be remembered, is the difference between the progress of vessel and propeller.

Such results, as Isherwood has thus officially stated, are obtained in the screw-propelled vessels fitted with machinery of his proportions, are thus clearly shown to be impossible. Such results cannot be accounted for by the anomaly, which in some rare instances has been observed in screw vessels, namely, "negative slip;" the stern lines of the *Lackawanna*, etc (Isherwood), and those of the *Iroquois*, *Dakota* and *Kearsarge* are practically the same. It should be remarked that these revolutions of propeller and speeds of the several vessels, as given by Isherwood, are, of course, those supposed to be obtained in perfectly smooth water, the vessels uninfluenced by either wind or tide. This being the case any difference in the surface of the propellers, by different diameters, etc., cannot come to the aid of his disingenuous tables, particularly as the proportion of the propeller's disk—i. e., the circle equal to its diameter—to the midship section in both the *Lackawanna*, *Juniata* etc. (Isherwood's), is nearly the same as that of the *Iroquois*, *Dakota* and *Kearsarge*. This proportion in the *Lackawanna* is as 1 to 2 6-10; in *Juniata*, as 1 to 2 8-10; in *Iroquois*, as 1 to 2 4-10; in *Kearsarge*, as 1 to 2 8-10; in *Dakota*, as to 2 97 100.

Unfortunately for himself, in another sense than the wickedness of the deceit itself, Isherwood, in his statement of the revolution, speed and power developed by the vessels with his engines, has supplied data from his own figures, which prove at once the utter inefficiency of the machines he has proportioned. Marine engineers throughout the world have an expression for comparing the performance of engines, hull and propeller collectively, called the "coefficient of performance." This coefficient, as may be seen in any engineering primer, is found by multiplying the area of the midship section in square feet by the cube of the velocity in knots, and divided by the indicated horse-power.

Of course the higher this coefficient the better the performance.

Performing this simple operation on the several United States vessels already mentioned, using Isherwood's statement, the following result is obtained:—

Lackawanna and *Ticonderoga* (Isherwood's), 613; *Sacramento* (Isherwood), 609; *Monongahela* (Isherwood), 614; *Adirondack*, *Juniata*, *Ossipee* and *Housatonic* (Isherwood), 604; *Canandaigua* (Isherwood), 628; *Shenandoah* (Isherwood), 628; *Iroquois*, 747; *Kearsarge*, 771; *Dakota*, 733; *Oneida*, 747.

Now, as the hulls of these vessels are of practically the same model, they offer relatively, with the power which Isherwood states they exert, the same resistance in passing through the water. This being so, the comparison, as shown by their coefficients, appears to be solely between the engines, "per se," (as Isherwood would say), so it is clear that the only way to account for the inferior performance of those vessels with his machinery, is in the mal-proportion of the engines "per se."

Although this gentleman states that the power developed by his engines, in the above vessels, was 1,304 horse-power, it is plain that but a small portion of this power could have been expended in pushing the ship through the water; the rest was wasted in the friction and heated bearings, which are inseparable—at the number of revolutions he says they make—in engines of such outrageous mal-proportions. Now, the *Iroquois*, well known as one of the fastest and most successful vessels in this or any other navy, according to Isherwood, exerts 813 horse-power, with boilers of the same style and almost exactly the same amount of grate and heating surface as the *Lackawanna*, etc., fitted with the machinery of his proportions, which he asserts exerts 1,304 horse-power. It is plain that the boilers of the *Iroquois* will boil off nearly as much water, consuming the same amount of coal as her sister's, with Isherwood's proportions, yet he makes a difference of 491 horse-power—nearly 40 per cent—in these vessels, a result which, "ceteris paribus," is simply impossible; such a difference in the steam power of these vessels cannot exist. No doubt he has the assurance to assert, judging from his "precedents," that his *Lackawanna* engine gets from 30 to 40 per cent more work out of the steam than the *Iroquois* engine, which is fitted with a good independent cut-off.

If, according to his own tables, his sloops cannot create the power he states, what becomes of his twelve knots? By a triumph of arithmetic, his 1,304 horse-power is just about what his engines would give if they carried forty pounds pressure in the boilers, and seventy revolutions; but with this power the mean pitch of screw only advances twelve knots, and the forward part is being dragged through the water.

Isherwood himself says in one of his "papers" in the *Franklin Journal*:—

It must be distinctly remembered that a negative slip (the vessel progressing faster than the propeller) can only happen when the vessel has a high speed, and owes a considerable portion of it to a power additional to that applied to the screw—that of the sails for instance; though it has frequently been reported to exist, when the vessel was being propelled by the screw alone. In these cases, it was manifestly the result either of inaccurate observations of distance gone and revolutions made, or of a mistake in the pitch of the screw, reckoning it less than it really was.

The only conclusion which can be arrived at is, that in order to exaggerate the performance of his own vessels, he has overstated both their power and speed, and underrated that of the others, the engines of which are built on the usual plans. For this transparent trick he should be subjected to the severest censure.

It is generally known that it was with great difficulty the engines of the *Lackawanna*, etc., could be made to go at all, on account of the defects in the main valves, and that these engines are so overloaded with unnecessary material, that the friction and chronic state of heat of the principal bearings entirely precludes the possibility of working off the steam; which the boilers, if in proper order should supply them.

The *Wyoming*, a vessel of the *Iroquois* class, is fitted with one of the very finest pairs of engines in the navy, of the usual proportions adopted by the most successful makers in America, France, England, Sweden and Russia, and arranged with a good independent cut-off.

A comparison, therefore, between these engines and those proportioned by Isherwood, for the *Lackawanna*

wanna, etc., will illustrate his professional ignorance.

The *Wyoming* has two cylinders, fifty inches in diameter by thirty inches length of stroke; the *Monongahela* (Lackawanna class, Isherwood's) has two forty-two inch cylinders by thirty inches length of stroke. Assuming that the former carries twenty-five pounds of steam and the latter thirty-five pounds, the strain put on the *Wyoming's* engines is five thousand nine hundred and fifty-eight pounds greater than on the other, yet Isherwood has put into the *Monongahela*, etc., seventy-eight per cent more cast-iron, sixty-eight and a half per cent more wrought iron, one hundred and seven per cent more brass, and sixty per cent more weight in the reciprocating parts than the *Wyoming* engine, which, as before stated, is one of the most perfect in the naval service. There is no doubt (see his specifications) but that he intended these sloop engines to make a greater number of revolutions than those of the sloops *Iroquois* and *Wyoming*, as he employed a propeller of finer pitch, but in consequence of his mal-proportions, so much power is absorbed in excessive friction when running, as he states, at 70 revolutions, developing 1,304 horse-power—587 more than the *Wyoming*—he is not able to make as many revolutions as that vessel does with a screw of much greater pitch. Mr. Bartol, one of our first marine engineers, said, before the naval committee, "I do think putting in engines of excessive weight has been fatal to the naval engines." These facts are conclusive as to the professional incapacity of the chief of the Naval Steam Bureau. Perhaps Isherwood will meet these damaging statements by insisting that his tables are right, and producing, as he did once before, letters from dependent contractors and engineers, stating that his vessels, under steam alone, advanced through the water faster than their propellers were progressing. But this question is one of easy determination. Let one of these sloops, with the naval committee on board, be run from New York to West Point and back; the evidence of any intelligent person, noting the speed and number of revolutions, would be just as reliable, and perhaps more so, than any number of "expert" affidavits obtained under the circumstances which he obtains his. This trial would give much more valuable information than a trip on the Potomac with an old-fashioned American poppet valve-expansion paddle-wheel engine (the same as has been used in the merchant service for twenty-five years)—a trial got up for the purpose of throwing dust in the eyes of his superiors.

RHADAMANTHUS.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Apparatus for Putting up Work on Knitting Machines.—This is an apparatus for setting up work on knitting machines, by the aid of which the work may be set up in a knitting machine almost instantly, without the aid of old work. By this means a great saving of time is secured upon any knitting machine to which it may be adapted, in renewing the work, when, by accident, it may have run off a machine; but its value is especially apparent in the facility it affords for knitting the heels of stockings. Isaac W. Lamb, of Rochester, N. Y., is the inventor.

Watch and Purse Safe.—The object of this invention is to protect watches, purses, and other articles of value from being stolen from one's person by pickpockets or other thieves. It consists in constructing a safe which fits within, and is sewed or riveted fast to, the pocket of a garment, and which is made in two parts that become separated in order to receive the watch or other article to be placed in it for safe keeping. C. W. Devereux, No. 180 Ninth avenue, New York, is the inventor.

Insoles for Boots and Shoes.—This invention consists in coating, in any proper manner, the inner side or surface of the sheep-skin, used for the insoles of boots and shoes, with a suitable enameling or protective composition. By this means the skin is not only prevented from wrinkling or stiffening, but it is also rendered impervious to moisture, either from the perspiration of the foot or from the penetration of

water through the leather, or other material, of which the boot or shoe is made. John K. Gittens, of Brooklyn, N. Y., is the inventor.

Opening the Veins of Oil Wells.—This invention consists in opening the veins and crevices of oil wells, by forcing the water and other liquids which are in the well into the said veins and crevices, and thereby removing the obstructions thereout, so as to permit the gases and oil to resume their flow. Isaac Relf, of Minago, N. Y., is the inventor.

Packing for Tubes of Oil and other Wells.—This invention relates to packing the tubes of oil and other wells which are to be protected from the inflowing of surface water, and of water from springs and other sources. It consists in applying a series of flat springs, arranged lengthwise, in the form of a cylinder, about a well tube, the latter being divided or made in two sections, within the points inclosed by the springs, and their ends connected by a coupling in such a way as to make a sliding joint. The ends of the springs are fixed to the different sections of the pipe, and the several springs are inclosed by a cylinder of gutta-percha or other suitable elastic material. Francis Martin, No. 52 Barrow street, New York, is the inventor.

Folding Seat for Wheel Vehicles.—This invention relates to a folding seat for wheel vehicles—such as are provided with a back and sides—and it consists in attaching the back and sides of the seat to the latter, and arranging the same in such a manner that the back and sides will automatically fold and unfold as the seat is turned up for use and turned down when not required for use. Henry A. Gilbertson is the inventor, who has assigned it to Wood Brothers, 596 Broadway, New York.

Rigged Oar or Boat Fin.—This invention relates to a means for propelling small boats—row boats, commonly so termed—and is designed as a substitute for, and an improvement upon, the common oar now used for such purposes. This propeller, which the inventor terms a rigged oar or boat fin, consists in attaching to each side of the boat, by joints, one or more blades or paddles, arranged with rods in such a manner that the operator may work said blades or paddles to propel the boat forward while sitting with his face toward the bow, and, at the same time, have perfect command over the boat, and apply his power in a direct and far more favorable manner than by the ordinary oar. Ralph Smith, of Brooklyn, N. Y., is the inventor.

Automatic Press.—This invention relates to a press designed for striking up or swaging articles into various forms, and consists in the employment of a feed wheel in connection with a driving wheel, a bolster plate, a slide and a cam, all arranged in such a manner as to admit of the work being performed automatically and expeditiously. Peter Hayden, of Pittsburgh, Pa., is the inventor.

Let-off Motion for Looms.—This invention consists in making the reed, or that part of the batten which comes in contact with the woven fabric in beating up, yielding, and combining it by means of levers, pawl and ratchet wheel, with the yarn beam, in such a manner that, when the batten moves forward, and its yielding portion comes in contact with the woven fabric, in beating up, the pawl is drawn back more or less, according to the force which said yielding part of the batten has to overcome in beating up, and when the batten falls back the yarn beam is turned in proportion to the motion previously given to the pawl, and, consequently, the let-off motion is regulated by the force of the blows exerted by the batten in beating up, and the texture of the fabric produced is of uniform density throughout. Samuel Estes, of Newburyport, Mass., is the inventor.

Steam Boiler.—This invention consists in placing the furnace or fire-place of a steam boiler at or near the top of the same, in such a manner as to have there the highest heat, causing, at the same time, the hot gases to descend toward the bottom of the boiler, either in a zig-zag direction or otherwise. By these means different degrees of heat are produced in the water, the highest degrees being always on the top, and the lowest at the bottom of the boiler, and, consequently, no circulation of the water will take place, as in ordinary boilers, whether the water is made to pass through the tubes or outside of them, and whether those tubes are placed in a horizontal, vertical, or any other convenient position; and, further-

more, the heated gases being brought in contact with water of gradually decreasing temperature will be deprived of all their heat, or nearly so, before they are allowed to escape through the chimney. R. Rafael, of the Delamater Works, New York City, is the inventor.

Fresh-water Apparatus.—This invention relates to an improvement in that class of apparatus known as "Lighthall's Fresh-water Apparatus," its object being to condense a sufficient quantity of steam to obtain water for injection which is free from all air and other impurities. In Lighthall's apparatus the exhaust steam from the cylinder passes into a box which is filled with a large number of pipes terminating in chambers which communicate with an unlimited supply of cold water. It used on board a vessel, said chambers communicate with the open sea. By coming in contact with the cold surface of these pipes, the steam is condensed, and a sufficient quantity of pure water, free from air, is obtained for the injection. This water, however, is not cooled down to the desired degree of temperature unless the apparatus is made very long and expensive. The improvement which forms the subject matter of this present invention consists in passing the pipe, which serves to draw the injection water from the condensing chamber through the chamber or chambers at one or both ends of the condensing chamber, either in a direct or in a serpentine line or coil, in such a manner that the injection water, while passing through said chamber or chambers filled with cold water, is cooled down several degrees without increasing the size or capacity of the condensing chamber or without materially increasing the cost of the apparatus. Thomas Callan, of Philadelphia, Pa., is the inventor.

Cornet.—This invention involves, or rather creates, an entire change in the construction and shape of the cornet. It involves also a different manner of holding the instrument in playing, and the operator has great facility in sustaining it, in operating the keys, and in relieving the instrument of water. The invention will be understood by an expert from the claims alone, without an elaborate explanation. Louis Schreiber, of New York city, is the inventor.

Production of Steel by Means of Gases.

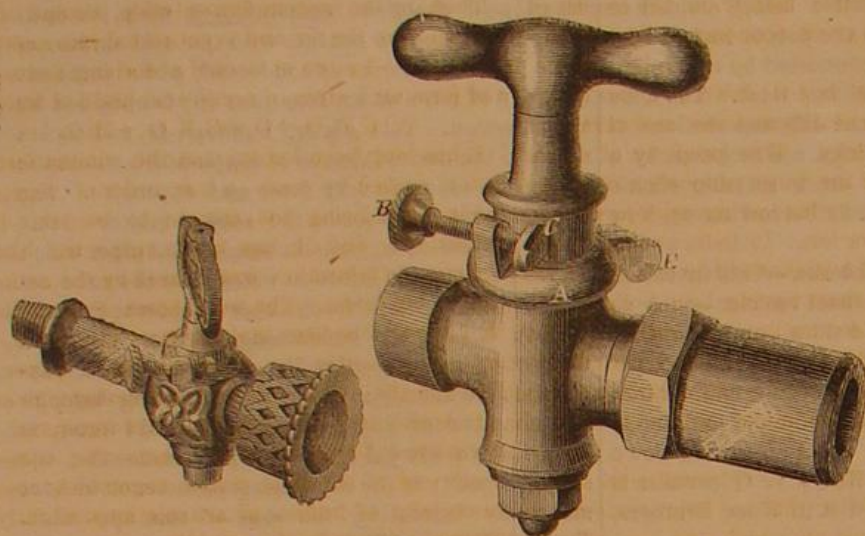
M. Aristide Berard brought before the Academy of Sciences, at its sitting on June 26th, his method of forming steel by means of gases. It consists in alternately oxidizing and reducing cast iron in a furnace suited to the purpose. The oxidation is produced on one portion of the cast iron, by the introduction of atmospheric air, and the reduction on another by a mixture of hydrogen and carbonic oxide, previously freed from sulphur. After twelve or fifteen minutes the processes are reversed, the portion subjected to oxidation being submitted to reduction, and *vice versa*. Any oxygen evolved is absorbed by burning coke placed in a suitable position. When this alternate action is found by trial to have been continued long enough the operation stops, decarbonization being the terminating process. During oxidation the bases of the metals proper and of the earth are oxidized; the sulphur, phosphorus, etc., form acids, and escape. During reduction, the iron is brought to the metallic state, and the earths separate as scoria, any remaining sulphur, phosphorus, etc., being eliminated as acids, and some carbon is restored to the iron. A high temperature is produced during oxidation, a low during reduction. Ten or twelve tons are manipulated at each operation in the establishment which has been formed by the inventor; and the steel produced is said to have all the properties of the ordinary kind. —Trade Circular.

CATERPILLARS FOR WELDING IRON.—The Pittsburgh Chronicle says:—"Workers in iron, when they wish to weld a joint, use borax as a flux. An intelligent gentleman of this city, who is curious in facts of natural history, says that on one occasion a blacksmith near his residence having no borax, a man hanging round the shop told him he could get a substitute, and brought him a number of caterpillars, which, being applied to the heated iron, made as strong and firm an adhesion of the metal as the borax."

[Workers in iron who understand their business can make "a strong adhesion" of iron without either caterpillars or borax.—Eds.]

Improved Self-regulating Faucet.

This engraving represents an attachment to a faucet for regulating the flow of liquid through the same, so that the fluid can be drawn off, and the faucet closed properly to prevent leakage. This is useful where inflammable liquids have to be drawn, such as naphtha. No light can be carried near this liquid, as it explodes instantly if brought in proximity to a lamp. The attachment consists of a collar, A, provided with a screw, B, and a pin, C, let into the plug of the faucet. The collar is fast on the shell, being secured thereto by the bolt, E, and the screw, B, can be run in or out, so as to allow the opening to be varied at will, as shown in the engraving. For gas fixtures this arrangement is very desirable, as

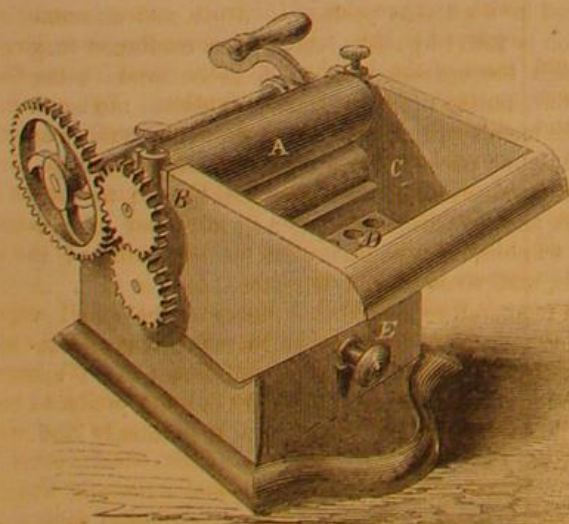
**PERCIVAL'S SELF-REGULATING FAUCET**

the amount of light can be adjusted to a nicety thereby; a full head of gas can only be turned on by setting the screw at a certain point. As this is not likely to be tampered with, hotels or boarding-house keepers can secure themselves against extravagance in this respect. This arrangement is also applicable to gas stoves, where a fixed heat is desired.

It was patented through the Scientific American Patent Agency on July 25, 1865, by Dr. George G. Percival; for further information address him at Waterville, Maine.

PRICE'S PEA SHELLER.

This machine is intended to perform a tedious operation now done by hand—that is, to shell beans and peas. The details of this machine are simple enough, being merely a pair of rollers, A, covered with india-rubber, similar to those used in wringing machines, and mounted in a wooden frame, B, in the same general way. These rollers are connected by gearing with a shaft and crank, so that when the



same is turned the rollers will revolve also. In the bottom of the compartment, C, in which the rollers work, there are holes, D. These holes let the peas and beans fall into the drawer, E, below. By turning the rollers, the pods are drawn in, and the compression causes them to burst open and deliver the peas on the other side in good order. Where large quantities of the vegetables in question are to be shelled, the inventor provides an endless apron, not shown—one on each side—so that the peas are carried into the rollers regularly, and the pods thrown out on the other side.

For hotels and boarding-houses the machine will effect a saving of labor. It was patented through the Scientific American Patent Agency Aug. 16, 1864, by G. B. Price; for further information address patentee at Watervliet, N. Y.

SMITH'S RIVET.

In riveting with the common solid-end rivet, it is a common experience, even with the greatest care, to have the rivet "cant" over and spring the whole job out of shape. It is also common for a mechanic or



other person to strike from five to twenty-five blows before he can form a proper head, or clinch, on a rivet, even under the most favorable circumstances; and also when riveting on leather or other soft material, to have the rivet "dance round" so as to render it almost impossible to form a head at all. All these difficulties are entirely obviated by this improvement, which consists in countersinking the end of a rivet, as shown, so that when this rivet is struck with a stunt punch, or set or squeezed with an eyelet nipper or other suitable stool, the outer edge will easily turn over so as to form a handsome and substantial head, as compared with the bad jobs which frequently disfigure all kinds of articles on which rivets are used.

The improvement is applicable to all kinds and sizes of rivets; the countersink can be made of any required depth, and, in the opinion of experts, with very slight alteration in the common rivet machine, be made as cheaply and quick as common rivets are now made.

This invention was patented Feb. 21, 1865, by John W. Smith; for further information address him at No. 152 Washington street, Boston, Mass.

Pothooks.

In the last century, the original Crawshay, then a farmer's son, rode to London on his pony (his sole property) to seek his fortune. He began by sweeping out the warehouse of an ironmonger, who was of a discriminating mind, and saw that young Crawshay had good stuff in him. The ironmonger had been speculating successfully in sending out iron pots to America, and his astute apprentice observed that if the Americans used so many pots they must want hooks to hang them on. Whereupon his master not only took the hint, but kindly determined that Crawshay should send them out, and that he would lend him the money for the purpose. Upon this venture £100 was realized, and from that time the farmer's son moved rapidly upward, being first taken into partnership by his master, and ultimately becoming an iron king in South Wales.—*Once a Week.*

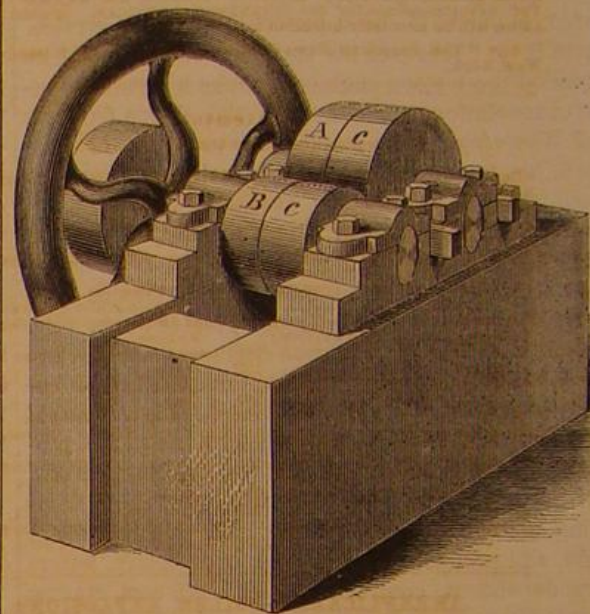
HITCHCOCK'S ROLLER QUARTZ MILL.

It is asserted by those familiar with the subject, that after many years of experiments and experience in grinding ores for procuring the precious metals, there has never been a machine produced that equals the Cornish rollers for speed and capacity of work. But there is an objection to them on account of their wearing out rapidly; that is, when two plain cylinders are used in reducing ores to the condition of coarse sand, the middle of the cylinders are worn concave on their surfaces, which prevents them from being set up to grind to the required fineness.

By a very simple device in the present machine this difficulty is entirely overcome, as may be seen by referring to the engraving. A and B are two rollers, divided transversely through the middle into two sections, as shown by the lines, C C. When the mid-

dle of the rollers become worn by use, as shown by the dotted lines, then one or both of the rollers are taken off of their respective shafts and reversed—the out end or largest diameter of each section is placed in the middle, while the smallest diameters are at the outer ends. Each cylinder now presents a convex surface, and they will first touch in the middle, where nearly all the grinding must be done. By this arrangement they may be reversed indefinitely, and made to last any length of time.

Other parts of the machine are too well known to need description, except in a few minor points, as making the roller, B, about one-half the diameter of A; and making the driving pulley twice the diameter of the roller, B, using a very heavy belt with fly-



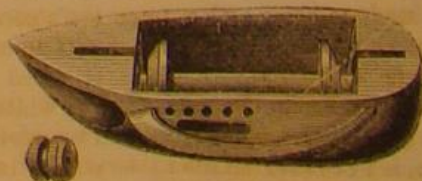
wheel and no gearing. But those machines with no gearing are not intended to be used as breakers except for desulphurized ores, or for hard quartz, after it has been passed through a breaker. To make this machine a breaker, would require gearing.

The patent having been allowed, further information may be had by addressing A. Hitchcock, Nos. 4 and 6 Pine street, New York.

CUTTER'S SHUTTLE.

The bobbins in sewing machines are liable to various contingencies, whereby their efficacy is impaired—such as getting out of the centers, wearing of the journals, battering of the same, and displacement of one end of the bobbin, so that the head wears against the end of the recess in which it works. It has been customary to make shuttles with one bearing solid and the other to spring, also with both bearings solid; these methods are objectionable and give great trouble, it is asserted, to keep the bobbins in repair. It is claimed for this shuttle that by making both of the bearings to yield or spring, all the objections noted are obviated, and that some advantages are secured. As for instance, a longer bobbin can be inserted, because both bearings spring apart; the bobbin cannot fall out of the centers unless both bearings yield in opposite directions, which is not likely to occur; the tension is more uniform, and it is easier to put the bobbin in place or remove it. The small figure represents one of the bearings removed.

The inventor has also patented an improvement in the shuttle drivers of sewing machines, whereby they are made to yield slightly, so that if the sewing ma-



chine is run rapidly the percussion will not be so great on the shuttle or the driver, and the parts will consequently last much longer without repair.

These inventions were patented through the Scientific American Patent Agency, on Aug. 1, 1865, by Volney Cutter, of Cincinnati, Ohio; address him at No. 270 Central street, that city, for further information.

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Contents:

(Illustrations are indicated by an asterisk.)

*Davenport's Gang Plow.....	191	*Perceval's Self-regulating	193
New Mineral.....	191	Faucet.....	193
Patent Zinc Smelting.....	191	*Price's Pea Sheller.....	193
Economic Magnesium Light.....	191	*Smith's Rivet.....	193
Manufacture of Ultramarine.....	192	Pothooks.....	193
Manufacturing Peat for Fuel.....	193	*Hitchcock's Roller Quartz	193
Water Power in Warehouses.....	193	Mill.....	193
*Brainard's Parallel Traversing	193	*Cutter's Shuttle.....	193
Vise.....	194	Inexplicable Boiler Explosions	199
*Velocipede.....	194	Great Improvement in Sugar	199
New Method of Photo-relievo	191	Making.....	199
Printing.....	191	Power Required to Drive Ma-	199
Hard Rubber Violins.....	195	chines.....	199
Condensing Engine Without	195	Changing Alcohol into Vin-	199
an Air Pump.....	195	egar.....	199
Query.....	195	The Opening of the Fair.....	200
Washing Machine.....	195	The Naval Engine Contest.....	200
*A Natural Flying Machine.....	195	A Sensible Governor.....	200
Transmitting Power.....	195	New Books and Publications.....	200
The Congressional Report on	195	The New Jersey Flying Ma-	200
Shaw's Machinery.....	196	chine.....	200
Recent American Patents.....	197	Patent Claims.....	201, 202, 203
Production of Steel by Means	197	*Bradley's Receiving Magnet.....	206
of Gases.....	197	*Markland's Coal Scuttle.....	206

INEXPLICABLE BOILER EXPLOSIONS.

We have before us an exchange which gives an account of a boiler explosion, and ends, as usual, with this remark: "Everything was in good order about this boiler and it was considered one of the strongest in the place." To this the impertinent skeptic might reply, how could it be in good order when it burst! And if this was the strongest, how is it that the weak ones are still in existence?

It would be curious to know how many boilers in use at the present day are inspected. Inspected, not smelled of, superficially criticised, or jocularly allowed to be "a pretty good boiler." How many inspectors are there who take off their coats, roll up their sleeves and go in where they can get in, crawl where they cannot stand, and lie down, doubled up, where they cannot crawl, in order to see what the actual state of things is—the real condition of the boiler? We venture to say there are but few boilers thoroughly inspected in this country, and the frequent recurrence of disaster shows that stringent examination is necessary. It is almost useless to look at a boiler after an explosion to see the cause; it ought to have been examined and predicted before, and the proprietor whose works are destroyed is himself to blame for the disaster which, in most cases, he might have prevented by care.

In England they have an association of sensible men who examine boilers and insure them against explosion for a small premium, and the system has been found to work admirably. At last accounts neither president nor subordinate had run away with the funds. We have no such system in this country, but we might have, with a little organization and energy; good results would be sure to follow.

We should thus, doubtless, be spared the pain of reading such an avowal as a police inspector of boilers made recently. "I examine the engines and give them certificates," quoth he, "but I am not a practical engineer myself."

On board ship the chief engineer is the inspector, and that he does his duty as a representative of his class is to be inferred from the rarity of accidents at sea from the explosion of boilers. Every explosion so caused—that is, by neglect of inspecting the boiler—can be counted on the fingers. With the commonest prudence most of the boiler explosions might be prevented.

MISS FANNY R. PURVES, of Philadelphia, proposes, as an improvement in school desks, the setting of a slate in the lid or cover of the desk, flush with the top of the desk.

GREAT IMPROVEMENT IN SUGAR MAKING.

The two properties which most broadly distinguish grape sugar from cane sugar are the inferior sweetness of grape sugar and its disposition to absorb moisture. Cane sugar is very easily converted into grape sugar, but it is not known that the reversed process has ever taken place. When juice is expressed from the sugar cane its sugar always contains two per cent or more of grape sugar—the proportion being greater if the growing canes have been bruised or wounded. In the process of evaporation the proportion is generally increased to at least 15 per cent, and every pound of grape sugar prevents the separation of a pound of cane sugar, thus causing the loss of 30 per cent. This goes mostly into the molasses.

The proportion of cane sugar converted into grape in the evaporation depends mainly on the length of the process, hence the great economy of rapid evaporation.

Grape sugar may be boiled down dry, but if exposed to the air it gradually absorbs moisture, and becomes clammy or sticky. This property of maple sugar is mainly due to the large proportion of grape sugar which it contains—this having been formed in the process of evaporation. In India and in the interior of Cuba there is a similar article of sugar made from cane—the whole mass having been boiled down to dryness instead of separating the cane sugar by granulation in the usual way. The principal difficulty with the sorghum in this country is the large proportion converted into grape sugar in the process of evaporation.

We are informed by a very intelligent sugar manufacturer from Cuba, that an improvement has recently been introduced by which the formation of grape sugar in the process of boiling is almost wholly prevented; it is simply the introduction of superphosphate of lime into the cane juice before boiling. If this is as effectual as is represented, it must be of incalculable value, not only to the sugar growers of Cuba and Louisiana, but also to the refiners of this city, and to the growers of sorghum and the manufacturers of maple sugar. The author of the improvement is Mr. Reed, an Englishman.

The several kinds of sugar are composed of carbon and water, or rather of carbon and the elements of water—hydrogen and oxygen—united in the same proportion as that in which they combine to form water. The authorities differ somewhat in regard to the composition, but the following table is from Muspratt, probably taken from the most recent determinations.

Name.	Composition.
Cane sugar, or sucrose.....	C ₁₂ H ₂₂ O ₁₁
Fruit sugar, or fructose.....	C ₁₂ H ₂₂ O ₁₂
Starch sugar, or glucose.....	C ₁₂ H ₂₄ O ₁₄
Milk sugar, or lactose.....	C ₁₂ H ₂₂ O ₁₂
Manna sugar, or mellitose.....	C ₁₂ H ₂₄ O ₁₄

POWER REQUIRED TO DRIVE MACHINES.

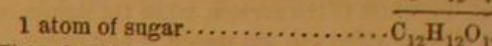
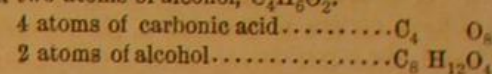
One of our correspondents writes us:—"I should like to get a table giving the number of horse-power required for the different sizes of circular saws," and we have no doubt that many others who are about to start machinery would like to know what sized engines it is necessary to provide to drive their machines. For the benefit of these persons we should like to collect a large number of facts in reference to the power employed in driving different kinds of machinery, and if any manufacturer, superintendent or engineer will send us a statement of the facts in his own case, we will, if approved, publish it, thus making our paper the medium for collecting and disseminating a great mass of knowledge in regard to this important matter.

Where an engine is employed we should like the diameter and stroke of the piston, the point of cut-off, and the average pressure carried; the dimensions of the boiler would also be interesting; then a statement of the machinery driven. Where machinery is driven by water power it would be of no interest to learn anything in relation to it unless enough can be known to enable the horse-power to be computed. This would require the height of the fall, and the quantity of water, either in pounds or cubic feet, passing through the buckets in a minute. Where this can be furnished, then a full description of the machinery in motion would be acceptable. We suggest that many manufacturers may find it to their

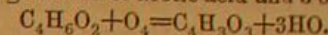
interest to forward us a statement of these facts in relation to their establishments, while they will, at the same time, be disseminating very valuable information.

CHANGING ALCOHOL INTO VINEGAR.

By fermentation sugar is changed into alcohol, and alcohol into vinegar. An atom of grape sugar is composed of 12 atoms of carbon, 12 of hydrogen and 12 of oxygen, C₁₂H₂₂O₁₂, and by the vinous fermentation it is converted into 4 atoms of carbonic acid, CO₂, and two atoms of alcohol, C₄H₆O₂.



Then, by the acetous fermentation, alcohol absorbs oxygen from the air and is converted into acetic acid and water—1 atom of alcohol absorbing 4 of oxygen, and forming 1 atom of acetic acid and 3 of water.



It has long been known that the vinous fermentation is caused by yeast—a low order of vegetable—the individual being too minute to be seen by the naked eye, and it has been suspected that the acetous fermentation was caused by the action of a similar organism. The well-known French chemist, M. Pasteur, has been making some researches, which are said to settle the question. In a paper, published in the *Annales de l'Ecole Normale*, he says:—

"Acetic fermentation is always produced by the exclusive influence of an organism—the *mycoderma aceti*—one of the most simple vegetables, consisting essentially of frames of articulations slightly compressed toward the middle, measuring about $\frac{1}{50000}$ th part of a millimeter in diameter, and double that in length. However much charged with albuminoid matter, no alcoholic liquid has ever been known to give the appearance of acetification without the presence of this mycoderma. On the contrary, if a trace of the mycoderma is spread on the surface of an albuminoid liquid, alcoholic or slightly acid, it is immediately seen to develop, extend like a veil over the surface, and, by a correlative action, the atmospheric oxygen in contact with the liquid disappears and the alcohol acetifies. It is not essential for the liquid to contain albuminoid matters; provided the mycoderma finds there, besides the alcohol, a small quantity of alkaline and earthy phosphates, it will live and its action be the same as before; and this identity proves that the albuminoids which have been employed were merely nourishment for the ferment, and not the ferment itself.

"If, in the actual process of vinegar making, acetification takes place without the previous spreading of the mycoderma, it must have been without the knowledge of the experimenter; it is this organism which forms the gelatinous mass which was formerly, with a vague idea of the truth, called mother of vinegar; it is this which, by spreading over large surfaces of the beechwood chips used in the German process, produces acetification. By pouring an alcoholic liquid on these chips, well washed and scoured, and thus deprived of the ferment, no trace of vinegar is obtained; but, the circumstances being favorable, acetification is produced by depositing a little of the mycoderma on the surface of the chips, where it rapidly develops.

"While alcohol is present the small vegetable produces acetic acid; but what happens if the alcohol is wanting? M. Pasteur shows that the vegetable can in this case bring its burning action to bear on the acetic acid itself, and reduce it to the state of water and carbonic acid. This effect seems to be produced only when no alcohol is present, when there is alcohol the combustion is effected by the preference on it.

"Such is the action of the mycoderma under the ordinary conditions; but it sometimes alters, and, having no longer the same appearance or the same consistence, its action is different. It is then incapable of effecting the combustion of the alcohol to the acetic stage, and gives intermediary products with a suffocating odor, and causing the eyes to water, and which have already been obtained in the oxidation of alcohol and ether by platinum black. This black, under other conditions, will give acetic acid, and here between platinum black and *mycoderma* there is a resemblance of effects from which

it would be unsafe to infer a resemblance of causes. The only inference to be drawn is that both are means of transporting the oxygen of the air on to certain combustible matters.

"For the production of acetification it is necessary that the mycoderm should be at the surface of the liquid; the process is arrested by submersion, and only recommences on the formation of a fresh film on the surface.

"The absorption of oxygen by this film is complete, and not a trace of this gas enters the liquid through it. When there is, as in Orleans' vinegar, a quantity of small eels—animalcules needing air to support life—a curious contest takes place between them and the mycoderm, the latter tending to engross the whole of the surface, while the former combine all their efforts to submerge it and expose the liquid in which they live to free contact with the air.

"The complete study of the manner in which this ferment acts and of the last interesting particulars will, perhaps, cause some progress to be made in the industrial preparation of vinegar; but the study of possible improvements must be left to the manufacturers."

THE OPENING OF THE FAIR.

Now is the harvest of the year, and now does the farmer gather in the crop he has so long toiled over. The fields give up their bounty; the orchards droop with their luscious loads; from the vines the clusters hang purpling in the sun. Why then should not the mechanic, who toils with a different steel from the farmer, reap his reward also, and in the fall of the year make harvest time of the fruits of his ingenuity? Let us all have our time of rejoicing together, and, by friendly competition, endeavor to work to mutual advantage and interest.

No reflective person can enter the Fair of the American Institute, which opened on Tuesday last, without feeling, in some degree, the immense interests and the importance of them gathered there. The machines, products and materials shown comprise but a small part of our immense resources, for in all parts of the country—North, South, East and West—the same scenes are being enacted, and each district has something novel which the others have not. Yet from this exhibition we can realize in a degree the importance, extent, and versatile character of the inventions annually made public. To classify them would be impossible. There are in the Fair machines for so many different objects; fabrics of so many different materials—combined and distinct, raw and finished; works of art so beautiful, and specimens of ingenuity to be met with so frequently, that the beholder is compelled to give each its due share of attention. The consequence is, that a long time can be usefully spent in examining the attractions, and not one, but several, visits made profitable.

The large armory of the Seventh Regiment, on Fourteenth street, near Sixth avenue, has been fitted up by the American Institute for the exhibition this year, and it is an excellent building for the purpose—the view in the main room being uninterrupted by massive columns, while the general character of the building renders all parts easy of access.

On entering the room the visitor beholds a large square apartment full of machines in active operation. In the character of a visitor we wandered down the aisles formed by the various tools, and noted what was to be seen. It is not our intention to give an exhaustive account of the contents of the building, but to simply note such things as seemed to us novel and of a useful character. We naturally went to the machines and among the tools we saw.

JAMES STEWART & SON'S LATHES.

These tools have won a great reputation for the makers by reason of the excellency of the workmanship on them. They are intended to be run by the foot, but are adapted to power as well. They are made of the best materials, well finished, with or without back gears and slide rest, and set on a neat work-bench with a chest-of-drawers for tools, etc. They are superior lathes in all respects, and will last "forever" with care.

We noticed, a little further along, "Pomeroy's Aerial Governor." This is intended for steam engines, and is an ingenious and excellent thing for

the purpose. It was illustrated on page 17, Vol. X., of the SCIENTIFIC AMERICAN. The controlling agent in the governor consists of two circular metallic disks at the extremity of two horizontal arms. These arms are attached to a spindle and have two steel rollers near the center, set so as to run on inclined planes formed on the column which supports the governor. When the disks are revolved with rapidity, they run up on the inclined plane, with any change in the original speed, and close the throttle valve—opening it as they descend again by gravity. Numerous testimonials from parties using them show the estimation they are held in. J. H. Pomeroy & Co., Syracuse, N. Y., are the manufacturers.

TUBE EXPANDERS.

Messrs. Thos. Prosser & Sons, of this city, exhibit some of their well-known tube expanders, for expanding the flues of tubular boilers. These articles have been in use for many years, and are indispensable. These gentlemen also exhibit wire brushes, and a general assortment of implements useful to engineers.

SNOW'S GOVERNOR.

This governor is on exhibition at the Fair, and the proprietors show many certificates of its utility. It is in appearance an ordinary two-ball governor, with the exception that the arms are very short; it is without the central spindle and diagonal arms common to the old kinds, and connects directly to the throttle. A large-sized governor, for marine engines, is shown; it consists of a flat bar with balls on the end, set at an angle in a shaft running horizontally. When set in motion the centrifugal action tends constantly to throw the bar at right angles with the shaft, and this action is taken advantage of to control the engine. G. W. Lascell, of 437 Broadway, is the exhibitor.

TWIST DRILLS.

The Manhattan Fire-arms Company, of Newark, N. J., exhibit a beautiful case of their tools. These drills, as is well known by our mechanics, are made in a machine specially constructed for the purpose, and are of uniform size and quality. They do beautiful work, and no shop should be without them.

SODA FOUNTAINS.

Mr. William Gee exhibits a set of his soda fountains in working order. By recent improvements in such apparatus, Mr. Gee furnishes a very different article from that commonly offered. Thirsty persons may have noticed that the rush and sparkle of soda water is soon lost generally, and the mighty "fiz" with which it issues, turns to a rapid "fizzle" at the close, long before the bottom of the glass is seen. Mr. Gee's soda water is quite another thing. It issues as placidly from the fountain as a jet from a pump, but the sparkle and effervescence of the gas escaping is mighty, and the beverage is pungent to the last. We never before tasted soda of such excellence.

ROOT'S STEAM ENGINE.

The machinery was not in operation at the time of our visit, but will be before this article is published. Root's engine, which was at the Sanitary Fair last year, is to be seen this year, and of all the compact engines, this is the thing. In the space of about 18 cubic inches a machine, capable of giving out 15 horse-power, is placed; and that they give great satisfaction is shown by the number sold. Some of these engines are in Government cutters. Manufactured by the Root Steam Engine Co., New York.

THE NAVAL ENGINE CONTEST.

The trial of the two vessels—the *Winooski* for the Navy Department, and the *Algonquin* for Mr. E. N. Dickerson—has not yet begun in earnest. There have been some preliminary experiments, but what the result is we are unable to state. At the time of our visit, however, on the 15th inst., the *Winooski* was turning her wheels with great ease and rapidity, while the *Algonquin's* engine was stopped, and had been for some time. Boiler-makers were at work on board, and some engineers were examining the piston, but the cause of this delay and repairing was not given, as the engineer interrogated, prudently knew nothing about what was going on. On visiting the naval vessel we were informed that the 96-hour trial would come off next week, possibly Tuesday. The conditions are, that each vessel, having the same sized wheel and draught of water, shall receive 1,600 pounds of coal per hour, and make fifteen revolutions per minute. Of course the en-

gine that can make this speed with the least fuel will be the victor. This point being decided, the vessels will proceed to Sand's Point, and run from thence three times around Fisher's Island, a distance of about 750 miles; then the contest will be ended and the result made public. We shall publish the facts and figures of the trial when the same is concluded.

A SENSIBLE GOVERNOR.

Brown University, at Providence, R. I., enjoys the honor of having commenced, under the direction of its former able President, Dr. Wayland, that great reform in education which is spreading through all our colleges—the establishment of a scientific department in addition to the regular classical course. The sound practical sense evinced by this reform seems to be broadly diffused among the people of that State. At the commencement of Brown University, on the 6th inst., Lieutenant-Governor Duncan C. Fell, spoke as follows:—

"I thank you, Mr. President, for your courteous introduction; and if any thing could console me for the absence of the Governor it would be your kindness. The State, so far as I have served it, has prospered finely. Governor Smith takes charge of the Providence Plantations, and I take charge of the State of Rhode Island. From the day I was inaugurated to the present, I have not heard the slightest complaint. I consider it to be a great honor to be the Lieutenant-Governor of the State of Rhode Island. But I felt it to be a greater honor to be President of the Board of Education of the City of Newport—an office I held for some time. During that period I had an opportunity of ascertaining the character of the literature read at the firesides of many different classes of our citizens; and I tell you that I never have been more amazed than in witnessing the sound nature of the reading matter I have found in the houses of comparatively humble people. I sometimes, when the great cares of State will permit, go a fishing; and I have put up at the houses of plain farmers, where I have found complete sets of the SCIENTIFIC AMERICAN, and the owners have mastered me on every article contained in it."

NEW BOOKS AND PUBLICATIONS.

SECOND EDITION OF GESNER'S COAL OILS.—Messrs. Balliere Brothers, No. 520 Broadway, New York, have published a second edition of Dr. Abraham Gesner's treatise on coal, petroleum and other distilled oils. As the death of Dr. Gesner has occurred since the publication of the first edition, this second edition is prepared by his son, George W. Gesner, consulting chemist and engineer. It is a book of 181 pages, containing a history of petroleum and distilled oils, with the modes of refining, and a summary of the principal patents relating to the manufacture of aniline dyes, all illustrated by wood cuts of the apparatus employed.

POETICAL TRIBUTES TO THE MEMORY OF LINCOLN.—This is a compilation in one elegant volume, by J. V. Plott, of many beautiful poems, by different authors, upon the occasion of the death of the immortal Lincoln. The work contains poems by Bryant, Bickerstaff, Alice Carey, Duganne, Gurley, Holmes, Stoddard, Mrs. Stebbins, Tuckerman, Willis, and a host of excellent writers. The book should have a place in every library. J. B. Lippincott & Co. publishers.

Trial of the New Jersey Flying Machine.

We are informed that the flying machine which has been in process of construction in Jersey City, and which has been incorrectly called the Government flying machine, as the Government had nothing to do with it, has been completed and tried. It of course failed as every body of any judgment knew that it would. They could not get it off the ground.

A wagon which was passing through the Rue de Rivoli, Paris, one day last month, was seen to be suddenly enveloped in ghastly blue flames. It was loaded with phosphorus, which had caught fire from the friction occasioned by jolting over a rough piece of new macadamization. One of the passers-by, who hastened to render assistance, was himself covered with the half-melted substance and severely burned.



ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING SEPTEMBER 12, 1865.

Reported Officially for the Scientific American.

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.

49,845.—Cultivator.—J. A. Bardel, Freeport, Ill.:

First, I claim the plow beams, F F, attached to the front part of the frame C, by universal joints, a, in combination with the laterally swinging extension bar, D, and lever, H H', all arranged to operate substantially as and for the purpose herein set forth.

Second, The treadles, I I, in combination with the plow beams and extension bar, D, as and for the purpose specified.

[This invention consists of an improved article of manufacture, to wit: a button, which is attached to a garment by means of a washer.]

49,847.—Steam Generator.—J. D. Beers, Philadelphia, Pa.:

First, I claim the combination of the tubes, a, with the plate, b, the stays, d, and the shell of the boiler, A, as described and set forth.

Second, I claim the combination of the heating surface, N, with H F and A, as described and set forth.

49,848.—Gun Wiper.—Hiram Berdan, New York City.:

I claim, as a new article of manufacture, the expanding gun wiper, constructed with elastic leaves grooved upon their exterior surfaces, as herein specified.

49,849.—Invalid Chair.—T. J. Blackburn and E. P. Terrel, Spring Hills, Ohio:

First, We claim the arms, b, extending from the rock shaft, a, serving as adjustable cranes and stops, in combination with the back, D, arranged to operate substantially as herein shown and described.

Second, Pivoting the back, D, to the frame at a point near the center of its length, so as to bring its lower part in the path of the arms, b, substantially as herein specified.

Third, The slide board, E, forming an extension seat, in combination with the rod, s, and back, D, arranged to operate substantially as herein shown and described.

[This invention consists in pivoting the back to the frame in such manner that the person using the chair may regulate its inclination to a position for sitting or reclining by means of suitable arms attached to a rock-shaft, which arms bear against the lower portion of the back, and are operated by a hand lever easily reached by the occupant of the chair; and it also consists in arranging a slide-board on the front part of the chair, connected to the back by a rod in such manner that it may be slid out or drawn in according to the inclination of the back.]

49,850.—Carpet Fastener.—W. B. Blaisdell and J. E. Atwood, Lynn, Mass.:

We claim the combination of the fastener, A A, groove and tongue, B B, and pins, g g, when made and used for the purpose herein described.

49,851.—Evaporator.—John Bogue, Auburn, Wis.:

First, I claim the arrangement of the hollow float, F, plug, f, tubes, D and F, reservoir, C, and pan, A, substantially as described.

Second, I claim constructing the float with a vent tube, r, or an equivalent aperture, for the purpose explained.

49,852.—Floor Clamp.—John L. Bryant, Logansport, Ind.:

I claim, First, The described arrangement of the jaws or tugs, F F, inclined plane or planes, H H, or their equivalent, to form a clutch, for the purpose described.

Second, I claim the application of the lever, A, ratchet, B B, pinion, E, and pawl, C, in combination with the clutch, for the purposes set forth in the specification.

49,853.—Piston Packing.—William Buchanan, New York City:

First, I claim, in combination with a piston, A1 A2, the single bull-ring, B, formed separate from the spider of the piston, and having the three ridges, b b1 b2, with suitable packing in the spaces between the ridges, substantially as and for the purpose herein set forth.

Second, I claim a tongue-piece, D, adapted to defend the joint in the packing ring, C, against the passage of steam both longitudinally and radially, substantially in the manner and for the purpose herein set forth.

Third, I claim the surfaces, d' d', on the tongue-piece, D, in combination with the surfaces, c' c', in the packing ring, C, arranged substantially in the manner and for the purpose herein set forth.

Fourth, I claim the groove, E, under the tongue-piece D, and adapted to insure the submission of the fluid, substantially as and for the purpose specified.

49,854.—Fastening for Shoes.—Carl Burchardt, New York City:

First, I claim the slide, M, way, L, and surface, K, arranged close to the line of the cord, I, or its equivalent, to be retained substantially as and for the purpose herein set forth.

Second, The heads, J, or equivalent eye, cord, I, and retaining clasp, M K, arranged relatively to each other and to an article of clothing, substantially in the manner and for the purpose herein set forth.

49,855.—Condenser.—Thomas Callan, Philadelphia, Pa.:

I claim passing the pipe, d, through which the condensed water is drawn off from the chamber, A, through one or both cold water chambers, B B', substantially as and for the purpose set forth.

49,856.—Corn Cultivator.—Jasper Chapman, Linn Co., Iowa:

First, I claim the double bars, d, constructed and operating as and for the purpose set forth.

or ends of the valve chest, in combination with the partition, a, and with a rocking lever, k l m, constructed and arranged substantially as and for the purpose set forth.

[This invention consists in a valve chest which is divided by a longitudinal partition into two compartments, each of which contains two ports and two valves, the ports in the first compartment forming the steam ports, and those in the other compartment forming the exhaust ports, in combination with three armed levers, one in each compartment, and connected to the valves by springs or other yielding connections, and to each other by a rocking lever, in such a manner that by imparting to said lever a rocking motion the steam is alternately admitted from one and exhausted from the opposite end of the cylinder, and a valve is obtained which operates with comparatively little loss of power, and which is easily fitted and kept tight.]

49,859.—Flour Packer.—Isaac Cook, St. Louis, Mo.:

First, I claim the pin form, B, the rock shaft, f, the cam, g, g', the lever, F, the toothed pawl, I', and the pin, I'', when constructed and operating as and for the purpose set forth.

Second, I claim a flour packer, constructed with two augers, one of which has a rotary motion only, while the other has both a rotary and a vertical motion, so that it may descend into the barrel, and, as it revolves, pack the flour beneath it, and can, at the same time, rise to the top of the barrel.

Third, I claim passing the head, F, between the stationary guide, G, and the adjustable guide, G', for the purpose of producing the requisite amount of pressure on the auger, F', the guide, G', being drawn toward the guide, G, with more or less force, as may be desired, by means of the weighted lever, H', as recited.

49,869.—Self-acting Mule.—A. G. Cumnock, Lowell, Mass.:

I claim the combination of the rod, l, spring, k, arm, l, and the fork, p, and pins, h h', or other equivalent clamping device, the whole applied in combination with the mule carriage and belt, e, to operate substantially as and for the purpose herein specified.

49,861.—Self-acting Mule for Spinning.—A. G. Cumnock, Lowell, Mass.:

First, I claim the mangle wheel, D, having its inside gearing and guard constructed substantially as herein described, applied to a mule in such manner as that it is made to check the movement of the carriage and the winding-on movement of the spindles, as the carriage strikes in, without the use of a scroll friction brake or binders.

Second, Combining the shaft, k, of the carriage, from which the spindles are driven, with the drum, N, on which the chain, p, from the quadrant gear, is wound, by means of gears, L Q F, a dial, L', or its equivalent, a pawl, K, and a ratchet wheel, m, the whole applied and operating substantially as herein specified.

49,862.—Hot-blast Apparatus.—Robert Denholm, Newburg, Ohio:

I claim the sectional flues, A, mounted on the blocks, D, in combination with the curved pipes, C, arranged within a furnace, E, having its throat, H, opening into the chimney near its base, as and for the purpose herein set forth.

49,863.—Watch Safe.—C. H. Devereux, New York:

I claim the safe above described and operated substantially as and for the purpose herein set forth.

49,864.—Railroad Rail.—John A. Dickson, Scranton, Pa.:

I claim the construction of a compound rail or bar, consisting of an upper portion in the form of a T-rail, with or without a tongue projecting from the bottom, and an under portion being flat or slightly concave in the bottom, and with a narrower or wider groove on the upper side to receive the tongue on the bottom of the upper portion on the entire base thereof, as above described.

49,865.—Machine for Combing Cotton, Etc.—Ira Dimock, Florence, Mass.:

First, I claim the arrangement of the two nipper cylinders, d' d'', the doffer, f', for the combed fiber, t, e two combed cylinders, b b2, the rotary brush, a2, and oil doffer, c, substantially as herein described, to operate as set forth.

Second, Applying friction to counteract the momentum of the nipper cylinders during the latter part of each movement, substantially as and for the purpose herein specified.

Third, So arranging a rotary series of combs of different degrees of fineness in relation to a nipper cylinder that the fibers will be acted upon, first, by a coarse toothed comb, and afterward successively by combs, each having finer fibers than its predecessor, substantially as herein specified.

Fourth, The comb, K2, applied in connection with the feed rollers, and in relation to the nipper cylinder of a combing machine, substantially as herein described and operating as herein set forth.

49,866.—Fruit Box or Basket.—J. H. Doolittle, Ansonia, Conn.:

I claim a fruit box or basket, made smaller at the top than at its bottom, so that the bottom of each box may rest upon the top edge of the box beneath it, when a series are packed together, substantially as and for the purpose set forth.

49,867.—Harrow.—M. Easterbrook, Geneva, N. Y.:

I claim the employment or use of the self-locking band lever, h, whereby the axial bars to which the teeth, t, are attached, may be controlled and adjusted while the harrow is moving, substantially in the manner and for the purpose shown and described.

49,868.—Saw Teeth for Saws.—J. E. Emerson, Trenton, N. J.:

I claim the curved tooth, a c b, constructed and applied to a saw plate in the manner herein specified.

49,869.—Method of Preventing Insects from Injuring Fruit Trees, Etc.—Cyrus Fisher, Leesville, Ohio:

First, The mode herein described of protecting trees or vines from insects, by the combined use of the three distinct applications, substantially as set forth.

Second, Pouring a boiling solution of lye and salt around the roots of trees and vines, for the purposes specified.

49,870.—Flour Sifter.—Nathaniel W. Foye, Cambridge, Mass.:

I claim the removable rubbing or brush shaft, C, with its shoulder head or disk, D, in combination with the box or hopper, A, and sieve, B, substantially as and for the purpose set forth.

49,871.—Method of Constructing the Acid Chambers of Soda Water Apparatus.—William Gee, New York City:

First, I claim making an acid chamber or vessel to hold acid for a soda water apparatus or generators, lined with one piece of sheet lead, having a flange turned at the bottom as well as at the top, with a valve seat of pure lead belted between the flange of the acid chamber and the flange of a generator, making a chamber or vessel free from all solder tin, burned seams or rubber joints where acid comes in contact.

Second, I also claim the wrench, K, in combination with the stuffing box, H, for releasing the packing when the valve is to be raised, and to tighten the packing and make a friction, and keep the valve from blowing up when the valve is down, as herein described.

49,872.—Folding Seat for Wheel Vehicles.—Henry A. Gilbertson, New York City:

I claim a folding or hinged seat for wheel vehicles, provided with a back and sides, either or both, arranged and applied in such a manner as to admit of folding automatically by the folding or turning up or down of the seat, all constructed substantially as herein shown and described.

49,873.—Gate.—Sylvanus M. Gillett, Homer, N. Y.:

I claim the use of the jointed bar, F, in combination with the slats, e e', so formed as to make a folding gate, as and for the purpose specified.

49,874.—Insole for Boots and Shoes.—John K. Gittens, Brooklyn, N. Y.:

I claim as a new article of manufacture, an insole for boots and shoes made of sheep skin, with a wool surface upon one side and any suitable enameled or protective covering or coating upon the other, substantially as described.

49,875.—Telegraphic Repeater.—William H. Hamilton, Albany, N. Y.:

I claim the batteries, P R P' R', applied in combination with sounders, A A', receiving magnets, L L', registering levers, D D', and main wires a a', substantially as and for the purpose set forth.

[This invention consists in the application of an electric current formed from a main or local battery alternately to two receiving magnets, by any suitable mechanism, on a receiving magnet, register, or sounder, simultaneously with the removal of the main current, in such a manner that impulses can be repeated from one telegraph wire to another automatically, and without liability to errors.]

49,876.—Grain Separator.—Theophilus Harrison and William C. Buchanan, Belleville, Ill.:

We claim, First, The construction of the riddles, consisting of transverse slats, f, with double beveled upper sides and with projecting wires, g, spanning the intervening spaces, the successive slats descending as they recede from the fan, substantially as described.

Second, The boards or flaps, h, attached to the strips or bars, f, to operate in combination with the bar, D, in the manner substantially as and for the purpose set forth.

49,877.—Automatic Press.—Peter Hayden, Pittsburgh, Pa.:

I claim the feed wheel, G, provided with holes, g, to receive the work to be operated upon, and moved by means of the rotation of the driving wheel, C, through the medium of the teeth on the feed wheel and a pin attached to C, or other equivalent means, in connection with the bolster plate, F, and the pins, I J, and operated from wheel, L, C, through the medium of a cam, substantially as and for the purpose herein set forth.

49,878.—Pen and Pencil Case.—William S. Hicks, New York City:

I claim, First, The case, A, consisting of a single tube, and provided with the cap, c, and tube, e, constructed and arranged to operate as herein shown and described.

Second, In combination with the case, A, as above described, I claim the pencil, B, constructed and arranged to operate in the manner and for the purpose set forth.

49,879.—Car Coupling.—Alvin J. Hobbs, Kokomo, Ind.:

I claim, First, Connecting the jaws of a self-acting car coupling of two transverse bars, D and D', supported firmly in front by breaking upon the solid portion of the draw head, substantially as set forth.

Second, The construction of a double extension cam, C, for the purpose of separating the jaws, D and D', in such manner that being suspended at the center, c, it may be operated from the extremity with any advantage of leverage that may be necessary.

Third, The combination of the draw head, A, the transverse bars, D and D', the elastic bands, M, or equivalent springs, the double eccentric cam, C, rods, E, and cross-head, F, with the shackle bar, B, substantially as described and for the purposes set forth.

49,880.—Soldering Fruit Cans.—Robert J. Hollingsworth, Cincinnati, Ohio:

I claim the plate, C, constructed and operated substantially as described, for soldering the joints of metallic fruit cans.

[The object of this invention is the soldering of the joints of tin cans, such, for instance, as fruit cans. It consists in the construction and manner of using a heating or soldering plate on which the can is placed, and by the communication of heat from which solder applied in the inside of the can is melted, and the joints securely soldered together.]

49,881.—Machine for Cutting Wood Gear.—Christopher R. James, Jersey City, N. J.:

I claim the arrangement of the sliding cutter carriage, the revolving cutter stock, M, and cutter, P, and the revolving dividing plate, E, substantially as and for the purpose herein specified.

49,882.—Grain Drill.—James D. Jones, Pittsburgh, Pa.:

First, I claim the arrangement of the hopper, E, agitator, F, gage plates, G H, cut-off plate, I, adjustable hangers, J, lever bar, K, and connecting rods, L, constructed, arranged and operating substantially as herein described, and for the purpose set forth.

Second, The employment of the reversible shute, x, with the adjustable drag bar, y, and tooth, n', as described, and for the purpose set forth.

49,883.—Adjustable Drag Bar for Grain Drills.—James D. Jones, Pittsburgh, Pa.:

I claim a new article of manufacture, to wit, an adjustable drag bar for grain drills, said bar consisting of parts, A and B, constructed, arranged and operating in the manner herein described, and for the purpose set forth.

49,884.—Machine for Making Paper Board.—John F. Jones, Rochester, N. Y.:

I claim, First, The combination of two wire mesh aprons, B B', between which the pulp passes, with suitable pressure rollers, G G', or equivalents, for forming board in a continuous or indefinite length.

Second, The construction and arrangement of the frame, H, made up of the parts, and adjusted in the manner hereinbefore set forth, and used in connection with the endless apron, B, and cylinders, G G', substantially as and for the purpose herein specified.

Third, The double boxes, S S', in combination with the endless aprons, B B', substantially as and for the purpose herein set forth.

Fourth, The employment of the adjustable rollers, u u', in combination with the deckle straps, s s', and boxes, q q', for the purpose of holding said straps to their work, substantially as described.

Fifth, The arrangement of the soft coupler, T, felt, v, first press, U V, wash tank, W, and felt beater, W, used in connection with the endless apron, B, and roller, D, in such a manner as to take the web from the said apron and convey it upward to the press without injury or loss of pulp, substantially as herein set forth.

49,885.—Railroad Car Brake.—Joseph Jones, West Albany, N. Y.:

I claim the combination and arrangement of the sleeves, A A', with the brake bars, c c, shoes, D D, and jaw braces, m m, operating substantially in the manner and for the purposes set forth.

49,886.—Composition for Tanning.—Ell Keith and Barclay Thorn, La Fontaine, Ind.:

We claim the combination of ingredients, in the proportions and in the manner substantially as described and for the purpose described.

49,887.—Manufacture of Ice.—C. M. Keller, New York City, and J. Henderson, Brooklyn, N. Y.:

We claim exposing water in a series of pans or vessels made of some good conductor of caloric, and suspended by their rims so as to expose their outer surface to the action of the atmosphere, substantially as described.

And we also claim combining with the series of freezing pans the means substantially as herein described for causing a more energetic action of the air on the surface of the said pans, as described.

49,888.—Machine for Wiring Window Blinds.—Daniel Kelly, Grand Rapids, Mich.:

I claim, First, In machine for wiring blind rods, the sliding box, c, constructed and operating substantially as above described.

Second, I also claim the driver, d, fitted over the back end, f, of the sliding box, as above set forth, and with a rebate on its lower front edge to overlap the staple, substantially as described.

Third, I also claim the combination of the sliding box, c, with the driver, d, substantially as described.

[This invention consists in a novel arrangement of devices for forcing wire staples into the rods of window-blinds, whereby the work is greatly facilitated, and at the same time performed in a workmanlike manner.]

49,889.—Hindling Attachment to Reaper.—James M. King, Quincy, Minn.:

I claim, First, In combination with the seat, F, and inclined board, G, the rake, E, when attached by the elastic cord, c, and the rake stand, D, substantially as described.

Second, In combination with the carriage, A, the adjustable caster wheel, B, arranged, operated and operating substantially as described.

49,890.—Chimney Cap.—J. H. Kirkwood, Cleveland, Ohio:

I claim the chimney cap, when constructed of a series of fixed rectangular slats, arranged on the sides and ends in an inclined position, overlapping each other, and each series connected at the ends to the single obliquely-set standards, E, in combination with the bonnet, C, furnished with a rectangular opening upon its top, and the flange, D, in the manner and for the purpose set forth.

49,891.—Manufacture of Fertilizer.—Frederick Klett, Philadelphia, Pa.:

I claim the making of a fertilizer, substantially as herein set forth.

49,892.—Knife Cleaner.—W. T. Kosinski, New York City:

I claim, First, The leather-lined throat, K, and inside block, C, in combination with each other and with the box, A, platen, G, and screw, H, substantially as herein described.

Second, The throat lining, F, composed of one piece of leather, folded and seared at its edges, and provided with slits, A, a, substantially as herein specified.

Third, The flexible flap, B, in combination with the opening, P, at one end of the platen, substantially as and for the purpose set forth.

49,893.—Barbers' Apparatus for Brushing Hair.—Conrad P. Kroll, New York City:

I claim a revolving brush for brushing and dressing the hair of the head, arranged upon a shaft provided with suitable handles for holding the same by the hands, and connected with the driving power used, by means of an elastic belt or band, substantially as herein described, and operating as specified.

[This invention consists in arranging around and upon the periphery of a cylindrical drum placed upon a shaft having suitable handles at each end for holding the same in a person's hands, a series of brushes of any desired stiffness, to which brush cylinder—by means of an elastic band or belt passing around the same and over a pulley, receiving motion through any suitable devices connecting it with the driving power used—a rotary movement is imparted, the elastic band permitting the brush to be freely moved about from place to place, or to any desired position, without disconnecting it from the driving power.]

49,894.—Stop Valve for Faucet.—William Krull, New York City:

I claim the stop valve, composed of a shell, B, of hard metal, having on its back a hemispherical test, G, fitted to a corresponding cavity, N, in the screw or spindle, G, and a filling, I, of soft metal, part of which forms the face, substantially as herein specified.

49,895.—Apparatus for Setting Up Work in Knitting Machines.—Isaac W. Lamb, Rochester, N. Y.:

I claim the setting-up apparatus, made substantially as before described, having fingers, B, to be placed between the needles of a knitting machine with hooks, or their equivalents, on the ends of such fingers, for the purpose of holding on to the yarn between the needles, and thus setting up the work on a knitting machine without the aid of the old work.

49,896.—Traveling Valise.—Frederick Lamoureux, Binghamton, N. Y.:

I claim, First, A traveling valise, so constructed that it can be readily converted into a couch or bed, for the purpose shown and described.

Second, In combination with a convertible valise, the hooks, or their equivalents, for the uses and purposes set forth.

Third, In combination with the convertible valise and the suspending hooks, the straps, G, G, for keeping the lower half in proper position.

Fourth, The canvas bottom, constructed as shown, when used in connection with the convertible valise, for the purpose described.

49,897.—Horse Hay-fork.—S. F. Leavitt, North Fairfield, Ohio:

I claim, First, The arrangement of the plates, A, a, shank, E, with the grooves, C, and grooved washers, C', substantially as and for the purpose set forth.

Second, I claim the catch, P, spring, N, and levers, M, in combination with the head, E, and rod, C, arranged as and for the purpose set forth.

Third, I claim constructing the arm, D, of one entire plate or plates, with a space between, as and for the purpose set forth.

49,898.—Hammer.—J. H. Littlefield, Cambridge, Mass.:

I claim the within-described implement, constructed substantially as described, as a new article of manufacture.

49,899.—Damper and Ventilator.—J. H. Littlefield, Cambridge, Mass.:

I claim the disk, A, constructed and arranged in combination with the wire hook, H, the spindle, B, and the slide, G, as and for the purpose set forth.

49,900.—Syringe.—Hamilton D. Lockwood, Charlestown, Mass.:

I claim an elastic bulb syringe, in which the flexible induction and ejection pipes are connected to the elastic bulb by a lateral pipe—extending from and integral with said induction and ejection pipes, substantially as set forth.

49,901.—Transportation of Petroleum.—H. J. Lombaert, Philadelphia, Pa.:

I claim the use for transporting petroleum of truck cars and portable metal tanks, when the latter are of such weight, dimensions and capacity that one tank will form an appropriate load for an ordinary two-horse oil wagon, and when the truck cars are so constructed as to hold and steadily retain a given number of said tanks, all as set forth.

49,902.—Machine for Making Bolts.—Charles Lusted, New York City:

I claim, First, The reciprocating cutter, H, in connection with the stationary perforated plate, I, when said parts are constructed as herein described, and used in combination with the intermittently rotating bed or die, R, and reciprocating female die, K, for the purpose specified.

Second, The rod, B, operated through the medium of the yoke, C, tappet, D, and spring, E, and provided with the rod, B, all the said parts being constructed as herein described, and arranged in relation with the perforations of the bed or die, R, as herein shown, for the purpose of discharging the bolts or rivets from the bed or die R, as set forth.

49,903.—Deep Well Packing.—Francis Martin, New York City:

I claim, First, In packing the tubes of oil and other deep wells, connecting the end of the packing device or apparatus to separate or disconnected sections of the well tube, so as to inclose the joint within said packing device, substantially as above described.

Second, I also claim connecting such separate sections of the well tube to each other by means of a coupling, one end of which slides on one of the sections, substantially as described.

Third, I also claim the elastic leaves, B, arranged as shown about the well tube, so as to inclose the slip joint above described, substantially as above set forth.

Fourth, I also claim the elastic covering, I, in combination with the spring leaves, B, which it incloses, substantially as above described.

49,904.—Sewing-machine Shuttle.—James S. McCurdy, Bridgeport, Conn.:

First, I claim the bar, C, constructed with a projection, C', entering a recess, B', at one end of the cavity, A, of the shuttle, and with a notch, E, or its equivalent, in the said projection, for the reception of one of the journals of the bobbin, and otherwise applied, in combination with the shuttle, substantially as and for the purpose herein specified.

Second, The arrangement of the holes, H, in the bar, C, in a line transverse to the length of the shuttle, substantially as and for the purpose herein specified.

Third, The tension device, consisting of a screw, D, a slotted plate, M, and a spring, T, combined and applied to operate within a recess, N, in the face of the shuttle, substantially as and for the purpose herein described.

Fourth, A sewing-machine shuttle, which is constructed with a pivoted bar, C, adapted to form a bearing for one end of the bobbin, in combination with a tension device, consisting of an adjusting screw acting directly upon a slotted spring plate, substantially as described.

49,905.—Mechanical Movement.—Wm. C. McGill, Cincinnati, Ohio:

I claim combining with an ordinary crank and pitman, the link, E, and yoke, F, G, arranged and operating as set forth.

49,906.—Machine for Making Nails.—C. H. Merrick, Pittsburgh, Pa.:

I claim the combination of devices by which this is effected, substantially as herein described and set forth.

49,907.—Table for the Sick.—Anselm Millhauser, New York City:

I claim a table for the sick, constructed with an adjustable swinging top, capable of projecting over a bed, and steadied by means of an extensible foot, substantially in the manner herein specified.

49,908.—Fruit Box.—Edmund Morris, Burlington, N. J.:

First, I claim in a fruit box, constructed as described, the dovetail and wire rod or equivalent.

Second, The bottom, provided with its pins for insertion, in combination with the sides, jointed and constructed as described.

49,909.—Device for Closing and Opening Shutters.—G. G. Morton and Edwin Lamasure, Philadelphia, Pa.:

We claim, First, The casing, D, constructed and arranged as and for the purpose set forth.

Second, In combination with the subject matter of the above, we claim the worm wheels, B and H, pinion, G, and crank shaft, I, substantially as set forth.

49,910.—Machine for Cutting and Scoring Pasteboard.—Samuel Orth, Philadelphia, Pa.:

I claim the adjustable carriers, E, with their scoring cutters, C, and the adjustable carriers, E', with their severing cutters, C', in combination with the rollers, H, and their cutting edges, M, the whole being arranged and operating substantially as and for the purpose herein set forth.

49,911.—Gang Plow.—J. S. Padon, Summerfield, Ill.:

I claim, First, The side bars, C, C, seat standards, D, D, slotted axle, A, and slotted brace, C', in combination with the pivoted plow beams, F, F, and rocking levers, G, G, all arranged and operating substantially as described.

Second, In a wheel cultivator, I claim providing for expanding or contracting for plow beams, F, F, the supporting frame thereof, and the contrivances for elevating or depressing the said beams, substantially as described.

Third, Supporting the plow beams, F, F, in an elevated position by means of levers, G, G, links, D, D, and a spring catch lever, G, which is pivoted to a post projecting from the draft pole, substantially as described.

Fourth, Pivoting the plow beams, F, to side beams, C, C, which are susceptible of being separated or contracted without detaching them from their axle, A, substantially as described.

Fifth, The use of slotted standards, J, J, in combination with the slotted sector plates, J, J, and fastening, K, K', substantially as described.

Sixth, The clamps, K, applied to the standards, J, substantially as described.

49,912.—Umbrella.—Geo. L. Peabody, New York City:

I claim, in combination with a tubular tip, A, the handle, B, when the same shall be combined, constructed and operated substantially as described, for the purpose specified.

49,913.—Wood-splitting Machine.—B. F. Penny, Rochester, N. Y.:

I claim the relative arrangement of the stripper, D, vertically adjustable rest, C, ax, A', and stock, B, in the manner and for the purposes specified.

49,914.—Water Elevator.—Peter Perrine, Little Falls, N. Y.:

I claim the combined arrangement of the crank, B, the pawl, E, and the hooked pawl, D, substantially as set forth.

49,915.—Catamenial Sack.—Edward L. Perry, New York City:

I claim forming with, or attaching to, a catamenial sack lappels or wings, substantially as and for the purpose herein shown and described.

[This invention consists in attaching lappels or wings to each side of a catamenial sack, said sack being a rubber pouch, somewhat like a canoe in form, and having a long mouth, into which may be placed a sponge or some other substance for absorbing the menstrual discharge, which absorbent material may be removed when occasion requires and replaced by new. These lappels or wings lie close against the thighs of the female, and effectually prevent any of the catamenia getting upon the clothes of the female.]

49,916.—Artificial Cork.—Edward L. Perry, New York City, and E. D. Lazell, Brooklyn, N. Y.:

We claim a cork for chemical and apothecaries' use, and for hermetically sealing fruit and preserve jars, and for other purposes, made substantially as herein specified.

[This invention provides a cork or stopper for apothecaries' use, for hermetically sealing jars of fruit and preserves, for bungs for barrels, casks, kegs, etc., made of a composition which will not be affected by acid or any heated fluid, and which can be manufactured and sold very cheaply. The corks can be withdrawn in the usual way, and used again and again for different purposes.]

49,917.—Saw-mill.—Stuart Perry, Newport, N. Y.:

I claim, First, The use of the strap and shoulder thereon, in combination with a cam nut or washer for tightening up the box or bearing of pitman, or connecting rods-heads, substantially as described.

I also claim the joint between the pitman or connecting rod and saw arm, composed of the metal head and strap, and the hook and tongue, uniting with a common pivot, and made adjustable, substantially as described and represented.

I also claim uniting the cross-head to or with the joint between pitman and saw arm, so that either may have motion independent of the other, substantially as described.

49,918.—Valve for Steam Radiator.—Fred. Presser, Philadelphia, Pa.:

I claim, First, The application of a tube, B, to the expanding vessel, A, substantially as described, so that the liquid in said vessel can be replaced while steam is up, and without interrupting the operation of the radiator.

Second, So arranging the channel through which the cold air enters the chamber, A, that said air, on rushing in, has a tendency to open the valve, instead of to close it, as heretofore.

Third, Placing the vessel, B, which carries the valve, D, loosely into the chamber which contains the valve-seat, as described, so that the valve can at all times be re-ground whenever desired.

[This invention relates to valves of that class which open and close by the expansion or contraction of water or other liquid in a vessel, one or more sides of which are expandible or flexible, the expansion or contraction of said liquid being dependent upon the heat of the atmosphere surrounding the said vessel.]

49,919.—Automatic Boiler Feeder.—R. Rafael, New York City:

I claim the reciprocating plunger, A, provided with a series of cells, A, and operating in combination with a supply chamber, B, and feed chamber, C, substantially as and for the purpose described.

49,920.—Washing Machine.—L. E. Ransom, Trenton, Mich.:

I claim the combination of the tangential rubbers on disk, A, the bearing, F, the perforated disk, B, and bearing, M, so arranged that the whole can be adapted and applied to and used in common wash-tubs, substantially as herein set forth.

49,921.—Clasp for Lamp Shades.—Christian Reichmann, Philadelphia, Pa.:

I claim the elastic grooved or flanged band, A, holding the top of the paper shade by its own expansion, and employed in combination with a frame, C, C, constructed and applied as and for the purposes set forth.

[The object of this invention is to obtain a clasp or support for

lamp shades, which may be cheaply constructed and applied to the shade with the greatest facility.

49,922.—Expelling Oil from the Veins of Wells.—Isaac Reif, Mina, N. Y.:

I claim forcing the liquid in an oil or other well into the veins and crevices thereof by means of blows and concussions, as and for the purposes described.

49,923.—Bird Trap.—Rudolph Rex, Charles City, Iowa:

First, I claim the use of netting frame, which is applied to pivoted goldie posts, C, C, C, and provided with props, G, G, or their equivalents, substantially as described.

Second, The combination of the posts, A, C, and loaded cords, C, with the netting frame, D, D, E, E, substantially as described.

49,924.—Coal-oil Hand Lamp.—Edwin Roberts, Moorestown, N. J.:

I claim the jacket, C, constructed as described and set forth, in combination with the cylindrical wick tube, B, of a coal-oil hand lamp, the said jacket and tube being arranged to operate together as described for the purposes specified.

49,925.—Cornet.—Louis Schreiber, New York City:

First, I claim in cornets and similar musical instruments placing the mouth-piece tube vertically above the valve tube, substantially as above described.

Second, I also claim constructing the key or keys, F, of a straight piece, and placing them in a position parallel with the axis or axes of the rotary valve or valves operated by them, substantially as above described.

Third, I also claim placing the tuning pump, D, in a vertical position at the termination of the mouth-piece tube, substantially as described.

Fourth, I also claim the water valve, F', in the end of the tuning pump, substantially as and for the purpose above described.

Fifth, I also claim the combination of the finger ring, G, with the tuning pump, for the purpose of providing means for holding the instrument, substantially as above described.

49,926.—Horse Rake.—Frederick Seidle, Mechanicsburg, Pa. Antedated Sept. 6, 1865:

I claim the arrangement of the staples, A, and coiled springs, B, embracing the staples, and their lower ends resting upon the teeth, while their upper ends pass through the upper ends of the staples in connection with the wire teeth, E', attached separately by means of the brackets, D', to the bar, C', in the manner and for the purposes specified.

49,927.—Paper Collar Machine.—Samuel Shepherd and Ammi M. George, Nashua, N. H.:

We claim a machine for cutting out, punching the button holes in and embossing an imitation of stitching on paper collars, composed of a pair of rollers, C, C', furnished with steel bands, D, D', cutting rings, E, E', embossing rings, I, I', packing rings, T, T', punches, S, S', and dies, T, T', the whole constructed and operating substantially as therein specified.

49,928.—Grindstone.—John F. Shillaber, Portsmouth, N. H.:

I claim so arranging the lower water-box or receptacle of a grindstone that it can be raised toward, or lowered from, the stone, substantially as herein described and for the purposes specified.

[This invention consists in so arranging the receptacle or vessel containing the water, and through which the grindstone passes when revolved, in such a manner that it can be readily adjusted to any desired height with regard to the stone, according to the quantity of water necessary to be supplied to its surface, or set entirely away therefrom, so that the stone when not in use shall not remain in the water, as has heretofore been the case and which, as is well known, greatly tends not only to soften the stone, but also often seriously injures it, causing it to peel or crumble to pieces.]

49,929.—Coffee and Tea Drawer.—John O. Shriner, New-castle, Ind.:

I claim a perforated or wire drawer, made of any proper shape, having a closely-fitting perforated lid, and a long handle with a ring on the end, for the purposes herein set forth.

49,930.—Rigged Oar or Boat Fin.—Ralph Smith, Brooklyn, N. Y.:

I claim the arrangement and combination of the blades, B, and rods, C, attached and operated as described and represented.

49,931.—Composition for Preventing Incrustation in Boilers.—G. R. Spannagel, St. Louis, Mo.:

I claim the composition of matters as above described, for the purpose set forth.

49,932.—Coal Scuttle.—William Sparks, New York City: Antedated Sept. 6, 1865.

I claim the combination of the screw, D, and gate, G, at the upper end of the said scuttle, with the frame work, A, and the elevated platform, B, in the manner and for the purpose set forth.

49,933.—Boring Machine.—Daniel Stanley and George Johnson, Cincinnati, Ohio:

We claim the arrangement of the eccentric, N, O, pivoted rack, K, compound spur and bevel wheel, J, slide, E, wheel, G, and auger shaft, F, all constructed and operating substantially as specified.

49,934.—Apparatus for Carbureting Air.—B. Terry, Auburndale, Mass.:

I claim the air-pumping apparatus, made substantially in manner and so as to operate as described, viz., of one or more bellows, G, with its valve openings, I, N, valve, H, M, levers, K, rod, F, and eccentric, E, the whole being applied to the shaft, D, and the case, A, in manner and so as to operate substantially as described.

I also claim the combination of each bellows head, E, with the air-receiving chamber, by means of a flexible ejection pipe, P, so applied to the two as to allow of the necessary movements of the bellows heads, E, as described.

I also claim the combination and arrangement of the chamber, H, with the air-forcing bellows, the flexible ejection pipe or pipes thereof, and the vaporizing chamber, C.

I also claim the flexible or expansive dome, I, made substantially as and to operate as described, with the vaporizing chamber, C, and the apparatus for forcing air into the latter.

I also claim the combination of the flexible or expansive dome, I, and its case, V, with the vaporizing chamber, C, and an apparatus for forcing air into such chamber for the purpose of being carbureted, as described.

I also claim the combination of the force pump, K, its jet tube, Y, spray disc, T, air-distributing conduit, A2, and series of discs, F2, G2, H2, the same being used in the vaporizing chamber, C, and with the apparatus for forcing air therein, as specified.

I also claim the arrangement of the tube, B', and its stop cock, C', with the outlet tube, A, the air chamber, H, and the vaporizing chamber, C, provided with an apparatus for forcing air into it, as described, the tube, B, in such arrangement being wholly within the vaporizing chamber, as set forth.

I also claim the improved flowage regulator, constructed as described, viz., with the flexible tube, K, combined with the disc, C', and the vessel, I, the said vessel, I, having the partition, G, going across it, and the valve, H, suspended from the disc, C, the whole being arranged and so as to operate substantially as specified.

49,935.—Packing the Shafts of Dry Gas Meters.—Nathaniel Tufts, Jr., Boston, Mass.:

I claim in dry gas meters, and in combination with the vertical shafts therein, and with the packing boxes of such shafts, the cup, S, when secured to such shafts and made to rotate therewith.

49,936.—Artificial Leg.—James Walber, New York City:

I claim the construction of the joints of artificial legs with metal-faced supporting bearings on the circular surfaces of the central tenon and of the side cheeks of the mortise of the joint, substantially as herein described, whereby the plus of the joints are relieved of the weight of the body, and cylindrical bearings are obtained both above and below the axes of the joint.

49,937.—Machinery for Punching Metal.—Daniel T. Walker, Brooklyn, E. D., N. Y.:

First, I claim the improved punch holder, consisting of the driver, A, the cap, B, and a fastening, substantially as described.

Second, The driver, conical cap fastening, and punch, in combination, substantially as described.

Third, The conical bush, in combination with the cap and driver, for the purpose of holding various sized punches in the same punch holder, substantially as described.

49,938.—Cultivator.—Londus B. Walker, Chicago, Ill.:

First, I claim the combination and arrangement of the vibrating bars, C C, with the bars, D D, which draw the cultivating teeth.
Second, In combination with the vibrating bars, C C, I claim the levers, W W, and links, Z Z, arranged to operate them, substantially as described, for the purpose set forth.
Third, I claim making the foot levers, W W, with three arms, and hanging them so that the driver, by applying his foot to either of the upper arms, can work the levers and vibrate the bars, C C, in either direction.
Fourth, I claim making the axle or pivots of the wheels hollow, in combination with the rock shaft and levers marking through them, to raise the cultivating teeth.

49,939.—Mode of Manufacturing Halters.—Hiram B. Ware, Burlington, Iowa:

I claim a halter, made with clasps and rivets, substantially as herein shown and described.

49,940.—Burglar Alarm and Lock.—Elijah Warne, Broadway, N. J.:

I claim a burglar alarm and lock, consisting of the parts herein described, or their equivalents, combined and operating substantially in the manner above described.

49,941.—Feed-water Apparatus.—George J. Washburn, Worcester, Mass.:

I claim, First, The piston valve reciprocating in the chamber, as described, in combination with the openings, K, and their alternate induction and exduction connections, substantially as described.
Second, The rotary steam valve with its steam ports, R R', and exhaust ports, S S', communicating alternately by the pipes, Q Q', with the ends of the piston chamber, G.

Third, The combination of the shouldered plates, P P', with the wheel, N, and the pins on the faces of the latter, by means of which devices the reciprocating motion of the piston valve produces the rotary motion of the valve, M.
Fourth, The arrangement of the pipes and passages for connecting the water chamber, A A', with the water supply from below and the steam from above, without allowing either to pass through the chamber, so as to obtain a raising and falling column of water in said chambers, the upper or surface portion of said body of water always remaining in the chamber exposed to the influence of the incoming steam.

Fifth, The arrangement of the chambers, A C and A' C', communicating respectively by the pipes, K and K', and the orifices in the chamber, G, by which an equilibrium in the height of water in the connected chambers is periodically established by the weight of the column of water driving the steam from the lower chambers and condensing it during its passage by the described means of communication toward the chambers, C C'.
Sixth, The arrangement of the pipes, U U, which connect the chambers, C C' and A C', respectively, carry a body of water from a chamber under pressure, and discharging it in spray in a steam chamber disconnected with the steam induction, as and for the purposes described.

Seventh, Conducting the condenser pipe, K, through a body of water exterior to that in the chambers, so as to avoid impairing the vacuum therein when this is used in combination with the chambers, A A' C C', substantially as described and represented.
Eighth, I claim the arrangement of the valves and ports, by which air, which may be in the chambers, is expelled at each stroke and driven toward the boiler, substantially as described.
Ninth, In connecting with pumps which draw their water by the vacuum caused by the condensation of steam and expel it by the direct action of steam, I claim the method described of regulating the supply of steam to the apparatus by placing the steam pipe with its open end downward in the steam boiler at the water line of the boiler, or in a chamber connected to the boiler, substantially as described and represented.

49,942.—Railway Carriage.—L. A. West, Cambridge, Mass.:

I claim the arrangement of levers, D D, and the spring or springs of each, with the platform frame, A, and the truck frame, B, the same being substantially as and so as to operate as specified.

49,943.—Fertilizer.—J. D. Whelpley, Boston, Mass.:

I claim, as a new article of manufacture, a fertilizer, consisting of finely pulverized feldspar, feldspathic granite, and other potash-bearing rock, in combination with gypsum and bone or phosphate of lime, substantially as described.

49,944.—Horse-power for Sawing Machine.—O. A. White and L. W. Bostwick, Norwalk, Conn.:

We claim a horse-power, arranged and constructed substantially as and for the purposes herein set forth.

49,945.—Lifting Apparatus.—G. B. Windship, Boston, Mass.:

First, I claim the combination and arrangement of the weighted lever, O, yoke, F, and their connecting chains, U U, or their equivalents, substantially as set forth and for the purpose described.
Second, The combination and arrangement of the sliding car, S, rope, Y, and pulleys, d z, or their equivalents, substantially as set forth, for the purpose described.
Third, The dogs, e c, attached to the car, S, and operating in combination with the rope, Y, and the holes in the top of the lever, O, substantially as and for the purpose described.
Fourth, The nut or swivel, R, and rod, Q, in combination with the lever, O, chains, V, and yoke, F, or their equivalents, substantially as and for the purpose specified.
Fifth, The employment of the rubber spring between the top of the lever, O, and the rod, Q, substantially as and for the purpose described.

49,946.—Lining for Boots and Shoes.—John Adams (assignor to himself, A. B. Walker, A. J. Hobbs and William Russell), Kokomo, Ind.:

I claim constructing the lining of a boot or shoe at the point where the front or side slit is formed, in such a manner that it closes the slit against the entrance of water and dust, and also allows the ankle position of the shoe or boot to be expanded in size, but this I only claim when the lining proper is constructed and applied as herein described.

49,947.—Cloth-drying Machine.—Charles F. Bennett (assignor to Maria Bennett), Philadelphia, Pa.:

First, I claim the combination of two or more revolving rims, G G', with the stationary plates, H H, and the system of heating pipes herein described, or the equivalents to the same, secured to the frame by the machine, and arranged in respect to the said rims, substantially as and for the purpose herein set forth.
Second, Constructing each rim with a recess in the inside for the reception of the wheel, F, and the edge of the stationary plate, H.
Third, The central rim, G, and outer rim, G', the latter being guided by the rods, h, secured to the central rim, and being rendered adjustable to and from the latter by the screw rods, d, or their equivalents, for the purpose specified.
Fourth, The fan, K, and system of heating pipes described, or their equivalents, the whole being secured to the frame of the machine, and surrounded by the revolving rims, substantially as set forth.
Fifth, The combination of the fan casing, J, casing, L, of wire gage or perforated plates system of heating pipes or their equivalents, and the shield, I.
Sixth, The combination of the rims, G and G', their internal wheels, F F, and pinions, E and E, on the grooved driving shaft, B.
Seventh, The combination of the central rim, G, with the retaining wheel, f, on the driving shaft, B.
Eighth, The tenting wheels, F, with their sliding blocks, n, in combination with the disks, q q, on the shafts, N N', and the device herein described, or the equivalents to the same, whereby the position of the blocks before their hooks seize the fabric is determined by the position of the edge of the said fabric, for the purpose specified.

49,948.—Brake Shoe.—James Christy, Philadelphia, Pa., assignor to himself, Rudolph Birks and E. H. Bitzman:

First, I claim the holder, A, with its lugs, a e', and the sole, E, with its lug, c, constructed and secured together by the key, F, passing through the lugs, substantially as described.

Second, The key, F, for securing the sole E, to the holder, the said key being curved, as and for the purpose specified.

49,949.—Automatic Boiler Feeder.—Samuel Driver (assignor to himself and Edward Longan), Philadelphia, Pa.:

First, I claim combining the feed pipe with the boiler by means of the box, A, and chests, B B, arranged and operating substantially as described and for the purpose set forth.
Second, The combination and arrangement of the valves, D D', with the chest, B, for opening and closing the communication between the box, A, and the boiler, substantially as described.
Third, Combining and arranging the cams, I I', with the valves, D D' and F, substantially as and for the purposes set forth.

49,950.—Let-off Motion for Looms.—Samuel Estes, Newburyport, Mass., assignor to himself and C. O. Morse, and said Estes assigns his right to Hiram Littlefield:

I claim making that part of the batten of a loom which comes in contact with the finished fabric, yielding and combining it by suitable levers, C D, pawl, E, and ratchet wheel, F, or their equivalents, with the yarn beam, G, substantially as and for the purposes set forth.

49,951.—Machine for Making Paper Bags.—E. W. Goodale, Clinton, Mass., assignor to Benjamin S. Blinney, Somerville, Mass.:

I claim, First, Making the side cutters, B, with curved ends, substantially as and for the purpose set forth.
Second, Making the former, C, in two or more parts, substantially as and for the purpose described.
Third, The pasteur, H, in combination with the adjustable strap, v, knife, G, and paste roll, I, constructed and operating substantially as and for the purpose set forth.
Fourth, The arrangement and combination of the side cutters, B, former, C, measuring rollers, D, cutter, E, oscillating arm, F, paste roll, I, pasteur, H, and knife, G, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention relates to a machine for making paper bags of a novel construction, which, however, cannot be explained without drawings.]

49,952.—Apparatus for Shaping Paper Collars.—W. E. Lockwood and Henry Howson (assignors to W. E. Lockwood), Philadelphia, Pa.:

We claim the three rollers, J K and M, the said rollers being of the form substantially as illustrated, and being arranged and operating in the manner described.

49,953.—Lantern.—Samuel Roebuck (assignor to Roebuck Brothers and Markland), New York City:

I claim a lantern constructed with openings to receive the glass plates by slitting the sheet-metal body, as shown, and bending the metal outward at each side to obtain reflecting surfaces behind the glass plates between them and the main portion of the body, substantially as set forth.

[This invention relates to a new and improved mode of constructing lanterns, whereby the openings and reflectors are obtained to cause the rays of light to be radiated from the lantern in the most favorable manner, and the latter rendered capable of being manufactured at a very moderate expense.]

49,954.—Manufacture of Spectacle Frames.—J. E. Spencer and Edwin Want (assignors to J. E. Spencer), New Haven, Conn.:

We claim forming the pivot solidly upon the temple, and otherwise constructing the hinge, and uniting the bore with the temple, substantially as described.

49,955.—Vapor Burner.—James Stratton (assignor to the Petroleum Vapor Stove and Gas-light Company), Philadelphia, Pa.:

First, I claim conducting the fluid from which the gas is to be generated through an annular or nearly annular tube, which communicates with and is arranged above a nipple, substantially as and for the purpose described above.
Second, The detachable deflecting plate, H, adapted to the annular portion, a, of the tube, A, substantially as and for the purpose described.
Third, The nipple, E, with its opening, c, and its valve-seat, in combination with the valve rod, F, and its needle point, e, the whole being constructed and arranged substantially as and for the purpose set forth.
Fourth, The cap, I, with its pointed rod, l, adapted to the nipple, E, substantially as and for the purpose specified.

49,956.—Smoothing Stone or Implement.—J. E. Tucker (assignor to himself and C. H. Moore), Boston, Mass.:

I claim the combination of the stone or steatite body, A, the metallic socket, B, and handle, C, arranged and applied together substantially as specified.

49,957.—Apparatus for Clinching Clasps on Hoop Skirts.—George F. Wright (assignor to himself and H. H. Waters), Clinton, Mass.:

I claim, First, A vibrating hopper, having apertures in the side or sides thereof, of the form substantially as herein described, in combination with one or more suitable guiding bars, and a spiral or other suitable-shaped delivery tube or tubes, arranged together and operating substantially as and for the purposes specified.
Second, The bow, or other suitable springs, g' g', attached to the clinching tool for grasping the clasps, arranged and operating as described.
Third, The toothed feeding wheel, P, for feeding the clasps as they are delivered by the tube to the clinching tool, arranged and operating as described.
Fourth, The sliding bar, s, with hopper and feeding tube attached, arranged and operating substantially as described.

49,958.—Method of Preparing Aniline Colors for Dyeing and Printing.—August Samuel Leopold Leonhardt, Berlin, Prussia:

I claim the rendering of the blue and violet colors of commerce, obtained from magenta, and which are insoluble in water, in a fine state of subdivision, so that without further use of alcohol or other solvent they are in a fit condition for use in dyeing and printing, by first dissolving them in alcohol, or aniline, or sulphuric acid, and subsequently allowing the solutions so obtained under brisk and consistent agitation to drop into cold water alone, or into cold water containing in solution neutral salts, caustic or carbonated alkali; or, as in the second described process, when aniline is used, into cold water containing hydrochloric acid; or, as in the last process, when sulphuric acid is used, into cold water containing an equivalent amount of alkali to the sulphuric acid employed, and subsequently recovering the solvent used, as described in the first two processes.

REISSUES.

2,070.—Truss Bridge.—Albert D. Briggs, Springfield, Mass. Patented July 27, 1858:

I claim, First, The method of increasing the bearing surfaces for the blocks, d d e, by the employment of the blocks or keys, e' e', fitted between the chord sticks and between the bearing blocks, d d e, substantially as described.
Second, The employment of the blocks, h h, fitted between the bearing blocks, d d e, on the outside of the chord sticks, substantially as herein set forth.

2,071.—Machine for Cutting Splints.—J. C. Brown, Brooklyn, N. Y. Patented June 21, 1864:

I claim, First, The cutter cylinder, C, when the cutters are placed diagonally thereon in the manner described, so that the angle of each cutter relatively to the axis of the cylinder shall be opposite to the next cutter, and alternate cutters parallel to each other, whereby the cylinder revolving as described will cut the splints tapering, substantially as and for the purpose specified.
Second, The cutter cylinder, C, and the fixed cutter, a, when combined and arranged substantially as and for the purpose described.

2,072.—Saw-mill.—John L. Knowlton, Philadelphia, Pa. Patented Oct. 20, 1863:

I claim, First, In combination with the circular frame that holds and turns the saw sash or frame, the guides, j j, between which the

sliding block moves that transmits motion to the saw, so that the saw and the block shall always be in the same plane, and always move together, without cramping or binding, substantially as and for the purpose herein set forth.

I also claim so arranging the crank-wheel shaft and the ring frame as that the former shall be in a plane that shall pass through the opening of the ring frame, and as nearly central to said ring as practical with my construction, so that the two, while connected, may move on as nearly common centers as possible, to avoid all binding of the parts and all undue friction to the driving mechanism, substantially as herein described.

DESIGNS.

2,164.—Clock Case.—C. T. Foote, Bristol, Conn.

2,165.—Wind Vane.—A. L. Jewell, Waltham, Mass.

2,166.—Valve Handle.—John Matthews, Jr., New York City.

2,167.—Oil Cloth.—A. E. Powers, Lansingburgh, N. Y.

2,168.—Carpet Pattern.—F. J. Pierce (assignor to Roxbury Carpet Company), Roxbury, Mass.

2,169.—Ox Yoke.—W. T. Remington, Bridgeport, Conn.

2,170.—Stove.—Jacob Steffe (assignor to Cox, Whitman & Cox), Philadelphia, Pa.

2,171.—Hall Stove.—Jasper Van Wormer, Albany, N. Y.

2,172.—Spoon Handle.—Rudolph Wendt, New York City.



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[See Judge Holt's letter on another page.]

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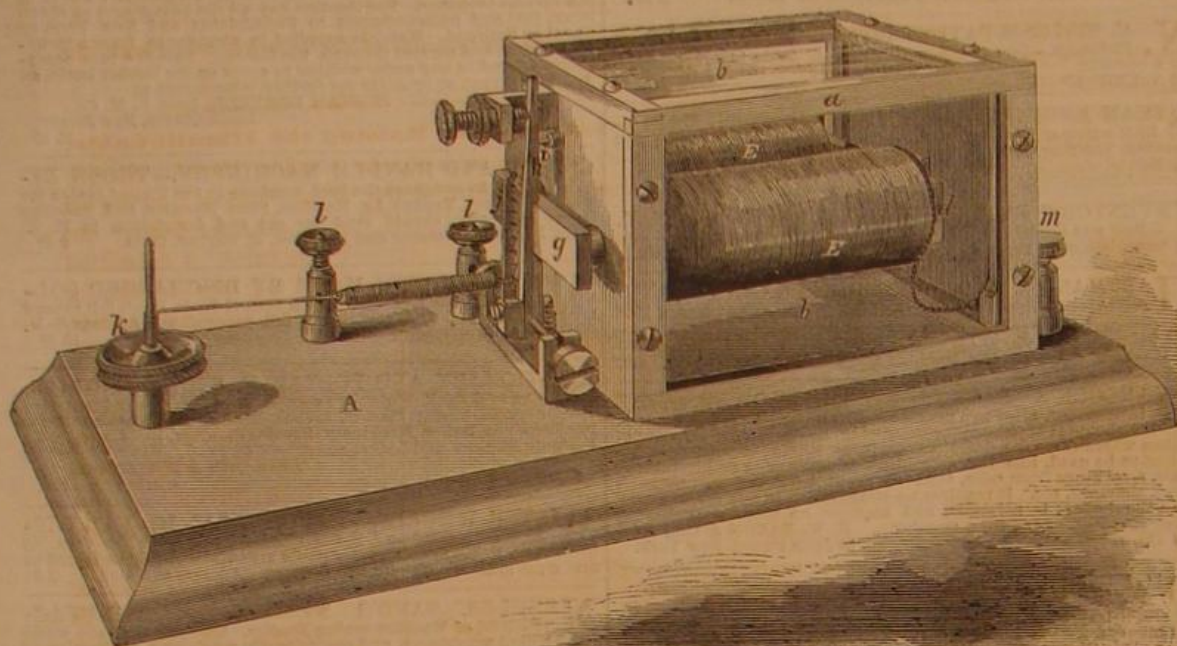
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Improved Electro-Magnet.

The telegraph has become so extensive that the manufacture of the apparatus employed is quite an important industry. In the Morse system—which is the one in universal use in this country—the electro-magnet may be called the central, or main part of the apparatus. A short rod of soft iron is wound with a coil of insulated wire, and then, so long as a current of electricity is passing through the wire, the iron is a magnet. The circuit may be a foot or one hundred miles in length, and any break in the wire in any part of its length of course stops the current, when the iron ceases to be magnetic. The magnet may be placed in New York and the current may be broken in

fiftieth of an inch in width, but in this helix they are only one eight-hundredth of an inch, and have been wound one-thousand-and-seventy-ninth of an inch. As the power of the current in inducing magnetism in the iron core depends upon the number of convolutions and their proximity to the core, the advantage of this more compact winding is manifest. We are told that Professor Page pronounces this the most valuable improvement that has been made in the electro-magnet since the introduction of the long fine wire.

This invention was patented through the Scientific American Patent Agency, Aug. 1, 1865, and further information in relation to it may be obtained by ad-

**BRADLEY'S RECEIVING MAGNET**

Albany, and by successive breaking and reforming, signals may be transmitted. In this way all our telegraphing is done.

The magnet here illustrated is wound with naked wire, the only insulation being the blank spaces between the several convolutions, the courses being separated by a wrapper of thin paper. By this modification a given length of wire gives a greater number of convolutions, and they are brought nearer to the central core, thus, with a given resistance to the current, increasing the power of the magnet.

There are also several minor improvements which will be seen by examining the engraving, in which A is the marble base, *a a* the brass frame of the box, *b b* the glass plates forming two sides and the top of the box, *d* the keeper or back bar of the magnet, *E E* the helices, seen through the glass plates, *g* armature, *h* armature lever, *i i* the platinum points for opening and closing the local circuit, *j* small ratchet bar on which the adjusting spring may be raised or lowered, *K* adjusting stand, *l l* screw cups for the local circuit, being connected with the platinum points, *m m* screw cups for main circuit (only one visible in the cut), being connected with the fine wire of the helices. The minor advantages are thus set forth by the inventor:—

The anvil which receives the stroke of the armature being in one side of the box, ample sound is given to be read without the use of a local battery and sounder.

The adjustments are effected with ease and facility, the most important of them being enlarged in its range by the ratchet bar, *j*. The adjusting stand, *K*, is peculiar, having a metal tube passing through the base and about one-fourth of an inch above—that portion above being slotted. A milled-edge wheel, having a hub which is nicely fitted upon the tube and resting upon the base, has a steel wire spindle which extends above the wheel for winding the cord of the spring upon and down through the center of the wheel and hub, and through the tube. The spindle is made fast in the wheel and hub, and turns in the tube. This compound joint of spindle within the tube, and tube within the hub, gives double friction, which may be increased at pleasure by opening or closing the slot in the upper end of the tube.

But the characteristic peculiarity of this magnet is the naked wire of the helices. When the wire is wound with silk the spaces between the convolutions are from the three-hundredth to the one-hundred-and-

dress the inventor, Dr. L. Bradley, at No. 7 Exchange Place, Jersey City, N. J.

MARKLAND'S COAL SCUTTLE.

The chief point of novelty in this invention lies in the substitution of one material for another. Very often as much ingenuity, or at least benefit, can be attained in this way as in devising the most costly machine.

It is well known to all who use such articles that common coal scuttles rust out at the bottom, so that, while the other part is perfectly good, the scuttle has to be thrown away. In this utensil the bottom is



made of wood, of a proper thickness, and nailed to the body, and it is claimed by the inventor that it will wear much longer, and can be made in half the time; where a galvanized top is used the scuttle is claimed to be almost indestructible. It was patented Nov. 1, 1864, by Thomas T. Markland, Jr., Philadelphia, Pa. For further information address Markland & Co., No. 835 Ellsworth street, Philadelphia.

BAT MANURE.—A large deposit of guano, the produce of bats, has been discovered in a natural cave eight miles distance from Vesoul, in the Department of the Haute Saone, France. It is estimated at about 800 cubic meters in bulk. A French chemist has analyzed and pronounced favorably upon it.

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THE ANNUAL
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Scientific American.

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Vol. XIII—No. 14.
(NEW SERIES.)

NEW YORK, SEPTEMBER 30, 1865.

\$3 PER ANNUM
IN ADVANCE.

Apparatus for Burning Petroleum.

This engraving represents a plan for burning petroleum to heat water either for generating steam or for culinary purposes. The method employed is to allow the petroleum to flow into a vessel containing sand or fire-clay, on the surface of which it is ignited and burns steadily without creating smoke. This sand supplies the place of a wick in a lamp, and the vessel containing it is placed directly underneath the boiler, as common furnaces are. The oil is forced up to the pan by water pressure. The details are as follows:—

The oil chamber, A, is supplied with oil through the pipe, B, and there is a reservoir, C, which is filled with water. This reservoir communicates by the pipe, D, with the oil chamber, and its flow is controlled by the cock, E. There is also a compartment, F, above the oil chamber, which is also filled with water to keep the oil cool; this water rises no higher than the outlet, G. The fire pan containing the sand is at H, and communicates with the oil chamber by the pipe, I. The bottom of the pan is slightly inclined so as to diffuse the oil evenly all round, being also furnished with grooves, as in Fig. 2, for that purpose. There are holes, J, in the furnace door, and also air pipes, K, through the bottom of the pan to admit air to the flame.

These are the principal parts. Water is let into the chamber or reservoir, A, so as to cover the inlet pipe for oil, and the latter fluid is then filled in, as before described; being lightest it floats on the surface until it finally rises through the central pipe into the sand box or fire pan. The sand is completely saturated with the oil, which burns freely when ignited, creating an intense heat. There is no danger of accidental explosion with this apparatus, for the oil is entirely covered or surrounded by water.

It is claimed to be applicable to stoves for culinary purposes, and also to land or marine engine boilers. In the case of the land engine, the oil chamber may be removed to a distance from the fire box, as in the yard, for instance, where a special building could be constructed for the purpose, and the oil pipe could be carried under ground.

On board of a ship the oil chamber might be in the hold or near the keel, and the water reservoir on deck. The petroleum in this way might be kept in

tanks covered with water, remote from fire and where nothing but design could set it on fire. It could also be supplied to the fire without exposure to sight, touch or smell. A model of this invention will be on exhibition, says the inventor, at the Fair of the American Institute.

gines, and the quality of their work will speak for itself.

A New Plan for Raising the Atlantic Cable.

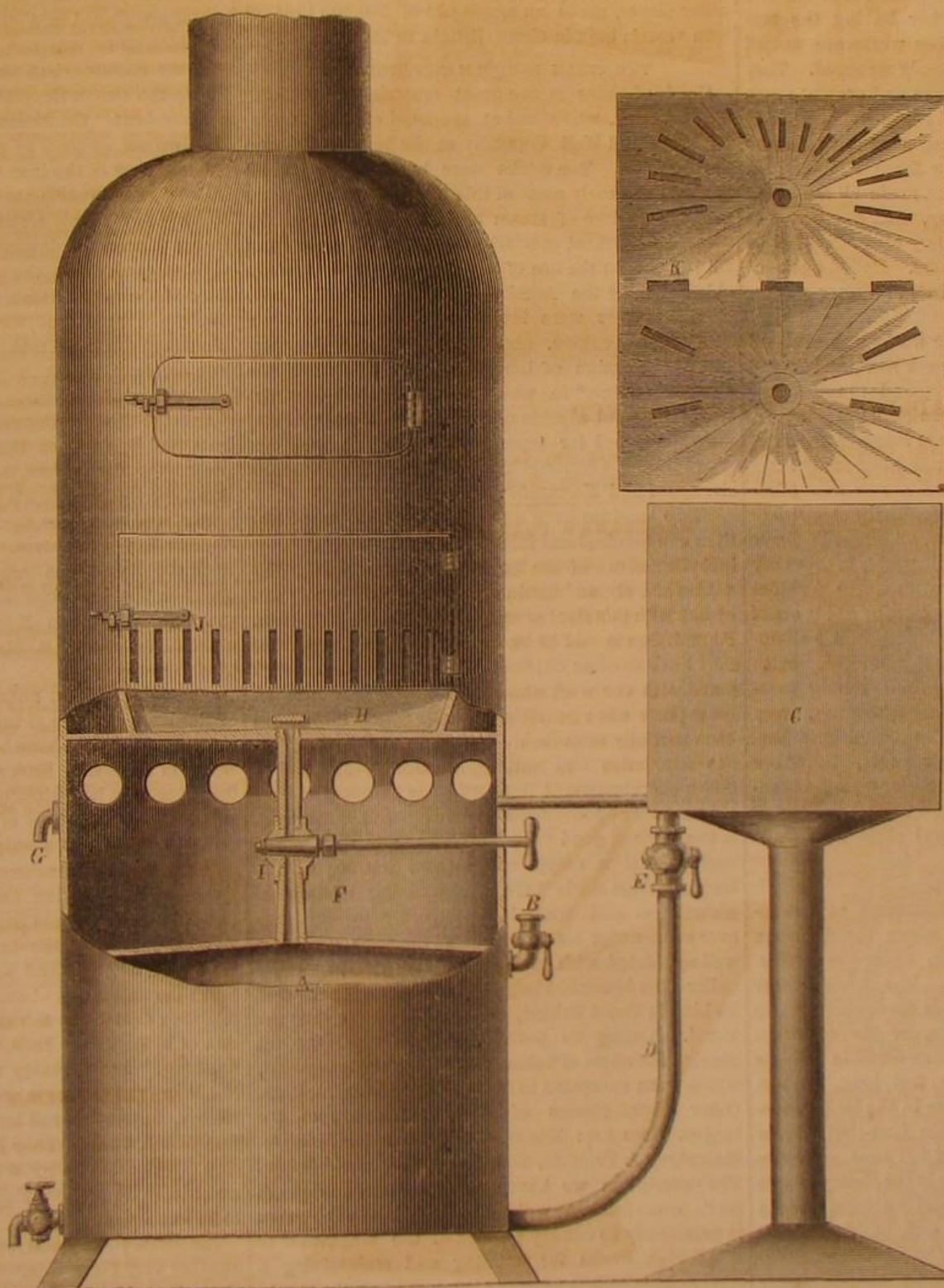
Louis Olin writes to the *London Morning Star*:—
“After the return of the *Great Eastern* I conceived

a plan for fishing out the cable. I submitted it to some friends or mine, among whom was a scientific gentleman. They found it so practicable that they advised me to publish it. I proposed to start three ships instead of one, each ship having a wire rope of great strength attached to the stern, of at least three miles in length. At the end of this rope I would attach a thick ring, weighing several hundred pounds, through which the end of the cable at Valentia should be passed; the ships would then be obliged to follow the cable, as the least deviation would be indicated by the angle described by the ropes. The ships would be from two to three miles apart, the *Great Eastern* in the middle; and, when within ten or fifteen miles of the broken end of the cable, would, by a signal from the *Great Eastern*, stop and begin the winding up. When the cable is raised a mile high, the first and third ships would stop, leaving the *Great Eastern* to finish the work; by this means the slack of at least six or seven miles of the cable would be available to raise it to the surface of the water, even if the depth were two miles.”

[This plan may seem plausible at first sight, but a very little reflection will show it to be impracticable. In any considerable depth of water the lower end of

the line carrying the ring would lie along the bottom of the ocean, and the ring would rest flat on the ground, with the cable bending through it and pressing it hard on two sides. In these circumstances no power could drag the ring along, and, if all the tackle should hold, the *Great Eastern* would be effectually anchored in mid ocean.—Eds.

A LARGE CYLINDER.—A cylinder of 100 inches in diameter—the largest ever cast at the navy yard in Washington—was successfully cast recently. The amount of metal used was 58,000 lbs; time of running into the mold, three minutes and a quarter.



M'KINNEY'S APPARATUS FOR BURNING PETROLEUM.

For further information address E. McKinney, at Box 372, Clarksville, Tenn., by whom it was patented through the Scientific American Patent Agency on July 25, 1865.

Pateron Locomotives.

An anonymous correspondent, writing from Paterson, says:—The heaviest engines turned out of Paterson, however, are those built for the Baltimore and Ohio Railroad by the New Jersey Co., and which are 19½-inch cylinders, 22-inch stroke, with 8 coupled wheels, and flues 15 feet long by 2½ inches in diameter. Paterson shops are not behind in the size of their en-

THE GREAT ENGLISH MACHINE WORKS.

The private iron ship-building works of England are of three classes. 1. Those that manufacture within one inclosure every part of a ship, including armor plates for iron-clads. 2. Those that manufacture steam machinery for ships. 3. Those that confine themselves to rolling armor plates and every kind of rolled work.

PRIVATE IRON SHIP YARDS.

There are in England two immense private establishments for the construction of iron ships, each as extensive as a government dockyard, and each containing appliances more modern and elaborate than any to be found in the public yards. The chief of these is the Mill Wall Works, formerly owned by Scott Russell, Esq., builder of the *Great Eastern*. The works cover 27 acres and have a water front of 1,900 feet. There are 4,500 men employed in the yard, and the business is conducted on a capital of \$2,500,000. The yard is divided into two parts by the public street, the one on the river bank containing the vessels under construction, and the other having the machine shops, foundries, etc. The works are not all modern nor are they advantageously arranged. They have grown from small beginnings and present much the same appearance as an old house which has had additions made generation after generation in the distinctive style of each. The forge contains six heavy steam hammers; here are made all the heavy forgings for the steam machinery, etc., of the vessels under construction. The smithery contains 97 fires and several small steam hammers. Rolled work of every description, from sheet iron to armor plates, can be made in the yard.

The Thames Company, whose works are situated near the Mill Wall Company's, rank next, and indeed are second only in not being prepared to roll armor plates. The first great British iron-clad, the *Warrior*, was built here. Rolled plates are found to be superior, and though this company still build many large sized iron-clads, they procure the armor from other companies. The distinctive peculiarity of the Mill Wall and Thames Companies, over all others in Great Britain, and, indeed, in the whole world, is that they take rough iron scraps, chiefly with some puddled iron, in at the gate, and in a few months sail it out of their yard in the form of magnificent and well-appointed ships, ocean steamers and iron-clads. With the single exception of armor-plate rolling mentioned in connection with the Thames Company, every process connected with iron ship building is performed within the walls of their yards. Seven or eight heavy ships under construction, with the manufacture of every part belonging to them, progressing simultaneously, is not an unusual sight in each of these yards.

OTHER YARDS.

Next in order comes the establishment at Birkenhead, owned by Laird Brothers, where the *Alabama* and other rebel vessels were built under the protection of the British Government. The works cover about 19 acres, and are remarkable for containing two large permanent stone dry docks, for the construction of vessels, which are not often found in private establishments. These are 410 feet long, 85 feet wide, and of depth enough to take in the largest vessels afloat. From one of them the iron-clad frigate *Agincourt*, 380 feet long, and 6,621 tons measurement, has lately been floated. It is the theory of this company that large vessels should be built on dry docks, as it saves much labor, and, besides, avoids the serious straining which they suffer in launching. Another feature of these works is an enormous pair of rolls 18 feet in length by 28 inches in diameter. Eight feet rolls are counted large in most iron mills. There is also a large planing machine where a slab of iron 33 feet long can be finished. The Lairds are accustomed to have five or six vessels on hand at once.

Messrs. Napier & Sons have an establishment on the Clyde, where they are now building three iron-clads for the Turkish Government.

Messrs. John Rogerson & Co. have a shipyard at Newcastle-upon-Tyne, and rolling mills at Consett, 13 miles distant. These mills are the most extensive in England, turning out bar and plate iron. In the shipyard eleven vessels have been seen under construction at once. At the

STEEL SHIP-BUILDING YARD.

of Messrs. Jones, Quiggin & Co., at Liverpool, ships built entirely of steel are constructed. Frames, plates, masts, yards, standing rigging, all being made of cast or rolled steel, or steel wire. This firm was the first to adopt steel in place of iron for ships, and their success may be seen from the fact that five steel paddle-wheel steamers may be frequently seen on their stocks at once. They also build vessels of iron or iron and wood.

We have not, in these few notices, given even a full list of the iron shipyards of Great Britain, but have merely glanced hurriedly at a few, from which an idea of the magnitude and perfection of England's ship-building facilities may be gained. The yards on the Thames River turned out, in 1864, 117,000 tons of iron vessels. Those on the Clyde are 33 in number, and launched, in 1863, 170 iron vessels, with an aggregate tonnage of 120,700 tons. The production of other localities is as follows:—Mersey 80,000 tons; Tyne, 51,236; Weir, 25,000 tons; Tees, 15,000 tons; which, with those vessels built at Belfast and Bristol, and other places, made an aggregate of 500,000 tons of iron vessels built in Great Britain in 1864.

THE STEAM ENGINE MANUFACTORIES.

Chief of these is the great manufactory of John Penn & Sons, who stand at the head of their trade, as do the Mill Wall Company at the head of the iron shipbuilding. The works were begun by Mr. John Penn in the early part of this century, and in 1830 the manufacture of steam engines was commenced. The establishment was without especial reputation till 1840, when the use of the screw propeller was decided upon by the Admiralty for the British navy. Engine-makers were invited to send designs for a direct-acting engine, and Messrs. Penn & Son furnished the design of the engine now known as the "trunk engine," in which all parts are below the water line and capable of running at the high rate of speed required for propeller engines. It was approved, and a contract given for two engines for the *Arrogant* and *Encounter*.

These engines have now been supplied to no less than one hundred and thirty vessels in the royal navy, including seven of the largest British iron-clads. The navies of Italy and Spain are almost exclusively furnished with this class of engine. The design of Messrs. Penn & Son is said to be inferior in some points, but they have so often duplicated it, and have taken such pains with the workmanship, altering the troublesome parts when possible, that its effects may have been partially remedied. The works of this company are foundries and smithery at Greenwich, and a boiler manufacture at Deptford. The foundry is very old, and its appointments are antiquated. But such is the value of good superintendence and determined energy, that a competent witness testifies to the large castings made here, as possessing soundness, smoothness and perfectness superior to any that ever came under his notice. The machine shops are well appointed with modern conveniences, and the boiler-shop is acknowledged to be the most perfect of its kind in Great Britain, which, of course, means the world. Among its peculiarities are machines for planing the edges of boiler plates previous to riveting, which is an exception to the rule in boiler making. Other manufacturers of steam machinery of the largest class are: Messrs. Maudslay & Son, Messrs. Humphrey & Tennant, and Messrs. G. Rennie & Son. The description we have given of Messrs. Penn & Son's establishment will suffice for all, as our design is principally to convey an idea of the magnitude of the British works for building and maintaining a navy. This brings us to the third division of our subject.

ARMOR PLATES

for the British Navy are produced at the works of the Mill Wall, Thames, Cyclops, Mersey, Park Head, and Park Gate Companies, all of whom compete for the government contracts. We will describe the works of J. Brown & Co., the largest manufacturers of armor plates in the kingdom; and first we will look at the process of manufacturing the massive slabs of iron which cover the sides of British iron-clads. The first plates ever made in England to protect a ship's sides from an enemy's shot were made during the Crimean war, by the Park Gate Company, at their works near Rotterdam. They were four inches thick, but of small dimensions to those now in common use,

The first sea-going iron-clad built, was the *Warrior*, armed with hammered plates, $4\frac{1}{2}$ inches thick. Hammered plates were soon discarded in favor of rolled; and, as the result of experience, the following process of manufacture has been decided upon:—

Bars of about twelve inches wide and one inch thick are first rolled; five of these are then piled on each other, and rolled into a rough slab; two of these slabs are rolled into a plate; four of these plates are rolled into another plate; and finally four of these plates are piled and rolled into a finished plate. The last plate thus contains 160 of the first plates. The iron is heated to a white heat for each rolling, the object of so many successive workings being to produce perfect homogeneity in the mass. In very thick plates the piling is carried still further. In ordinary five or six-inch plates, the thickness of one of the original inch plates is one thirty-second of an inch, or one twenty-seventh of an inch in the finished plate.

THE PROCESS OF ROLLING

is well worth seeing. The plates are heated in a reverberatory furnace, so called because the slabs of metal are placed in a chamber filled with flame, but in which they are not in contact with the coals. Twenty minutes, half an hour, or an hour, according to the size of the plates, suffices to raise them to a white heat. On looking through a little aperture in the furnace, as soon as the eye is accustomed to the intense glow of the iron and flame, the mass of metal may be seen, wearing a soft, waxy appearance, and looking too purely white to give a sense of heat. Drops of scoria or impurities may be seen running in vivid streams down the surface, and falling on the floor of the oven, which, being inclined, they run off into the "throat" of the furnace, and are removed. Workmen draw the mass with heavy hooks, on to an iron carriage, and it is wheeled to the rollers and its end presented to them. The swiftly-revolving cylinders seize the glowing mass, and, with a tremendous hug, pull it between them. Troughs of water are hung over the rollers, and streams of liquid pour down on them. Clouds of steam rise as fire meets water, and make the work and workmen appear more Vulcan-like than ever. The process is repeated until the plate is the required thickness. Its edges are then trimmed according to pattern, in a planing machine, and, when it is placed in position on the side of the vessel, it fits its appointed place, as a glove fits the hand.

THE ROLLING MILLS

of England, capable of turning out armor plates, are six in number, and have been mentioned above. The works of Messrs. J. Brown & Co. are the largest, and their size may be estimated by the following condensation of the statistics of their works:—Area of the principal works, 18 acres; workmen employed, 3,024; quantity of coal consumed each week, 3,600 tons. There are 60 puddling furnaces (furnaces for manufacturing scraps of old iron into bars), 42 steam-hammers, the drop of the largest being 8 feet with a weight of 20 tons, and an anvil block weighing 161 tons; the second size hammers are 12 tons, and from this they descend to the smallest size. There are four sets of armor-plate rolls, two preparatory and two finishing. The ordinary size of armor plates is 15 feet long by 4 feet wide and 5 or 6 inches thick. But Messrs. Brown can roll larger plates than any other firm in the world. They lately made some for a Russian fortification 14 by 6 feet and $13\frac{1}{2}$ inches thick, and others $7\frac{1}{2}$ inches thick, 4 feet wide, and from 24 to 34 feet long.

The Mersey Steel and Iron Works, at Liverpool, are another very large firm. They work 11 steam hammers, from 15 tons down. They possess an immense planing machine, having a travelling table 40 feet long, and two lathes of similar colossal proportions, being adapted to take in shafts 65 feet long. The works are also furnished with a steam traveling crane, with engine and boiler attached, which travels on rails laid down on the ground, picking up and transporting heavy work.

OTHER MACHINE AND TOOL MANUFACTORIES.

Besides these great establishments for the fabrication of ships and everything pertaining to them, the famous establishments of Sir William Armstrong, at Newcastle-upon-Tyne, and of Messrs. J. Whitworth & Co., at Manchester, are worthy of attention. The heads of these two establishments, Sir W. Armstrong and Mr. Whitworth, are well known to the world as

men of high scientific attainment, and the works under their management present a perfection of plan and an elaboration of mechanical appliances not to be found in any other similar manufactories in the world. The foundry in the Elswick Works (Sir W. Armstrong's) is regarded as the most perfect in Europe. The cranes for lifting heavy work are operated solely by hydrostatic power, and a boy stationed at a lever controls their action perfectly. Another remarkable peculiarity is the large steam hammer, weighing 10 tons, but which, by having the steam admitted over the piston, can give a blow of 65 tons, the heaviest of any in use in Europe, except perhaps, at the great steel works of Herr Krupp, in Russia. Under this ponderous instrument the famous Armstrong guns are welded. Experiments were some time since made here with the object of heating iron by gas, which would prevent the deleterious action of sulphur, always contained in coal. The subject is an important one, but we don't know the result of the trials.

The establishment of Messrs. Whitworth is, par excellence, the tool factory of Europe. The machinery is of the best description, and contains many peculiar and very ingenious tools invented by Mr. Whitworth or his workmen. The guns of this celebrated mechanician now rival closely those of Sir William Armstrong, and a long series of trials have closed in almost a "dead heat."

THE FAIR OF THE AMERICAN INSTITUTE.

On revisiting the Fair, this week, we found many things worth looking at, some of which we shall give a brief notice of.

APPARATUS FOR THE RUSSIAN TELEGRAPH.

In the southwest corner of the building may be seen a sample of the instruments that are to be used by the Collins Russian telegraph line, 75 sets of which have been manufactured in this city. The instruments are fixed in a box, which is quickly converted into a table by screwing on the four legs at the corners. For transportation, two of the boxes are fastened together in one package; and when these reach the station the operator has merely to screw on the legs and connect the proper wires with the air and ground lines, when he is ready to receive and transmit messages. The manufacturers expect orders for an additional supply of these instruments, as some 200 or 300 will be required for the whole line.

BESSEMER STEEL.

Messrs. Winslow, Griswold & Holley, of Troy, N. Y., exhibit Bessemer steel in various forms—in rails, cross heads, connecting rods for marine engines, boiler plates with flanges turned to show the endurance of the metal, crank pins, bolts with knots tied in them; in fact, all conceivable shapes.

This steel is exceedingly fine-grained in texture, and closely approaches the finest cast steel known to general machine work. A chipping chisel made from it was tried by us, and stood very well, although it is not recommended for tools. The flanged boiler plate has the advantage of being much lighter for the same strength of boiler, and also a greater facility for the transmission of heat, by reason of its thinness. Some of the specimens of flange turning were not only interesting as examples of the quality of the metal, but also for the good workmanship displayed. One three-sided aperture, about twelve inches long on each angle, had a flange turned around it as neatly and as square as if cast in a flask.

This steel will effect a great revolution in the proportions and weight of machines if properly applied. Among other curious examples of its toughness and tenacity a car axle bent double, cold, is shown.

GAYLORD'S COUPLING.

The American Coupling Co. exhibit a neat and useful coupling for hose or pipe, which can be connected or detached in a few seconds. It is perfectly airtight, is used on steam or water, and is highly appreciated by those who use it. No. 33 Day street, New York.

BEACH'S DRILL CHUCK.

This is one of those instruments which the introduction of twist drills has rendered indispensable. It is a highly-finished tool, is made of steel, and will take any-sized drill, from three-eighths to nothing at all; one of them will last a life time. It has three

steel jaws in it, which move to and from the center by being forced against inclined planes by a screw in the end. By catching hold of the chuck as it revolves, the jaws can be screwed tightly so as to hold against any common work. An engraving of this chuck is all ready for publication in the SCIENTIFIC AMERICAN. All sizes, from five-eighths to three-sixteenths, made by Clark Brothers, West Meriden, Conn.

WEBSTER'S WRENCH.

This is a most convenient little instrument. It is an ordinary screw wrench, with a socket outside the lower jaw. A tool fits this square socket, and is fed up by screwing on the nut that ordinarily changes the size of the wrench. For cutting off gas pipe, holding a round bolt, or screwing up pipe, it is just the thing. The wide range this tool has gives it a great advantage over the ordinary pipe tongs. The wrenches are made purposely for the admission of the patentable portion. Webster & Co., No. 17 Dey street, New York.

MURDOCH'S STAVE SAWER.

This machine is on exhibition at the Fair, and saws two staves at once, by a saw arranged like a crown gear, except that the teeth are on the lower side. The saw runs horizontally, and seems capable of doing excellent work. The saw also acts as a plane, and leaves a neat finish on the stave.

ART ROOM.

The display of art works is not very extensive. There are a few paintings, but none of distinguished excellence.

The show of photographic pictures is meager, but the specimens furnished are for the most part good.

Rockwood & Co. present some very fine and large architectural and mechanical views. Their prints of locomotives are superb.

Williamson, of Brooklyn, shows some excellent life-size portraits.

Gurney & Son exhibit a variety of excellent portrait specimens, among which is a splendid group of military officers—Gen. Dix and others.

Gutenkunst, of Philadelphia, has a fine collection of card portraits of marked superiority, with specimens of porcelain pictures that are truly beautiful. A splendid picture of Gen. Grant graces this collection.

S. A. Holmes, of New York, exhibits a fine collection of large out-door views—public buildings, Niagara, Central Park, and a series of oil-region pictures. All the mysteries of boring, pumping and tanking petroleum are here to be seen in perfection.

Messrs. Anthony present a number of fine Worthlytype prints. This process has been lately patented in the United States. The paper is covered with collodion containing salts of uranium and silver, and then printed. We have before fully described the process.

ROTATING BELLS.

Mr. Harrison, of the American Bell Co., has a number of their composition bells, with his attachment for causing them to rotate as they are swung. The bell is hung loosely upon a round bolt, which is surrounded by a spur wheel made fast to the bell; this wheel communicates by a simple train of gears to a lever on one side, which is actuated by a cam as the bell swings, and which turns the gears by means of a pawl and ratchet wheel. The object of rotating the bell is to prevent it from being broken by the continuous pounding of the tongue in one place. Mr. Harrison says that this is the most common cause of the cracking of bells, and that giving them a very slow rotation prolongs their durability indefinitely.

THE AMERICAN BARREL MACHINE.

This company exhibit some barrels, made by their patent machinery, which are very handsome specimens of workmanship. The machines consist of an apparatus for compressing the stave so that it takes a permanent "set" in the shape desired, and also in another machine, whereby the staves are jointed and finished. The barrels are subsequently set up by hand. Flour barrels made by this process are very tight. We were informed that, of a mixed shipment of flour to Cuba, in hand and machine-made barrels, the former were subjected to six or eight cents reclamation for short weight, while the machine-made barrels lost nothing. Thomas Richardson, No. 68 Broadway, is the agent.

IMPROVED ELECTRO-MAGNET.

Samuel F. Day, of Ballston Spa, New York, exhibits an electro-magnet, which he claims to be an improvement over any at present in use. Mr. Day has made hundreds of experiments with various forms of electro-magnets, and he says these have led to the discovery that the nature and action of the residual magnetism remaining, after breaking the circuit, is modified by the proportions of the magnet; in long and slender spools the scope of its power extends much further from the pole than in short thick spools. As the armature must be adjusted beyond the reach of the residual magnetism, any arrangement by which the power of this is circumscribed, is of great service in operating a telegraph. Mr. Day, therefore, makes his spools very short and of large diameter, the exact proportions having been determined by his numerous experiments.

A CHEAP FRUIT CUP.

J. F. Whitney & Son, of Milton, Ulster Co., N. Y., exhibit a fruit box, which they sell at \$20 per thousand—two cents apiece. It is made of a wooden splint, bent in a hoop and riveted, with a wooden bottom fastened by brads.

FOREIGN SUMMARY.

DR. PONOWSKI, of St. Petersburg, proposes powdered hellebore (*veratrum album*), as a remedy for the cholera; it is to be taken by the nose, like snuff. This is an infallible remedy when the patient sneezes eight or ten times after a pinch; but if the patient does not sneeze his case is altogether hopeless.

THE effluvia which escapes from sewers, in the very attempt to ventilate them, are of a very pernicious character, and have often been productive of mischievous effects. M. Robinet, a French chemist, has devised a very effective means of freeing the sewers from them. His plan has already been carried out on a small scale. He proposes that the furnaces of factories shall derive their supply of air from the sewers; the latter will thus be emptied of their mephitic gases, which will be destroyed by combustion, fresh air from the atmosphere supplying their place. He calculates that if the combustion of only 70,000 tons of coal can be thus economized annually in Paris, or only one-tenth part of what is burned there, the sewers will be supplied with about 140,000,000 cubic feet of fresh air—that is, more than seven times their contents—daily.

It is said that the impression produced on the officers of the British fleet during their late visit to Cherbourg, is that the iron shops at Portsmouth might be contained within the smallest basin in the Cherbourg docks, while the building, refitting and repairing works of the French iron marine occupy a space of many acres. It is evident that large establishments for iron ship building must, for the future, assume the most prominent position in British naval dockyards.

FROM Berlin we learn of the death of Astronomer Enke, whose name will ever attach to the comet he described and traced through its recurrent orbit; while other important additions to our knowledge of the firmament secure him immortality.

At the mineral works of MM Perret, of Lyons, on emptying an old cistern which had for some time been filled with water charged with sulphates of copper and iron, moderately thick coverings of metallic copper were found attached to the wood which had served to support the roof of the cistern, and among the stones forming its floor. The debris of the wood had doubtless acted by reduction on the cuprous solution. The reducing gases developed in the cistern had also acted.

THE operation of fixing the 8-inch and 6-inch armor plates which will protect the reconnoitering tower on the upper deck of the *Bellerophon* has been commenced. The port and starboard portion of the tower will be protected by armor plates 8-inches in thickness, but as this portion will be of conical form, the chances of any hostile shot effecting any injury to it, although obviously more exposed than the other portions of the tower, are reduced to a minimum. All the 8-inch plates have stood the bending, slotting and planing processes to which they have been subjected without exhibiting any flaw. The 8-inch plates are the largest yet operated upon at Chatham dockyard; but arrangements are now being com-

pleted for bending and working armor plates 8-inches in thickness, or double those of the thickness of the *Warrior*, with which the sides of the iron frigate *Hercules*, to be built at Chatham, are to be encased. Even this thickness of plating has been exceeded at the works of Messrs. John Brown & Co., Sheffield, where several thousand tons of armor plates of no less than 13½ inches in thickness have lately been manufactured for the Russian Government for encasing the sea face of the forts at Cronstadt.

THE capital expended in Great Britain on railways to the present time has been upward of three hundred and eighty-five millions sterling, or nearly half the national debt. This amount has been devoted to the construction of eleven thousand five hundred miles of railway in the British Islands, which are now open for traffic.

THE Directors of the British National Steam Navigation Company pay £1 a week to a rat-catcher for professional services on board the company's steamers. The rats, being fond of good living, are in the habit of migrating from ship to ship when they come into port, and as good living is plentiful on board the company's steamers, the rats patronize them extensively.

GREAT curiosity has been excited at Cherbourg by a small vessel propelled by electricity with great speed. The inventor, a French engineer, has shown his discovery to M. de Chasseloup-Laubat, the Minister of Marine. Another of the favorite scientific questions there has for some time been submarine locomotion.

ANOTHER hot-air and steam engine has been invented by Huck & Windhauser, Germany. It is illustrated in the *London Engineer* of Sept. 8th.

NOTES ON NEW DISCOVERIES AND NEW APPLICATIONS OF SCIENCE.

THE MECHANICAL EQUIVALENT OF LIGHT.

By a method, of which we shall give some account on another occasion, Professor Thomsen, of Copenhagen, has succeeded in ascertaining the mechanical equivalent of light. He finds that the mechanical equivalent of the luminous radiation, as distinct from the obscure radiation, from the flame of the French standard "bougie," is as nearly as possible 1.74 kilogrammeters per minute, being about one-fiftieth of the mechanical equivalent of the total radiation from the same flame. From this a writer in *Cosmos* has calculated the mechanical equivalent of the total light of the sun. He finds it to amount to something like that of 1,230 septillions of "bougies," or to thirty-five billions of tons lifted a billion of kilometers per second—the lifting of thirty-five billions of tons (French) a billion kilometers being about equal to lifting the weight of the earth twenty feet.

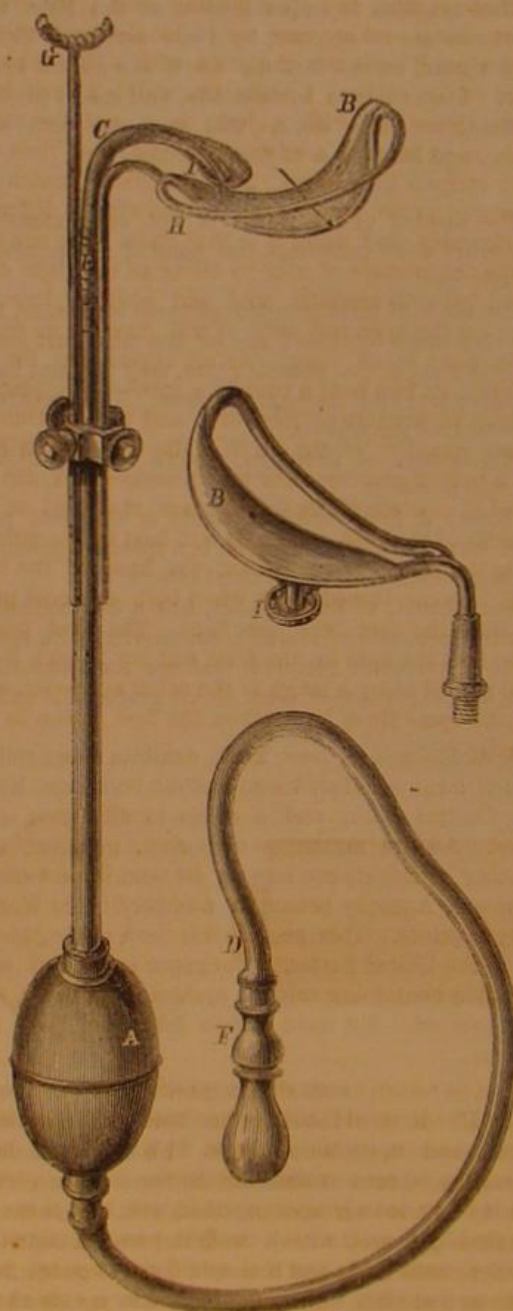
CHEAP METHOD OF OBTAINING CARBONIC ACID.

The Paris Societe d'Encouragement de l'Industrie has awarded its platinum medal to M. Ozon, the celebrated manufacturer of seltzer water and soda water, for the simple and ingenious method by which he obtains pure carbonic acid gas with which to aerate those beverages. M. Ozon burns coke in a furnace lined with refractory fire-clay, and supplies the furnace with sufficient air to effect complete combustion. The products of the combustion, consisting chiefly of carbonic acid gas and nitrogen, he first passes through water, in order to cool them, and, at the same time, to free them from mechanically admixed impurities, and then forces into the first of a row of receivers filled with solution of carbonate of soda. Except the last, which is open to the atmosphere, each of these receivers has a pipe passing from its upper part to the lower part of the next. The carbonate of soda in these receivers absorbs the carbonic acid contained in the gaseous mixture which is forced into them, becoming thereby converted into bicarbonate of soda, and the other elements of that mixture pass off from the last of the row of receivers into the air. When the solution of carbonate of soda with which the receivers were originally charged has become wholly converted into solution of bicarbonate, it is pumped into a boiler, in which it is heated by steam to 212° Fah., at which temperature the bicarbonate of soda gives off its second equivalent of carbonic acid, and is reconverted into ordinary or mono-carbonate. The carbonic acid so evolved is mixed with vapor of wa-

ter, but is, otherwise, perfectly pure, and the aqueous vapor, in association with which it leaves the boiler, can be readily separated by condensation. M. Ozon effects this condensation by carrying through a reservoir of cold water the pipes which convey the gas from the boiler to the gas-holder. The solution of carbonate of soda left in the boiler is used to recharge the receivers. As the portion of carbonate of soda first used will thus serve over and over again, *ad infinitum*, no carbonate of soda being actually consumed in the process, the cost of the carbonic acid obtained by this method is very little more than that of the coke which supplies the carbon for it—labor and wear and tear being quite insignificant items. While, therefore, both simple and highly effective, M. Ozon's process is also very cheap.—*Mechanics' Magazine*.

DIBBLE'S DENTAL APPARATUS.

The process of filling teeth cannot, by any possibility, be mistaken for a blessing in disguise, never-



theless it has to be endured by most persons at one period or another of life. Anything tending to shorten the time of boring, scraping, filing and similar delights will be gladly welcomed by the community at large, and also by the professional operator.

The apparatus here shown is intended to control the tongue or keep it out of the dentist's way, also to remove the saliva from the mouth as fast as it enters, so that it will not interfere with the progress or durability of the filling, and support the upper jaw, so as to render the operation less fatiguing. To secure these objects the inventor—who is an operating dentist, and may be supposed to know what is wanted—provides a pump, A, and a metallic plate, B. The pump is merely a hollow vessel of india-rubber connected to a pipe, C. There is a valve at E, and also one at F; the end of the tube, D, is deposited in a basin. The jaw is supported by the crutch-shaped rod, G. The apparatus is used in this way: The mouth of the patient being opened, the india-rubber chamber, A, is held in the patient's hand, and the rod, G, moved up against the teeth in the upper jaw

and secured at the proper height. The tongue compressor, B, is then placed against that unruly member, so that it is held back out of the way; this action then brings the wire guard, H, against the cheek, so that it is pushed out also, and a fair opportunity given the dentist to proceed with all speed—the instruments being introduced between the guard and the tongue compressor, as shown by the arrows. The saliva that flows in the course of the operation is immediately removed from the reservoir, I, by compressing the india-rubber vessel or pump, A; this act draws it into the vessel through the pipe, C, from which it is expelled into the basin placed at the end of the tube, D.

The plate or tongue compressor, shown isolated, fulfills the same office as the upper one, but is more compact in form, the two details being here combined in one.

A patent is now pending on this instrument through the Scientific American Patent Agency by W. H. Dibble, D. S., of Bordentown, N. J.

How the "Glasgow" Caught Fire.

Our readers may remember that the British steamer *Glasgow* was burned in a mysterious way a few miles off this port. The fire originated among the cotton, and was caused in the following manner. We take the account from *Mitchell's London Shipping Journal*:—

"The sounding well led from the steerage, and it would seem that, in stowing the cotton, it had been placed over the aperture, so that the carpenter could not get near enough to try the water in the ship. The boatswain's mate went forward with him for the purpose of removing the cotton. The two men got upon the bales and crawled twenty feet along the top of them. The carpenter then explained to the boatswain's mate what was needful to be done, and the carpenter, having reached the hole, had to remove some dunnage. To enable him to do this the other man held the lantern, and, on rising, the carpenter accidentally knocked it out of the mate's hand. As it was falling, the carpenter tried to catch it, but, unfortunately the door of the lantern flew open, the lamp fell out, and the flame from the wick came in contact with the loose cotton, which instantly burst out into a flame. The casualty was, therefore, the result of pure accident. After this fearful disaster we should think that, in future, the lanterns allowed to be taken in the hold, or among inflammable cargo, will be secured inside the former either by screwing down, or by a bolt. If the lamp had not fallen out of the lantern, the flames could not have come in contact with the cotton. We may, therefore, charge the destruction of the ship to two of the petty officers going among the cargo with a lantern having a loose lamp in it, which fell out on the door of the lantern flying open."

Sea-weed as an Insulator.

We understand that experiments have been made to test the value of sea-weed as utilized by M. Ghislin, of Hatton Garden, who gained the prize medal for manufactured articles made from this substance, and placed in the International Exhibition of 1862, and which it is now proposed to apply in the manufacture of the next Atlantic cable. Several specimens of a submarine cable made from this patented alginate have been tested by eminent scientific men, who have reported most favorably as to its merits. The advantages are said to be that it is a perfect non-conductor of electricity; it readily combines and amalgamates with rubber, gutta-percha and other gums; it will resist the influence of salt water when other supposed non-conductors have lost their insulating powers, and that while the ocean destroys nearly everything submerged in it, sea-weed, being its natural offspring, is preserved by restoration to its native element.—*Mechanics' Magazine*.

A MAN in New Bedford has very nearly discovered a perpetual motion. Nothing seems wanting to complete success but the removal of a "hitch" that appears to prevent the machine from starting on its endless journey. We are not informed of the nature of the hitch, but we presume it cannot be of a very serious character, and, like the shareholders in the Atlantic cable, the inventor is sanguine that he will "fetch" it the next time.

Correspondence

Platinum Glass Pots.

MESSRS. EDITORS:—In your journal of this date there is an article on "Platinum Crucibles," by F. H. S., in which he says:—"If platinum crucibles can be made to stand heat and fluxes, at a reasonable price, and will last, on a guaranty, say four months, a large business can be done," etc.

Some twenty-five years ago I made some experiments with platinum, in hopes of making it available in the flint glass business (though not for crucibles or pots, as they are technically named); and I am therefore able to assure F. H. S. that it will stand the heat and fluxes with impunity, without diminution in size or weight, and would, if carefully used in draggling and scraping, last for years; but the first cost will be an insuperable barrier to the practical use of that metal for the purpose designated, for, at a rough calculation, the cost of platinum pots for a ten-pot flint furnace would not be less than \$500,000.

My experience teaches me that F. H. S. is unjust to manufacturers in insinuating that they "take so little interest in the scientific part of their art." I do not think there is any business that requires and receives a greater share of attention, or in which more money is expended in practical experiments, than in the flint glass business. He is, however, correct in his supposition "that they desire to keep the formulas secret," and, I opine, that if F. H. S. had devoted his time for years, and expended no inconsiderable amount of money, in chemical and practical experiments to improve the quality of his metal, that on his succeeding in doing so he would not be so apt to "contend there is no necessity for secrecy."

The experiments of M. Pelouze have, doubtless, been on a diminutive scale, probably in a small experimental furnace. I always built my furnaces with proper facilities for this purpose.

I imagine your correspondent is not acquainted with any other branch of the business than the hollow-ware trade, while there are five different and distinct branches, viz.: flint glass or crystal, plate glass, crown glass, broad or common window glass, and bottle or hollow-ware, requiring different styles of furnaces and shapes of pots, and an equally distinct class of workmen. The flint glass being the most beautiful and costly, and requiring the greatest amount of practical and scientific knowledge in the manufacture, and a great delicacy of manipulation on the part of the workmen to produce a perfect article.

In regard to the construction of furnaces, etc., the relative proportion of pots (crucibles) and furnaces must necessarily be somewhat varied, depending entirely on the nature of the fuel and the power of evolving caloric. I have myself used five different kinds of fuel, and have found it necessary to vary the size of the eye and the rise or spring of the cap or crown to suit the fuel. As to the best material for benches (as they are termed in the hollow-ware houses) or sieges (in the flint house), I cannot think there can be two opinions among men conversant with both branches of the business. I have known a clay seige, constructed with care, last fourteen years, while the same material, used for the benches of a hollow-ware furnace, would not, without entailing trouble and expense in repairs, last a single blast of ten months; this will be obvious to the initiated. But it would take up too much of your valuable space to even cursorily enter into details at a greater length upon the various points mentioned by your correspondent; they could be better treated of, be of more use to inquirers, and certainly more interesting and entertaining to your readers, if systematically arranged in the form of a series of articles on glass making.

W. H.

Bordentown, N. J., Sept. 9, 1865.

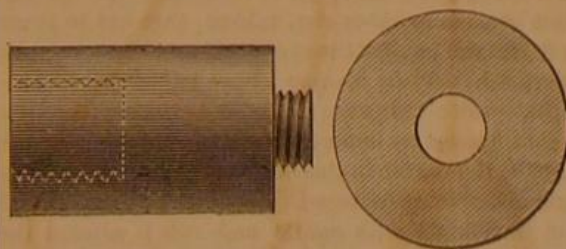
Chuck to Hold Sheet Metal, Etc.

MESSRS. EDITORS:—To turn a thin piece of sheet brass circular, and then to mill its edge, requires time and skill; first, to fasten the uneven piece of brass plate to a wooden chuck by means of screws, in order to turn a circular disk; and, secondly, to

fasten that disk between points, and a center, to hold it true and firm during the time needed to mill its edge. Unless great care be taken, the sheet bars will be indented by the points and the center-point. To obviate these difficulties, I adopt a very simple and quick mode of fastening the metal plate to a chuck.

Some of your readers may suggest that the plate could be secured by shellac or cement. This plan is the true principle, but the slightest blow would detach the plate and spoil the work. If, however, you use solder as a cement, the adhesion is perfect; and by the following plan, in a few minutes, the plate can be fixed so firmly to the chuck that no blow or jar will affect it.

As I have found old hands at the lathe entirely ignorant of the process of soft soldering, and as I have labored for years under the same disadvantage, it may interest some of your young subscribers to know how to attach two pieces of metal in a few seconds. This is effected by placing on each piece, with a leather or small brush, a small quantity of muriate of zinc, and then holding each piece over a spirit lamp—taking care not to inhale the fumes—and when it boils rub the plate with a thin stick of pure tin or solder; I prefer tin, which I melt in a ladle, throw out, with a jerk, on a metal or stone slab, so as to form a sheet when cold, and then cut into strips a little larger than an ordinary match; I, however, prefer drawing the tin into wire, of different thicknesses, and using it in that state. Any one can make the muriate of zinc by filling an ale glass one-third full with muriatic acid, and adding pieces of zinc (in the open air) until it will dissolve no more, then pour it off clear. As an experiment for the learner, let him heat a cent by a spirit lamp, placing a drop of muriate of zinc on it, and then rubbing a small quantity of tin on it, while the cent is held by a pair of pincers; then take a copper tack, dip the head in muriate of zinc, and place the head on the middle of the cent, which is still held by the pincers over the lamp; in an instant the head of the tack will become turned, and when both are cool press it with the foot into the floor. The first person who sees the cent on the floor will try to pick it up, and he will enjoy a laugh at the other's expense, and, at the same time, have taken the first lesson in soldering.



But to return to my chuck, which I call my "solder chuck." It would answer to heat any thin brass chuck and tin its face, then to heat the sheet brass you wish to turn round, and to tin it also; placing the two tinned surfaces together, you heat them and let them get cool, with a weight pressing them together until cold; but this would consume too much time and alcohol. I, therefore, make my chucks, of brass or iron, with a steel male screw, projecting not quite one-fourth of an inch beyond the face of the chucks.

I make several washers of brass, one-fourth inch thick, and tap them so that they screw accurately on to the male screw; they are of different diameters, to support smaller or larger pieces of brass plate, according to the diameter of sizes I may wish to turn. One side of these washers I tin by the process before described. I now take a piece of sheet brass (square or any other shape) mark the center with a point; then I tin, as before described, a place about as large as the washer to be used; then I place the tinned side of the washer on the sheet brass, in the center, which you see through the hole in the washer; let the whole be heated over a spirit lamp, and cooled, and this operation—which will only take a minute or two—fastens the sheet brass to the washer perfectly, and you now can screw the washer on to the chuck. You can thus turn the sheet brass round with perfect accuracy, and mill its edge, if you choose, as our silver coin was formerly milled on the edge, and then if you wish to form the bottom or top of a metal

box you can turn a groove to receive the body of the box. To disconnect the finished disk from the washer you heat it over the lamp and separate the two while hot, rub off most of the tin with a piece of newspaper, and, when cold, the rest of it with sand paper. I have before me a flat, round, brass match box, made in this way; grooves were turned in the top and bottom disks, and short pieces of brass pipe were soldered into the grooves in the same way as above described; the bottom was turned with eccentric circles to strike the match on, and the top ornamented with looped figures by an elliptical cutter; the box was then bronzed—it might have been plated or gilt.

The above description illustrates only one kind of "solder chuck" for turners. It will suggest, however, a variety of other plans for attaching work to be turned by the adhesive properties of solder. For instance, when I wish to turn steel "in the air" with great accuracy, I bore a hole into a brass chuck to receive one end of a bar of steel, which I solder into it, and thus avoid the possibility of shaking so usual in universal or die chucks.

E. J. W.

Lenox, Mass.

Cement for Aquaria.

MESSRS. EDITORS:—I would be obliged, and, no doubt, others of your readers, if you would give us the proper quantities of glue, rosin, oil and whiting required for a good composition to ornament frames or other inside decoration. I find by putting them in by chance they are apt to crack up and cost much labor to refix.

I have seen for years many inquiries in your paper for a good cement for aquariums. I have tried fifty different ones, and find the best composition is, one part common pitch, one-half part gutta-percha; they can be melted in a little turpentine. To make it work easier, there must be no coal oil in the turpentine, or the pitch will soften and be destroyed; a rascally druggist made me lose several dollars' worth of gutta-percha in that way. You will find this mixture gives a little with the material that the tank is made of, as the changes of heat and cold affect it; and it will adhere to glass, wood or iron.

E. BRUCE.

St. Louis, Mo., July 30, 1865.

[The proportions are one pound glue, one-half pound linseed oil, two pounds whiting. Stir well while melting, and let it cool gradually on a stone covered with powdered whiting; heat it well again until it is tough and firm; cover with a damp cloth when not in use.—Eds.]

Perfumers.

MESSRS. EDITORS:—Most all of your readers have seen the neat little article used to blow perfume in a handkerchief; it is composed of two pieces of tube glass, and when one is inserted in a bottle, and the other piece is blown through, the perfume rises in the tube, and is blown off in a delightful spray. What I wish is, that you will explain the philosophy of the thing. Why does the fluid rise in the main tube? Is it caused by the current of air passing at right angles with the main tube? Or how, then?

C.

[The explanation is simply friction. When a current is moving through any fluid the particles on the outside of the current rub against those of the fluid, and carry along a portion of them, thus creating in the fluid a current in the same direction. When the vertical limb of a T-shaped tube is inserted in a liquid, and a current of air is blown through the horizontal limb, the air is swept out of the vertical limb by this rubbing or dragging action, and the liquid is then pressed upward into the tube by the weight of the atmosphere resting upon the surface outside of the tube.—Eds.]

Petroleum for Worms.

MESSRS. EDITORS:—I read your abstract of the debates of the Farmers' Club with much interest, but have not yet seen it stated that coal oil, such as is used for lamps, will destroy tree worms, and the common yellow caterpillar and the measure worm. With us these vermin appear some three weeks earlier than with you, and may then still be dosed.

I have a plum tree some dozen years old—a bearing tree—in my yard, that has been regularly attacked and the verdure destroyed, unless much time was spent upon it, every summer. This summer, remem-

bering how effectually my people extirpate vermin from the house, I took my fishing rod, with a rag of the bulk of an egg tied upon the tip, and attacked them. I saturated the rag two or three times, and used it as many, touching under and upon the nests wherever I could, and not very thoroughly either. The leaves that had been attacked by the worms died and dried up; this was evidence of cessation of their work. In a week new leaves appeared under the still standing web, but there were no more signs of worms. A second crop, being another batch, appeared in a month or six weeks, and were as easily disposed of, and none have since appeared. I believe this to be a thorough and good remedy. Those worms that it touches I know it kills, and such as get a smell of it leave at once, perhaps die.

R. H. A.

Baltimore, Sept. 9, 1865.

An Electric Circuit.

MESSRS. EDITORS:—In a late number of the SCIENTIFIC AMERICAN there appears an article stating the manner in which the defect in the Atlantic cable was located. From the language used it appeared that the current sent out on the wire from Valentia passed off at the bit of wire, and the ocean then served as a conductor to carry the current back to the coast of Ireland—forming what electricians term a "circuit." Do I understand that, to form a circuit, the current must return to the same point from which it started? and, if so, why would not the current that passed off the wire at the place the bit of wire ran through the outside covering of the cable, as likely cut across through the ocean to the American coast as to return to the coast of Ireland? Or, in other words, explain the word "circuit" as employed by electricians.

SUBSCRIBER.

Paterson, N. J., Sept. 13, 1865.

[If you pour some dilute sulphuric acid into a glass cup, and place a plate of copper in the cup on one side, and a plate of zinc on the other, so long as the metal plates are not brought in contact or connection no action takes place; but if a metal wire or other conductor of electricity is stretched from the copper to the zinc outside of the liquid, a current of electricity immediately starts from the zinc, passes through the liquid to the copper, and from the copper along the wire to the zinc, thus flowing in a perpetual circuit. Instead of leading the wire directly from the zinc to the copper, it may be led from the zinc into the earth, and from the copper into the earth, when the current will flow the same as through a direct connection. The reason why the current should go to Valentia was, that the cable was connected with one plate of the battery, and the other plate was connected with the ground at Valentia. The mode of connecting the wire with the ground is by soldering it to a broad copper plate, and burying the plate in moist earth. In cities an easier and more effectual method is to connect the wire with gas or water pipes. At some of the stations on the line of the California telegraph, in the Great American Desert, the ground is so dry that it acts as an insulator, and no conducting connection with the earth can be made. It was at first supposed that the ground acted precisely the same as the portion of wire which it displaced, and that the current of electricity darted along through water, gravel and rocks from the end of the wire connected with the copper plate to the end of that connected with the zinc plate; but it is now regarded as settled that the earth is a great reservoir of electricity, into which the current flows from the end of the one wire and from which it is drawn into the end of the other.—Eds.]

Action and Reaction.

MESSRS. EDITORS:—There is, I believe, an important law of mechanics, never, as yet, definitely announced, and, so far as I am aware, lying unknown, because a current form of words, true in their application to a different case, is supposed to cover vastly more than their author ever intended. In this I allude to action and reaction in a mechanical sense, as distinct from the same when considered as an element of statics. Since Newton announced as a law of statics that action and reaction were equal and in opposite directions, the law has, with unquestioning credulity, been extended to another science as different from that of which this simple law forms the chief

part as two sciences in the least akin can ever be. Statics, as is well understood, treats of pressures alone, or of the intensity of forces, which is the same thing, while the science of mechanics considers forces with reference to their quantities. The law of statics referred to can, therefore, only mean that from every exertion of power the pressures produced in opposite directions are equal. But when we come to speak of mechanical action and reaction the question is what is the *quantity* of force consumed respectively by action and reaction. A mechanical force being always estimated by multiplying its intensity into the distance through which it moves, and, the intensity being always equal in opposite directions, it follows that the quantities of force expended in each of the two ways are to each other exactly as the distances acted through in the different directions; or, in other words, as the respective lengths of the forces. Assuming this as probably clear to every one, we have now but to inquire for the law which governs the distances moved through by different bodies in the same time when acted on by equal pressures. But it is a matter of every-day observation that this is proportionate to the intensity of resistance which they offer. The deduction from this is so clear that it might be made by any one, viz—that, in a mechanical sense, action and reaction are in opposite directions, and in quantity inversely as the intensity of the resistance in their respective directions. And this is a law verified by so large a number of instances that none can have failed to observe them, rendering a present induction of facts unnecessary.

ISAAC E. CRAIG.

Cleveland, Ohio, Sept. 16, 1865.

[Prof. Treadwell has published a pamphlet discussing this problem at length and coming to the same conclusion as our correspondent.—Eds.]

To Preserve the Eyesight.

MESSRS. EDITORS:—It may be well known, perhaps, by many of your readers, if not all, that, as a person grows old, the eye loses its convexity or the pupil becomes flattened. For this reason near-sighted people, whose eyes are too convex, often experience an improvement in their eyesight as they grow old, for the reason mentioned above. If all persons who are not near-sighted should, every time they wash their faces, press their eyes outward, or try to make them as round as they can, taking care not to press or flatten the pupil of the eye, their eyesight would be improved. In this manner I have improved my eyesight, which showed signs of decay. Another theory, almost as important—avoid rubbing the eye when it itches, for in this way the eye is not only inflamed but often flattened. When the eye feels tired wet your finger with spittle and rub it around the lids, this will cure inflammation; and, next, avoid coming from the dark to light, or light to dark; and never read much in a cloudy day or look long sideways.

C.

[Many years ago we heard this same direction for preserving the eyesight, and, being then very young, we accepted it without questioning; but every year of our observation of men brings some new evidence to strengthen our distrust of human testimony—not from the disposition of people to tell falsehoods, but from their carelessness of observation. When the French tourist saw a Dutchman recover from a fever after eating boiled cabbage, he entered in his journal: "Boiled cabbage will cure fever;" when, however, he saw the same remedy followed by death in the case of one of his own countrymen, he modified his conclusion, and made a new entry in his journal: "Boiled cabbage will cure a Dutchman of a fever and kill a Frenchman."

Men recover from disease without using any remedy; they doubtless frequently recover in spite of injurious remedies employed. Many persons never have occasion to use spectacles, though they follow no special method in washing or rubbing their eyes. We know of no reason why the plan proposed by our correspondent should not be perfectly effectual; we only want satisfactory evidence to believe that it is so; but one or two cases, observed in the careless manner which is common with most people, and not compared with the numbers of cases in which the plan was not pursued, we should hardly regard as any evidence whatever.—Eds.]

UP IN A BALLOON.

At the junction of Sixth avenue and Fifty-ninth street, in this city—just by the southern boundary of the Central Park—there is a vacant lot, which has been rented by the well-known aeronaut, T. F. C. Lowe, for the purpose of giving any person who may desire it, a balloon ascent to the height of a thousand feet. The lot is inclosed by a board fence, and twenty-five cents is charged for admission, the sum of five dollars being charged for each ascent; the balloon carrying up two at a time, beside the aeronaut, who accompanies them—thus making the charge two and a half dollars for each person. The balloon is held by a rope an inch in diameter and 1,200 feet in length, which is passed under a pulley and wound around a large drum, 16 feet in diameter. During the ascent the revolutions of the drum are held in check by two men with levers acting as brakes. The balloon is drawn down after an ascent, by turning the drum—a horse being at present employed for this service, though it is designed to use a steam engine. As a measure of precaution, a second rope is attached to the balloon, and this is let out and drawn in by hand. The balloon is about 40 feet in diameter, and holds about 25,000 cubic feet of gas. Its buoyant power is estimated at about 1,500 pounds, though it is the practice to take up only two persons at a time beside the aeronaut.

In the still bright forenoon of September 20th, two of "us" took our seats in the basket, some bags of sand were lifted out, the stout rope that fastened the balloon to the earth was unhooked, the word "All right!" was given, and we were lifted easily and swiftly upward into the air. In accounts of balloon ascensions it is usually stated that the sensation is that the balloon remains stationary while the earth sinks away beneath it; but this is not the case in this kind of attached ascent. The earth seems to stand as firm as ever, while we are the movable things that feel ourselves borne gently upward to a height in the air, compared with which the climbing of Trinity church spire, or Bunker Hill Monument, is contemptible. Though both extremely sensitive in this respect, no giddiness was experienced—the stout rope netting around the basket making a tumble-out manifestly impossible. We were, therefore, able to enjoy the novel experience with unalloyed satisfaction and pleasure.

There is, perhaps, no spot on the earth better fitted for such ascents than the one selected by Mr. Lowe. On one hand is the Central Park, with its serpentine roads, green lawns, and bright lakes and reservoirs; and on the other, the great city, with its long parallel avenues and cross streets, with its cars and omnibuses looking like crawling turtles, and its Lilliputian men and horses moving about so far beneath us. The geography of the city and its environs is displayed with remarkable distinctness; the North and East rivers, the islands of the harbor, the towns and villages all about, with embracing woods beyond—are shown in the double clearness of a combined map and landscape view. After gazing our fill upon the scene from our airy height, we inform our attendant aeronaut that we are ready to descend, he blows a shrill whistle, the horse commences his circling journeys around the whim, and we are drawn quite rapidly down to the surface of the earth again. The descent occupies about five minutes; the ascent a little less.

The whole thing is admirably managed, and nothing could be more agreeable and satisfactory in every respect. Mr. Lowe informs us that more ladies than gentlemen have improved this extraordinary opportunity to make a short aerial journey.

Submarine Cables.

In Europe, Asia, Africa, and Australia there are 52 submarine cables, which are of the aggregate length of 5,625 miles, and the insulated wires of which measure 9,783 miles. The longest of these is 1,550 fathoms, and the shortest $1\frac{1}{2}$ fathom. There are 95 submarine cables in the United States and British North America, which measure 68 miles, and their insulate wires 133 miles. The overland telegraph line between New York and the west coast of Ireland, through British Columbia, Northern Asia, and Russia, will be 20,479 miles long, 12,740 miles of which are complete. It has at length been resolved that this line shall cross from America to Asia at the southern point of Norton

Sound, on the American side, to St. Lawrence Island, and from thence to Cape Thadeus, on the Asiatic continent. Two submarine cables will be required for this, one 135 miles long, and the other 250 miles long. Cape Thadeus is 1,700 miles from the mouth of the Amoor River.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Device for Sifting Flour and Other Substances.—This invention relates to a new and improved device for sifting flour and other substances for domestic use. The invention consists in the employment or use of a semi-spherical sieve, in connection with an oscillating frame provided with spheres or balls, all being arranged in such a manner as to insure the flour being sieved in a thorough manner, with the least possible labor, and without pulverizing, and forcing through foreign substances, as is frequently the case with other devices of this kind. It is a very economical and ornamental affair, and will, doubtless, be extensively used. James Myers, New York City, is the inventor.

Loom.—The object of this invention is a hand loom, in which both the motion of the harness and the shuttle motion depend upon the motion of the lay or batten. The harness motion is effected by an arm extending from the batten and connected by a pivot with a lever catch that acts upon a lantern-shaped cam, mounted on the treadle shaft, in combination with suitable arms or tappets inserted in said treadle shaft, in such a manner that for each stroke of the batten a quarter revolution, more or less, is imparted to the treadle shaft, and the harness is changed by the action of the tappets on the treadles. The shuttle motion is effected by means of sliding blocks secured in each end of the batten, and operated each by a spring lever or driver, which is set automatically by the combined action of square disks, hook catches and cams, in such a manner that on each forward stroke of the batten a partial revolution is imparted to each of the square disks, and the driver on one end of the batten is set while that on the other end (having been set on the previous stroke) is liberated, and, by its action on the sliding block, connected to it, the shuttle is propelled to the opposite end of the batten. John Seaman and Wm. G. Henderson, Andover, N. Y., are the inventors.

Decarbonizing Retorts.—This invention consists in the employment of a current of air, either mixed with steam or without the same, for the purpose of decarbonizing retorts, particularly clay retorts, such as generally used for manufacturing illuminating gas, and for other purposes. Such retorts are liable to absorb a quantity of carbon, and a large quantity of carbon or soot adheres to their inner surface, particularly toward the back. If this soot or carbon is not removed, the retort becomes useless after a short time. Patented in the United States and Europe, through the Scientific American Patent Agency, by G. W. Edge, Jersey City, N. J.

Machine for Drilling Rocks, Etc.—This invention consists in the employment or use of a spiral lifter, in combination with a tappet extending from a sleeve fitted in the drill or drill rod, and with an arm extending from said sleeve in the cam slot, in such a manner that, by the action of the cam slot and arm, the tappet is held in contact with the thread of the feeder until it arrives at the end of the stroke, when the same, by a curve in the cam slot, is thrown out of contact with the feed screw, and the drill is allowed to drop, and, while being thrown out of gear with the feed screw, it is turned, causing it to strike a different spot on each stroke. By this arrangement two or more drills can be operated by means of the same lifter and by the same driving power. Robert Hood, Dayton, Ohio, is the inventor.

Balanced Slide Valve.—This invention consists in a balanced slide valve for steam engines. The valve is placed in a cylindrical steam chest, which has two steam pipes, one near either end, each encircling about two-thirds of the steam chest, said pipes being in communication with the steam ports which lead into the opposite ends of the cylinder. Steam is admitted into the chest at one end, and the valve or

piston being hollow, it is allowed to pass through it into the other end, thereby providing for an equilibrium of pressure on both ends of the valve. C. W. Tremain, Memphis, Tenn., is the inventor.

Umbrella and Parasol.—The object of this invention is to connect the stick of an umbrella or parasol to the ribs and their co-operative parts in such a way that the said parts shall be free to rotate on the stick instead of being fixed thereto, so that when the umbrella is extended and in use the part composing the cover will yield when it meets an opposing object, and will take a rotary motion on the stick, thereby relieving the hand and also the umbrella from strain. Wm. Damerel, Brooklyn, N. Y., is the inventor.

Gaiter Boot and Shoe.—This invention relates to a new and useful improvement in the lacing up arrangement of a gaiter boot or shoe, whereby the same is rendered water-proof from the bottom to the top; or, in other words, no seam or joint is allowed at the lacing for water to pass through, and the gaiter or shoe at the same time rendered capable of being applied to, and taken from, the foot, as readily as those of ordinary construction. Thomas Powell, Richland, Ind., is the inventor.

Machine for Dressing Minerals.—This invention relates more particularly to a machine especially adapted to the dressing of kaolin clay, so extensively used in the manufacture of porcelain ware, and also paper, and it principally consists in submitting the clay to the action of a current or currents of water within a series of one or more drags provided with flood gates, arranged so as to be opened and closed at pleasure, whereby the passage of the water with the clay through the drags can be regulated as may be necessary, and thus the separation or removal of all gritty substances from the clay accomplished—the pure kaolin being deposited by the water current in any suitable receiver or tank, from which it can be removed in any proper manner. By this machine the dressing of the clay is accomplished in a most satisfactory and expeditious manner, and, by duplicating some of the parts of the machine, a continuous operation can be maintained—an advantage of much importance. Thomas Moore is the inventor, and has assigned his right to John Ellerby, of No. 63 Pearl street, New York City.

Chair for Barbers, Dentists, Etc.—This invention consists in a novel construction of chair for the use of barbers and dentists; it comprises a stool and mirror, and the body of the chair is provided with receptacles for a supply of hot and cold water, implements of trade, washing apparatus, money drawer and other closets. The legs of the chair body are hinged so that they can be folded up, and the sides of the stool can be separated from each other and folded up, so that the whole apparatus can be packed in a small compass for transportation. Henry Remick, Portsmouth, N. H., is the inventor.

Alarm Lock.—This invention relates to an alarm attachment for locks, and also to a key-hole guard for the same, whereby it is believed that a very simple and efficient means is provided against burglary, and also for giving an alarm whenever the slide latch of the lock is operated and a person opens the door. Jacob Euteneur, of Peoria, Ill., is the inventor.

Wind Wheel.—This invention relates to an improved device for obtaining power from the wind, and it consists in the use of a wind wheel provided with a vane and shield, and with oblique fans or buckets, and arranged with a gate in such a manner that the speed of the wheel may be regulated as desired, and the wind made to act efficiently upon it. The invention also consists in a novel means for operating the gate and for stopping the wind wheel when required. John A. Hubbard, of West Houlton, Maine, is the inventor.

THE NAVAL ENGINES.

Since the article on page 216 was written we have obtained some additional particulars. Without giving a detailed statement of the log of the two vessels, which we have not room to publish at this late hour, suffice it to say that the *Algonquin*, at 8 o'clock on Sunday evening, had made 44,741 revolutions, burning 1,600 pounds of coal per hour, and carrying 70 pounds of steam, while the *Winooski* had made 44,718 revolutions on an average of 17 pounds of steam. The friends of the *Algonquin* are very confident of success. The naval engineers complain that

the draft is very poor, and that it is hard to make steam. At 10 A.M., the 25th inst., the *Algonquin* was lying idle at the dock, while her opponent, the *Winooski*, was paddling away vigorously. The *Algonquin* stopped in consequence of a bursted feed pipe, and will resume as soon as her repairs are completed. It is impossible to avoid noticing the fact that the *Algonquin*—Mr. Dickerson's boat—has broken down several times in the course of the trial; as also, that the engine, when in operation, performed poorly in comparison with the vessel opposite. On two occasions the engine stopped, when hooked on, without the slightest warning, when the boilers had 70 lbs. of steam on and heavy fires in; the tubes have collapsed, and several minor casualties of less note have occurred. The *Winooski's* engines work beautifully, and between the times of the exhaust the clock can be heard ticking in the engine room. At the time when the *Algonquin* ceased to work, the *Winooski*, as reported by the naval engineers, was 330 revolutions ahead of her.

A Locomotive Using Petroleum.

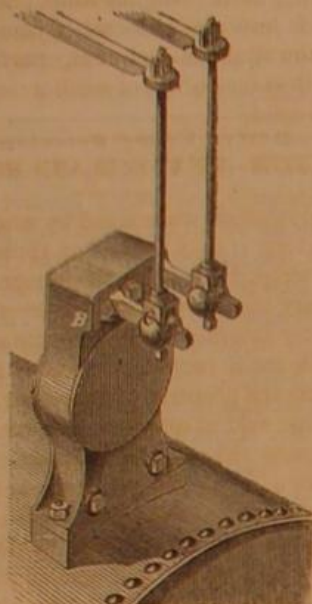
Mr. P. Hayes, of the Victorian Chemical Works, Footscray, Australia, has made another successful trial of his new invention for generating steam, from Williamstown to Melbourne. It was intended to have made a final test of his novel scheme by running a train a considerable distance on the Victorian line, for the purpose of ascertaining its carrying powers with loaded wagons, but his plans were thwarted by some unforeseen mismanagement on the part of the authorities. Mr. Hayes's discovery is the result of two years' close study, and is a new means of raising steam by oil in lieu of coal, which, it carried to a successful issue, will be attended with great economical and other advantages. The nature of the new process is to convey a hydro-carbon oil through heated retorts, to enable the gas to come in contact with hydrogen. This produces a large volume of smokeless flame, extremely pure and brilliant. It is unattended by anything of an explosive nature, and the heat therefrom is sufficient to produce steam as fast as coal or coke in an ordinary furnace. The only alteration made in the locomotive is the fixture, in that part of the tender in which the coal is usually deposited, of an iron cistern or tank, constructed to contain about 250 gallons of hydro-carbon oil. In order to permit of oscillation between the engine and tender, a small pipe, with a strong leathern joint, is carried from the tank to the bottom of the fire-box, where three small retorts are fastened in place of the ordinary bars. The oil runs into these, heat is applied underneath, and directly the gas begins to form, hydrogen is thrown in, by very simple means, and the contact creates the flame above alluded to, which, on passing through the tubes of the boiler, generates steam with surprising rapidity; and, instead of occupying two hours, as is customary by the old system, Mr. Hayes can, by his new process, get up steam in a locomotive with cold water, high pressure of 110 pounds, in the short space of three-quarters of an hour. The engine, as on previous occasions, was brought from Williamstown to Melbourne by Mr. Haughton, foreman engineer of the Government workshops at Williamstown, steam being on this occasion at 110 pounds. The gentleman speaks in very high terms of the new principle, and his opinion is supported by many of the railway officials. Mr. Hayes declares that his patent is applicable to any ordinary steam-engine boiler. Presuming the affair to turn out a success, the saving to the locomotive in many respects would be great, seeing that the oil is inexpensive, and can be obtained in large quantities; and, as applied to marine engines, the invention is most valuable from economy of space. Another great advantage is, that the money [which at the present time has to be transmitted to New South Wales for coals would be kept in Victoria, the ingredients with which steam is produced being derived from a mineral product which is found in inexhaustible quantities in this colony.—*Melbourne Age*.

[Instead of "hydrogen," it is probably either oxygen, or atmospheric air, that is thrown in to burn the vapor of petroleum. There is no difficulty in making steam with petroleum; the only objection is the expense. If, in Melbourne, a pound of petroleum does not cost more than a pound and a half of coal, it may be an economical fuel.—*Eds. Sci. Am.*]

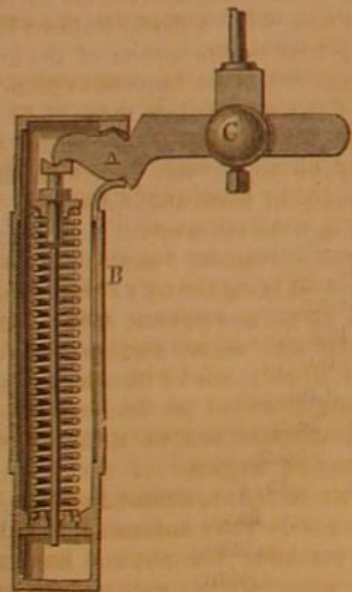
CAMERER'S SAFETY-VALVE BALANCE.

This simple and durably-constructed balance, illustrated in Figs. 1 and 2, was originally intended for locomotive engines, but can also, with great advantage, be used on marine engines, or any place where a dead weight is objectionable.

It is well known that a dead weight on a safety-valve lever is the most desirable and safest, wherever it can be applied; but on locomotive boilers, which rest on springs, it cannot be used, as its action on the valve would be influenced by the vibrations continually occurring. On marine boilers, where weights are still in use, the rolling of the ship occasionally makes it necessary to lash the levers down until the weather moderates, thereby destroying the only virtue of the valve. Spring balances, as generally made,



are more or less objectionable, on account of the springs becoming stiffer as the valve rises. Various plans have been adopted to overcome the defect by regulating the strength of the springs, thereby depending on the vigilance of the engineer to prevent the pressure from getting too great; whereas, the balance here illustrated, requires no attention whatever when in use, as an increase over the allotted pressure cannot take place.



The arms, A A, can rise as much as the safety valves may require, without additional pressure, which makes this balance equal in efficiency to a dead weight. An example will make the disadvantages of spring balances now in use more apparent. For instance, if a safety-valve lever is held down by a spring, the other end of which is fastened to the boiler or some other fixed point, the lever cannot rise without increase of power over and above the pressure it was calculated for; and if the proportions for length of lever are as 1 to 10, then the valve cannot be lifted one-eighth of an inch without raising the end of the lever ten times one-eighth, or $1\frac{1}{4}$ inches—which distance is, on the ordinary spring balance, equal to 28 lbs.; and ten times 28, or 280 lbs., on the valve. Now, if we have a valve of $2\frac{1}{2}$ inches diameter, or 4.9 square inches area, the additional pressure would be 57 lbs. per square inch to lift said valve only one-eighth of an inch off its seat. Under such circumstances it ceases to be reliable, and re-

quires watching and regulating to avoid over-pressure or accident.

The advantages of this improved balance are in the peculiar lever arrangement, by which the above enumerated faults are avoided. The arms of the levers, A, inside of the casting, B (see Fig. 1), from the fulcrum to the springs, are at an angle with the outside arms; and an upward movement of these outside arms is accompanied by a corresponding downward, and also an inward movement, of the inside arms resting on the springs; therefore, the more the springs are compressed the shorter the effective length of the inside arms will be, thereby increasing the power of the outside arms in the same proportion as the springs get stiffer from compression, thus enabling them to rise the required distance without increase of power. The rod, C, is fastened by a set screw to any distance from the fulcrum, according to the pressure required. Close behind this rod a small pin can be put through the arm, to prevent the engineer from increasing the pressure beyond what the boiler was intended to carry; but as much of the arms as is not in the way of anything, may be allowed to protrude, for the purpose of decreasing the pressure, should any accident to the boiler make it desirable to do so. To keep up a uniform pressure of steam is considered far less injurious to a boiler than the sudden changes, produced by slacking or screwing down safety-valve levers. Such changes will not take place where the improved balance is used.

The springs are made of hard brass wire, expressly drawn for these balances, and are not liable to corrosion, as is the case with steel springs; and, being compressed when working, are far less liable to break or to lose their elasticity.

These balances have been in use for more than a year on several of our leading railroads, where they give entire satisfaction. Patented March 1, 1864. For further particulars address the inventor, Wm. Camerer, Reading Pa.

NEW FORM FOR COINS.

We have seen a sample of a new plan for coins, which consists in making them in the form of the numeral of the denomination which they represent. For example, the one, two, three, four and five-cent coins have the form, respectively, of the numerals

1, 2, 3, 4, 5.

This novel style for coins presents a handsome appearance, and as each piece has its own distinctive form, no confusion in the use can take place. This is more than can be said of the new three-cent coins now being issued by the Government, which are so much like the one-cent pieces that after a short time it is difficult to perceive the difference.

Preservation of Flowers with their Natural Colors.

Dried flowers, in their natural colors, have, for some time past, appeared for sale in the shops. The mode in which the operation is effected is this:—A vessel, with a movable cover, is provided, and, having removed the cover from it, a piece of metallic gauze of moderate fineness is fixed over it, and the cover replaced. A quantity of sand is then taken sufficient to fill the vessel, and passed through a sieve into an iron pot, where it is heated with the addition of a small quantity of stearin, carefully stirred, so as to thoroughly mix the ingredients. The quantity of stearin to be added is at the rate of half a pound to one hundred pounds of sand. Care must be taken not to add too much, as it would sink to the bottom and injure the flowers. The flowers thus become dried, and they retain their color perfectly.

Patent Pin.

The Union Pin Company of Boston, are now extensively manufacturing Tower's patent pins. The improvement consists in making a couple of nicks or indentations on the pin, which cause it to hold more firmly when the pin is inserted in any cloth or fabric. In other respects these pins are similar to those in common use. The improvement finds general favor.

Librarian of the Patent Office.

Prof. W. E. Jillson leaves his position as Librarian of the Patent Office to take that of Assistant Superintendent of the Boston Public Library. He has

given general satisfaction in the position from which he is retiring, and his attainments as a linguist and bibliophile, and his invariable courtesy, make his resignation a loss to the department. He is succeeded by Dr. George C. Schaeffer, who was formerly an Examiner in the Office.

BOSWELL'S MUCILAGE BOTTLE.

Persons who have occasion to use mucilage must have been annoyed by the inconvenient brush as generally made. When the bottle is nearly full, the brush becomes overcharged with the liquid, so that a greater quantity than is necessary is smeared on the paper. The handle of the common brush screws through the cap so as to lengthen or shorten it; but this is of no benefit so far as overloading the brush is concerned.

The engraving published herewith shows a neat device for keeping the brush out of the mucilage, or allowing it to be inserted to a greater or less depth, as desired. The attachment consists of an elastic band of rubber, A, applied to the brush and cap in



such a way that a free movement of the brush is obtained up and down when the handle is pressed upon. So soon, however, as the hold is relaxed, the brush remains at the top of the bottle out of the mucilage entirely.

This is a very neat little affair, and one that will render the use of such things much more agreeable.

It was patented through the Scientific American Patent Agency on August 1, 1865, by E. H. Boswell. For State rights to manufacture, apply to him, at south-east corner of Walnut and Eighth streets, Philadelphia, Pa.

A NOVEL ENGLISH INVENTION.—The last number of the London *Artisan* has an illustration of an air engine, which it calls Messer's air engine. It is precisely the same in principle, and very closely similar in all its details, to the air engine invented by S. H. Roper, of Boston, Mass., which was fully illustrated in this paper on the 14th of February, 1863.

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

Contents:

(Illustrations are indicated by an asterisk.)

*McKenney's Apparatus for Burning Petroleum.....	207	Up in a Balloon.....	212
Paterson Locomotive.....	207	Submarine Cables.....	212
A New Plan for Raising the Atlantic Cable.....	207	Recent American Patents.....	213
The Great English Machine Works.....	208	The Naval Engines.....	213
The Fair of the American Institute.....	209	Locomotive Using Petroleum.....	213
Foreign Summary.....	209	*Camerer's Safety-valve Balance.....	214
Notes on New Discoveries and New Applications of Science.....	210	New Form for Coins.....	214
*Dibble's Dental Apparatus.....	210	Preservation of Flowers with their Natural Colors.....	214
How the Glasgow Caught Fire.....	210	Patent Pin.....	214
Sea-weed as an Insulator.....	210	Librarian of the Patent Office.....	214
Platinum Glass Pots.....	211	*Boswell's Mucilage Bottle.....	214
*Chuck to Hold Sheet Metal, Etc.....	211	A Secret Telegraph.....	215
Cement for Aquaria.....	211	Pistons Without Packing.....	215
Perfumers.....	211	Soda Water—What it is and How it is Made.....	215
Petroleum for Worms.....	211	Mechanics' and Inventors' Guide.....	216
An Electric Circuit.....	212	The Winooski and Algonquin.....	216
Action and Reaction.....	212	Pass Them Around.....	216
To Preserve the Eyesight.....	212	Patent Claims.....	216, 217, 218, 219
		Notes and Queries.....	220
		Hon. Thomas C. Theaker.....	222
		Aluminum.....	222

A SECRET TELEGRAPH.

At the establishment of Mr. Giuseppe Tagliabue, No. 298 Pearl street, New York, there is in operation a telegraph which transmits its messages without allowing them to be read by the operators or any employees of the telegraph company. A merchant or broker in New York is provided with a simple instrument which is furnished with a plain circular alphabet; he moves an index to the first letter of his message, and presses a lever, which punctures a rectangular slot in a roll of paper wrapped upon a cylinder; he then moves the index to the next letter of his message, and punctures another slot; proceeding thus till the message is completed. The roll of paper is then removed from the cylinder and sent to the telegraph office; the boy or girl in attendance wraps it upon the cylinder of the transmitting machine, and starts the machine, which is driven by a weight. As the cylinder revolves, at the opposite end of the line—say in Philadelphia—a narrow strip of paper is carried slowly along through the receiving machine, and the message appears pricked through it in very plain letters. In order that the message may not be read by the employees at the end of the line where it is received, the strip of paper is covered on both sides with very thin black berage, which must be pulled off before the letters can be seen.

This telegraph is the invention of Mr. Robert Boyle, a Scotchman; he commenced work on it in 1852, and for the last three years has given his whole time to it, day and night, as he says, "dreaming about it in the night and working upon it through the day." After all these years of labor and study, the invention is at last completed, and a patent for it, with sixteen claims, has just been obtained through the Scientific American Patent Agency. The patent is granted to Mr. Boyle jointly with Mr. Tagliabue, who took an interest in the invention before its completion.

To make all the details of the mechanism plain would require elaborate engravings; but an idea of the general principle on which it operates may perhaps be given by a brief letter-press description. The punctured paper is wrapped upon a cylinder, which is caused to rotate by a weight. On the same line of shatting with the cylinder, and rotating with it, are two brass wheels, each having fourteen plugs of hard rubber inserted into its periphery. Brass springs, connected with the battery current, rest upon the peripheries of these wheels, the springs being so arranged that the current is reversed twenty-eight times during each revolution of the cylinder. This is the transmitting instrument.

At the opposite end of the line, where the message is received, a permanent horseshoe magnet is delicately suspended between the poles of four electromagnets connected with the circuit, in such a manner that reversing the current causes the horseshoe magnet to vibrate. Each vibration releases a delicate escapement, and allows the rotation one step—or one twenty-eighth part—of a light steel wheel, on the periphery of which are engraved the twenty-six letters of the alphabet, with the character & and a blank for the space between the words. The letters are formed by rows of fine points.

Before the transmission of the message is commenced, both the transmitting machine and the receiving machine are set at zero, which brings the cylinder, on which the punctured paper is wound, and the type wheel into the same relative position. A brass spring, in connection with a local circuit, has its end pressing upon the cylinder that carries the punctured paper, and the connections are so arranged that while the end of this spring is resting upon the paper the local circuit is broken, but when a slot passes under the end of the spring, allowing it to come in contact with the brass cylinder, the circuit is closed. The closing of this local circuit draws forward an armature, and arrests for an instant the motion of the transmitting machine, thus stopping the frequent reversals of the current, and stopping, at the receiving end, the rotation of the type wheel. At the receiving machine is a magnet, in connection with the main circuit, with its armature so adjusted that the magnetism induced by the momentary reversed currents is not sufficient to overcome the tension of the withdrawing spring, but so soon as the reversals are suspended and the current of the main circuit is allowed to flow continuously in one direction, this tension is overpowered, and the armature is drawn forward. By this motion the paper is drawn down upon the type wheel, and the letter which is uppermost at the time is printed. This motion also breaks for an instant the main circuit, and this break is made to withdraw the stop of the transmitting machine, thus permitting the apparatus to proceed to the next letter.

We have seen this machine in operation on a short circuit, and it worked with perfect success. How it will operate on long lines, and in different conditions of the atmosphere, can, of course, be known only by practical trial.

PISTONS WITHOUT PACKING.

When the first pistons to steam engines were made they were made tight by hemp gaskets—that is, coils of hemp plaited with rope thoroughly slushed or soaked in hot tallow and subsequently driven in as tight as a man striking with a sledge could make them. It was a great step in advance when cast-iron rings were substituted for the hemp and steel springs inserted to keep the rings always up to the cylinder. Quite as much ingenuity and thought have been expended on the pistons of steam engines as upon any other detail, and the variety in shape, form and kind of packing would make an interesting study for the engineer if they were all collected in book form. The pistons of ocean steamers, for instance, have lighter springs than many small engines, and are not packed so tight, by many degrees pressure, in proportion to their areas, as some engines on land. There are few stationary engines in the country which will pass the centers with two or three pounds pressure on the gage, but there are plenty of steamboats that have engines which will do this with ease.

It was formerly the custom to pack locomotive cylinders with brass rings, which had a central lining of Babbitt metal let in. This also is done away with, and the largest works and the heaviest engines on the Erie Railroad, and others, for aught we know, have cast-iron rings.

In many instances pistons have been used without any packing in them—being simply solid disks fitting tightly, yet easily, to the bore. Some concession has been made to prejudices and conventional ideas by turning grooves in the solid piston and depending on the partial condensation of the steam to fill these grooves with water, and thus interpose an obstacle to the passage of steam between the piston and cylinder. It is probable that the evil of a leaky piston has been much exaggerated, for, although it will show

on the indicator diagram when very much out of repair, it is a question whether any great amount of fuel is wasted by such a loss. There is no question, however, but that much damage is done to steam cylinders by bad packing, and many can testify to the scored and seamed cylinders that were made so by forcing in the springs.

Air pumps have been made for compressing air with solid pistons, and, reasoning from analogy, there seems no objection to making the pistons of steam engines of a moderate diameter of cylinder entirely solid; in fact, many are now working so made, and those who built them, as well as the owners, find no fault with their performance. On the contrary, rings are frequently a source of trouble, and, taken altogether, with their springs, followers and follower bolts, the piston with metallic packing is a costly detail. If lessening the cost of construction and retaining the vital qualities of any part is an important feature, then the pistons of small steam engines should be made solid.

SODA WATER—WHAT IT IS AND HOW IT IS MADE.

It is, doubtless, understood by most of our readers that the term "soda water," as applied to the sparkling beverage drawn from the numerous fountains in apothecary shops, is a misnomer—the liquid being pure water saturated with carbonic acid under pressure, with not a particle of soda in its composition. Water has the property of absorbing its own volume of carbonic acid at all pressures; and as by doubling the pressure twice the quantity of the gas is compressed in a given volume, the quantity which water will absorb is in direct proportion to the pressure.

The gas is usually obtained by decomposing carbonate of lime, which is a combination of carbonic acid and lime. A quantity of marble dust is placed in a strong cast-iron cylinder, and the opening is closed air-tight by a screw plug, when a quantity of sulphuric acid is let down upon the marble from a vessel opening into the cylinder. The lime, having a stronger affinity for sulphuric than it has for carbonic acid, abandons the latter to combine with the former; the carbonic acid, on being set free from its combination with the lime, takes the gaseous form and becomes carbonic acid gas. The gas thus liberated is compressed in contact with water, when the water is saturated with it, and becomes the mis-named "soda water" of the fountains.

There are two plans for compressing the gas; in one form of apparatus it is done by an air pump, and, in the other, the gas is generated in a close vessel in communication with the water, the pressure being obtained by liberating a sufficient quantity of the gas in a confined space.

The vessel containing the sulphuric acid is lined with lead—that being the only cheap metal which is not acted upon by sulphuric acid. The vessel in which the marble dust and sulphuric acid are mixed together is usually lined with block tin. The gas, before being conveyed to the beverage, is passed through clean water, to remove any impurities with which it may be mingled.

At the fair of the American Institute there is on exhibition a soda-water apparatus, in which the vessel for impregnating the water is lined with glass. As the pressure in this vessel is between 200 and 300 pounds to the square inch, the glass lining would, of course, be burst, unless effectual means were taken to restrain the pressure. The plan adopted in this case is to open a communication between the interior of this glass lining and the space between this and the inclosing cast iron, so that the pressure is equal on the outside and inside of the glass. It is a very neat and effectual device, and would be perfect if the inventors would carry it a step further, and line the whole apparatus with glass. It is the invention of Messrs. Schultz & Walker, and the apparatus is manufactured by John Matthews, Nos. 437 and 439 First avenue, New York.

On another page, under the heading "Notes on New Discoveries," will be found a description of a new and cheap method of producing carbonic acid, which may be worthy of attention by our soda-water manufacturers.

COAL IN PRUSSIA.—The total production of the collieries of Prussia, in 1864, was estimated at 42,394,500 tons.

MECHANICS' AND INVENTORS' GUIDE.

We have lately published a new and convenient volume, of 108 pages, upon Mechanics' Patents and Inventions, which promises to be of much value to all who are of a scientific or inventive turn of mind. Although the proportions of this book are not equal to Webster's dictionary, still we venture to say that so large an amount of valuable information has seldom been collected within so small a compass.

The book contains all the patent laws in full, except repealed or salary sections; the principal official rules and directions for conducting business at the Patent Office; 112 engravings of the best mechanical movements, with descriptions, of great value to mechanics and inventors who study the best construction for machinery; a chapter upon the steam engine, with an engraving of the common condensing engine, with letters of reference and nomenclature of all the parts; instruction in practical geometry; table of the effects of heat upon bodies; table of the pressure and temperature of steam; of the electrical conducting power of various substances; forms for assignment of patents; instructions how to obtain patents and caveats; practical directions and best methods for selling patents; hints upon the value of patents; how to invent; information upon the rights of inventors, patentees, assignees, partners and employers; advice as to foreign patents, extensions, reissues, infringements, together with a variety of other highly useful scientific and mechanical facts and calculations, the whole abundantly illustrated with engravings. Price only 25 cents. Address Munn & Co., 37 Park Row, N. Y.

THE "WINOOSKI" AND "ALGONQUIN."

These two vessels, which have been so long written and talked of, are about commencing their trial for economy of power. It is hardly necessary to recite again all the conditions under which they are to be run—this matter has been alluded to in previous numbers of this journal—suffice it to say, that on Friday last the preliminary trials of the engines took place; that is, the five-hour runs to get ready, and immediately thereafter the ninety-six hour trial was to be entered upon. At the time of our visit the *Algonquin* was turning her wheels vigorously, while the *Winooski*, the naval vessel, was lying still, steam not having been raised. Mr. Dickerson deserves commendation for the energy he displays in looking after his interests; he runs his own engine, aided by others, and takes off his coat and goes at it with a will. The boilers on the *Algonquin* work admirably. The fires were started at 10:18 A. M., and steam started at 10:37; one boiler was cold, the other had water at 120° in it; 1,100 pounds of wood, and 2,000 pounds of coal were consumed in so doing. At 11:45 the engine was started with 45 pounds pressure, and, when we left, was making 16 turns per minute, with 60 pounds of steam, cutting off at points between half stroke (4 feet 4½ inches) and ten inches. We shall publish the results in our next issue.

PASS THEM AROUND.

We have received a number of letters from correspondents in various parts of the country, inclosing a printed puffing circular of "Morton's No-ink Pens," purporting to have been patented in June, 1865, and alleged to be a perfect substitute for ink, and requesting people to remit. The circular contains a strong recommendation, pretended to be quoted from the *SCIENTIFIC AMERICAN*. C. V. Morton & Co., No. 21 John street, Jersey City, N. J., is one name under which the humbug is conducted.

In reply to our several correspondents, we have to say that no such patent has been granted, nor have we given any such recommendation. On inquiry in Jersey City, that no such firm or place of business was to be found. We further ascertained that the police were on the watch for the scamps, which has caused them to depart from Jersey City. When we last heard of them, their victims were directed to address them at Tarrytown, N. Y.

We hope the postmasters at places where these fellows have been or may be operating will take the necessary steps for their arrest. They have swindled hundreds of people.



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING SEPTEMBER 19, 1865.

Reported Officially for the Scientific American.

43 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.

49,959.—Breech-loading Fire-arm.—E. S. Allin, Springfield, Mass.:

I claim, First, The combination of a solid recoil block, A, with a pinion, U, and rack, m, the first tooth, s, of which is hung on a spring, in the manner and for the purpose described.
Second, Reversing the front end of the recoil block at c', and forming a corresponding bevel, c, on the barrel, as and for the purpose described.

Third, The projection, X, in combination with the lever, f, and hammer, V, substantially in the manner and for the purpose described.

49,960.—Cut-off for Water Conductors.—James Ash, Sterling, Ill.:

I claim the adjustable tube, B, applied in combination with the conductor, A, and discharge pipes, D D', substantially in the manner and for the purpose set forth.
[This invention relates to certain improvements in conductors of water in buildings, and its object is to change the direction of the current from one outlet to another with little trouble or loss of time.]

49,961.—Steam Gage.—Chas. Barnes, Cincinnati, Ohio:
I claim the provision in a steam gage of two or more springs, G H, of unequal tension, arranged and operating in the manner and for the purpose set forth.

49,962.—Mowing Machine.—L. M. Batty, Canton, Ohio:
First, I claim the sliding shifter, L, in combination with the hand lever, d, and the intermitting lever, d', the pinions, k and k', the double clutch, l, and the shaft, z, as herein described, for the purposes set forth.

Second, I claim the swivel-jointed stay rod, E, the upright guide rod, N, with the set bolt and nut, n, and the shoe, H, in combination with the swivel joint, v, when operating as and for the purposes set forth.

Third, I claim the cam lever, F, with the standard and flexible joint, t, as herein set forth.

Fourth, I claim the arrangement of the outer shoe, J, block, T, and set screw, x', for raising and lowering the shoe independently of the cutter guard, substantially as set forth.

Fifth, I claim the coiled supporting spring, e, with the set screw, f, in combination with the frame, B, as herein described, for the purpose set forth.

49,963.—Harvesting Machine.—L. M. Batty, Canton, Ohio:
First, I claim the seat irons, E, with the set bolts, F, when used as described, for the purposes set forth.

Second, I claim the arrangement of the bevel cogs, G, in combination with the driving wheels, H and H', shafts, H and J, the pinion, K, and clutch, K', the double spur wheel, L, pinion, M or M', and the crank shaft, N, all connected and operated substantially as set forth.

Third, I claim the hand lever, o, with the spring, together with the shifting rod, A, the coiled springs, R and R', in combination with the pinion, K, and clutch, K', when operating conjointly, as described.

Fourth, I claim the arrangement of drag bar, T, with the filling, r, the hook, V, the pin, W, the hanging irons, S and S', the swivel, U, the runner, A, the standard, g, with the slots, g' and p', and flange, j, the set screw, W', and slot, u', the ring, Z, the bolt, Z', the shoe, G', the bed roll, a, the bolts, b, in combination with the finger beam, c, and the lever, d, as set forth, when operating as described.

Fifth, I claim supporting the reel post, e, and carriage, n, by the standard, K, fastened by a wedge, v, as described.

Sixth, I claim the segment lever, p', the rack, y', and the plate, r, in combination with the reel carriage, n, and reel post, e', in the manner and for the purpose set forth.

Seventh, I claim the arrangement of the folding arms of the reel, in connection with the tubular shaft, substantially as described.

Eighth, I claim the springs, y, in combination with the folding arms, S'' and arm holders, u, in the manner and for the purpose set forth.

49,964.—Rake Attachment to Harvesters.—L. M. Batty, Canton, Ohio:

First, The wrought-iron carriage, E, with its pin, b, and box, l, as and for the purpose set forth.

Second, I claim the arrangement of the crooked arm, D D', in combination with the peculiar guides, L and I, for operating the rake, substantially as set forth.

49,965.—Machine for Beveling Picture Frames.—Otis T. Bedell, New York City:

First, I claim the use of mechanism, substantially as herein described, for the purpose of beveling the edges of photographic picture frames by machinery, in contradistinction to performing the labor by hand.

Second, The combination of one or more knives, F, secured to a carriage, E, with the self-acting clamp, H, constructed and operating substantially as and for the purpose set forth.

Third, The vertical knives or cutters, J, in combination with the inclined knife or knives, F, and clamp, H, constructed and operating substantially as and for the purpose specified.

[The object of this invention is a machine intended to bevel off the edges of pasteboard frames, such as are generally inserted in photographic album leaves. These frames are equal in thickness to two photographic cards of that class generally made for the purpose of inserting in photographic albums, and the opening or openings in them are cut out large enough to take in such cards. In order to be able to remove the cards, it is necessary to have one of the ends (generally the lower end) beveled off, for if the edge is left square, and the card or cards inserted into the frame, they can only be removed with great difficulty.]

49,966.—Shipping and Unshipping Hind Boards to Freight Wagons.—Fred'k W. Bishop, West Haven, Conn. Antedated Aug. 31, 1865:

I claim the combination of the spring bolts, c and d, with the strap or loop bands, C and D, when the whole is constructed, arranged and fitted to produce the result substantially as herein described.

49,967.—Feeding Device for Sewing Machines.—James Bolton and Jerome B. Secor, Chicago, Ill.:

We also claim, in combination with a turning feeding foot or dog the studs, or arms, b b', arranged at right angles to each other, so that whether the feeding be longitudinally or laterally of the machine the said foot shall be in working condition with the rod, G, that gives it part of its feeding movement, substantially as described.

We also claim, in combination with a turning feeding foot or dog, the pivoted, slotted and oscillating carrier, M, for giving said foot or dog a part of its feed movement in any of its positions, substantially as described.

We also claim, in combination with a turning feed and the oscillating carrier, the stud or post, n, for guiding and directing the feeding foot, and allowing it to rise and fall thereon, substantially as described.

We also claim the pivoted and adjustable link, L, interposed between the rods, G K, for the purpose of regulating the extent as well as the time of the motion of the carrier, M, substantially as described.

49,968.—Corder for Sewing Machines.—J. W. Brady, Baltimore, Md.:

I claim the corder, E F G H I, substantially as described and represented, and adapted to feed the cord underneath the main fold and into the angle formed between it and the secondary fold.

Second, I claim the combination of the devices, substantially as described, by which the corder shank is moved vertically, laterally, or backward and forward, according to the requirements of this work.

49,969.—Apparatus for Packing Rubber for Dental Purposes.—F. C. Brown, Palmyra, N. Y.:

I claim the combination of the piston, B, barrel, A, flask, G, heated bath, H, with the accessories, substantially as described, forming an apparatus for injecting rubber into molds.

I claim the combination of the flask, G, piston, B, barrel, A, and indicator wire, f, substantially as described and represented.

[The object of this invention is an apparatus intended to force rubber around the teeth in making artificial dentures.]

49,970.—Binding Attachment to Reaping Machines.—Jacob Behel, Rockford, Ill.:

I claim, First, The arrangement of the cog-wheel that transmits motion to the ring carrier of a binding apparatus upon the axle of one of the wheels, which holds the ring carrier in its place, substantially as set forth.

Second, The combination, in the same binding apparatus, of a ring carrier and a vibrating tension arm to control the compressing strap, substantially as set forth.

Third, The combination of the ring carrier of a binding apparatus with a strap holder, of suitable size and form to seize and hold the knotted end of a rope-compressing strap, substantially as set forth.

Fourth, The combination of the detachable strap holder with an escapement, which permits the compressing strap to relax its grasp upon the grain and subsequently to be withdrawn from the shear, substantially as set forth.

Fifth, The combination of the twining cord holder with the ring carrier, substantially as set forth.

Sixth, The combination of the twining cord holder and ring carrier with the grooved case, substantially as set forth.

Seventh, I claim the combination of the cord spool and its friction apparatus with a swinging frame and cord guide, substantially as set forth, so that the tension is relaxed by drawing the binding material from the spool.

Eighth, The combination of the proving frame of the tying bill with the fixed framework of the binding apparatus by toggle-jointed links, substantially as set forth.

Ninth, The combination of the slotted plate for holding the cord band with the guide plate for guiding it into the slot of the said plate, substantially as set forth.

Tenth, The combination with the cord holder of a movable protector, substantially as set forth.

Eleventh, The combination of the tying bill and movable knife, substantially as set forth.

Twelfth, The combination of the knife and the instrument for transmitting motion to the escapement of the compressing strap holder, substantially as set forth.

Thirteenth, The combination of a pair of spring dogs upon the ring carrier with a yielding stop upon the framework of the binding apparatus, substantially as set forth.

49,971.—Cork Machine.—Harris Boardman, Lancaster, Pa.:

First, I claim a chamber, G H I, made adjustable in itself, independently from the adjustability of the bed plate, A, operated substantially in the manner and for the purpose set forth.

Second, I claim the construction and operation of the spindles or graspers, V W, and their appliances, arranged and in combination with the cradle, Y, operating jointly, substantially in the manner and for the purposes set forth.

Third, I claim the employment of a tumbler, K o o, hanger, or its equivalent, substantially applied in the manner and for the purpose shown and described.

Fourth, I claim the raising and dropping of the knife, E, for the purpose of giving the finishing cut to the cork, actuated substantially in the manner specified.

49,972.—Coal-mining Machine.—E. K. Bruce and Jno. M. Bruce, Liberty, Pa.:

First, I claim the combination of the frame, B, shafts, E F, bevel gears, c d, drill spindles, C, truck, A, toothed rack, I, and feed shaft, H, all constructed and arranged substantially as and for the purpose specified.

Second, The application to the drills of spiral flanges with gradually increasing pitch, substantially as and for the purpose described.

[This invention relates to a machine which consists of a series of horizontal drills laying parallel with each other, and rotating simultaneously by suitable gearing in the rear of the frame which forms their bearings. The frame moves back and forth, in suitable ways, in the side timbers of a truck, so that the frame can be fed toward or from the bed of coal to be excavated, while the truck rests on wheels, and can be moved in a direction at right angles to the motion of the drill frame.]

49,973.—Machine for Sowing Plaster.—Alpheus Bugbee, Elkhart, Ind.:

I claim the shape and construction of the double forks and stirrers, E, when arranged and combined with the slides, D, and operated as herein described and for the purposes set forth.

I also claim the shield, K, as arranged and combined with the stirrers, E, for the purposes set forth.

49,974.—Sorghum Evaporator.—Ransom Bullard, Litchfield, Mich.:

I claim the combination and arrangement of the slow evaporating section or compartment, b b' of the evaporating pan, the direct flue chamber, g, and the slide flues, k k', extending through the brick work, so as to communicate the heat to the evaporating pan through the medium of a slow conductor, substantially as and for the purpose herein specified.

I also claim the described method of constructing and uniting the sections of the evaporating pan, A, substantially as described.

49,975.—Amalgamating Apparatus.—W. H. Butler, Chicago, Ill.:

I claim feeding the quartz into the amalgamating vessel by a forced feed, and holding it immersed or submerged therein by pressure, while it is thoroughly stirred and mixed with the amalgam, using therefor an apparatus constructed and operating substantially as herein described and represented.

49,976.—Harvester Rake.—Wm. J. and Rhutson Case, Pittstown, N. J.:

First, We claim the vibrating upright shaft, D, with rake, J, attached to it, as shown, in connection with the rope, e, connected to the bar I, and pulley, M, on shaft, N, all arranged either with or without the spring, P', to operate in the manner substantially as and for the purpose set forth.

Second, The arrangement of the wheel, H, provided at its upper surface with teeth, e, and the ledge, p, in connection with the part pinion, o, and shaft, N, for the purpose specified.

[This invention relates to a new and improved automatic raking device for harvesters, and it consists in a novel means employed for operating the rake, and in a peculiar arrangement of the same, whereby the cut grain may be raked from the platform without materially increasing the draught of the machine, and without interfering with the other working parts thereof.]

49,977.—Washing Compound.—R.W. Chappell, Chicago, Ill.:

I claim a washing compound, composed of the herein-described ingredients, in the proportions substantially as herein described and specified.

49,978.—Implements for Contracting the Barrels of Watch Main Springs.—Andrew S. Clackner, Rochester, N. Y.:

First, I claim constructing the barrels of watch main springs by forcing the same within a circular tapering cavity by means of a plunger or other equivalent device.

Second, I claim, in combination with a circular tapering cavity, as above set forth, a follower, constructed substantially as described.

49,979.—Oil Can.—Benjamin Clark, New York City:

I claim an oil can, having a spring, B, and a lined elastic diaphragm, protected by a guard, A, all substantially as shown and described.

49,980.—Knitting Machine.—Wm. W. Clay, Philadelphia, Pa.:

First, I claim the combination of the hooked carriers, F, the cams herein described, or their equivalents, for operating the said carriers and the self-acting needles, whether the latter are arranged to operate in parallel grooves, in conjunction with a reciprocating thread carrier, or in radial grooves, in conjunction with a rotating thread carrier, all substantially as described.

Second, The bed plate, A, its opening, a, and grooves, b, with the inclined edges, x, adapted for the reception and operation of the needles, D, and carrier, F, substantially as specified.

Third, The combination of the said movable cams with the pattern wheels when the latter are operated by the machine, through the medium of the devices herein described, or the equivalent to the same, for the purpose specified.

49,981.—Planing Machine.—Jeremiah Close, Brooklyn, N. Y.:

I claim the relative arrangement of the adjustable feed rollers, the form or guide, E2, with the cutter head, B, and cutters, c, c, when operated for the purposes substantially as described.

49,982.—Hinge.—Jeremiah Close and Ira Buckman, Jr., Brooklyn, N. Y.:

In a hinge composed of three leaves and two pintles, we claim operating the two outer leaves by a power located within a cavity or cavities in said central leaf, substantially as described.

We claim a hinge, formed with three leaves and two pintles, as described, the spring or springs of which are located in a cavity or cavities, formed in the central leaf, in combination with the wrench or forked spring holder, E, the collar, F, the grooved pulley, D, the wrench or capstan, N, the chain, C, and smaller grooved pulley, D, on the shaft of the outside leaf, B, substantially as and for the purposes herein set forth.

49,983.—Lubricating Compound for Journal Boxes, Etc.—Hall Colby, New York City:

First, I claim the use of a lubricator composed of asbestos and plumbago mingled with a liquid so as to be capable of being applied to journal boxes and other rubbing surfaces in the manner substantially as hereinbefore described.

Second, The use of a fabric made from asbestos, and without any combustible substance incorporated therewith, to be interposed between rubbing surfaces, and saturated with the lubricator above-described, in order to produce an anti-friction surface for the journals of heavy machinery and other like purposes, substantially as described.

49,984.—Lamp.—M. H. Collins, Chelsea, Mass.:

I claim the improved lamp as not only constructed with its cone or deflector, E, and its chimney rest, D, and chimney, arranged with respect to each other, as described, but as having the said deflector provided with peripheral springs, or the same, and the slits, h, b, and the said rest, D, made concavo-convex, and provided with an annular groove or lid at bottom for supporting the chimney, the whole being substantially as described and represented.

49,985.—Weeding Hoe.—Charles Crofut, Weston, Conn.:

I claim the adjustable arrangement of the serrated rib, E, and stem, D, with the plain rib, F, and key, G, in the manner and for the purpose substantially as herein described.

49,986.—Umbrella.—Wm. Damerel, Brooklyn, N. Y.:

First, I claim in umbrellas and parasols so securing on the stick the crown piece or other device to which the upper ends of the ribs of such articles are attached as that the said crown piece and the parts attached to it shall be capable of rotating on the stick, substantially as described.

Second, I also claim, in combination with the crown piece, D, the collar, G, G, with the longitudinal flanges, a, a, and a cap, E, for enclosing the upper edge of the covering, C, and confining it to the crown piece, substantially as described.

49,987.—Ferrule for Boiler Tubes.—Geo. W. Durall, Norfolk, Va.:

I claim a screw or screws, B, in combination with a cylinder in one or more parts, for the purposes specified, substantially as described.

49,988.—Spinning Machine.—James Eaton, Boston, Mass.:

I claim a cylindrical spindle, either solid or tubular, of a mule or other spinning frame, provided with a helical tip, as herein set forth.

I also claim the cylindrical tube or bobbin, either with or without the ferrule or band, B, in combination with a spindle having a helical tip.

I also claim the combination of the cylindrical tube or bobbin, O, with a cylinder having a helical tip, or its equivalent, substantially as herein described and for the purpose specified.

49,989.—Decarbonizing Clay Retort.—G. W. Edge, Jersey City, N. J.:

I claim the use of a mixture of steam and air, produced by means substantially as herein described, or any other equivalent means, and injected into a retort, for the purpose of decarbonization, as set forth.

49,990.—Clutch or Rope Holder.—C. A. Emery, Springfield, Mass.:

I claim the device constructed, arranged and operating substantially as shown and explained and for the purpose specified.

49,991.—Lock.—Jacob Euteneur, Peoria, Ill.:

First, I claim the two arms, B B', attached to the hub, G, provided with the pivoted bars, I I, and connected with the latch, C, as shown, in combination with the two bell hammers, M M', bell, N, and lever, L, the rods, J M, of the hammers being attached to arbors, g, l, provided with projections, f, b, and all arranged substantially as and for the purpose specified.

Second, The plate or key-hole guard, Q, in combination with the rod or bar, R, arranged and applied to the lock, substantially as and for the purpose set forth.

49,992.—Sleeping Car.—Ben Field, Albion, N. Y., and G. M. Pullman, Chicago, Ill.:

We claim, First, Constructing a car seat, with back and seat cushions hinged together, and disconnected with said seat, so that the back cushion may be placed on the seat, and the seat cushion extended to meet the seat cushion of the opposite chair, in the manner and for the purpose herein set forth.

Second, The berth, A, connected to the side of the car by hinges, B, and supported by jointed suspenders, C, so as to be turned up into an inclined position during the day, and lowered to a horizontal position at night, all as herein described and for the purposes set forth.

49,993.—Lamp Chimney.—J. G. Floyd, Keokuk, Iowa:

I claim the within-described new article of manufacture, to wit, a lamp chimney, with a hole or holes in its sides or parietes thereof, as set forth and described, or when constructed with any other holes in its sides, described or the same purpose.

49,994.—Cartridge Retractor for Breech-loading Firearms.—G. P. and G. F. Foster, Mohawk, N. Y.:

First, I claim the expelling pin, P, in combination with the spring, Q, and screw, R, operating substantially in the manner described.

Second, The screw, R, actuated to free the expelling pin by impingement upon a projection during the vibration of the breech block.

Third, The expelling pin, P, retracted in the upward vibration of the breech block, and reset by the spring screw, substantially as described.

49,995.—Bottle Stopper.—Charles Goldthwait, South Weymouth, Mass.:

I claim a metallic mounting for bottle corks, composed of a cap, D, and plate, E, and either with a metal plate, b, or a wax covering, c, all arranged and applied substantially as and for the purpose herein set forth.

[This invention relates to a new and improved mounting or metal attachment for cork stoppers for bottles, whereby the corks are rendered extremely durable, capable of being readily drawn from the bottles, and enabled to stop the bottles much tighter than usual.]

49,997.—Combined Seed Sower and Stalk Cutter.—B. A. Grant, Mount Pleasant, Iowa:

First, I claim the combination and arrangement of the crank, M, provided with the lever, N, the slide bar, L, the rods, J J, and the plow standards, F F, when all constructed and operating substantially as set forth.

Second, The combination and arrangement of the lever, R, arm, S, the connecting bow, T, and beams, D D, when constructed substantially as herein specified and described.

Third, The combination and arrangement of the beams, D D, with the corn-stalk cutter, U, when constructed and operating substantially as herein set forth.

49,998.—Sugar Cane Mill.—James Harris, Janesville, Wis.:

First, I claim the combination of the sliding box, K, bolt, b, spring, a, and yoke, L, with the nut, e, for the purpose of making the mill either rigid or elastic at pleasure, substantially as set forth.

Second, Securing and adjusting the spring attachment of a roller bearing by means of the yoke, L, and set screw, d, substantially as set forth.

49,999.—Extension Lever Jack.—W. H. Hartman, Fostertown, Ohio:

I claim the device, h and g, spring, f, band, e, stirrup, c, in combination with the lever, E, and standard, C, when constructed, arranged and operating as and for the purpose substantially as set forth.

50,000.—Manufacture of Candles from Paraffine.—Chas. Havard, New York City:

I claim a new and improved process for making candles or blocks from the paraffine of petroleum, as herein described, using for that purpose the aforesaid ingredients or composition of matter, or any other substantially the same, and which will produce the intended effect.

50,001.—Rock-drilling Machine.—Robert Hood, Dayton, Ohio:

First, I claim the use of a spiral lifter, B, in combination with one or more drills or drill rods, constructed and operating substantially as and for the purposes described.

Second, The cam grooves, I, and sleeves, j, with arms, k, and tappets, l, in combination with the spiral lifter, B, constructed and operating substantially as and for the purposes set forth.

50,002.—Chimney Cap.—William Henry Horton, Jersey City, N. J.:

I claim the inner cap, A, closed at the apex and open at the sides, and the outer cap, B, open at the top and bottom, while its sides cover the apertures in the inner cap, substantially as and for the purpose herein specified.

50,003.—Wind Wheel.—John A. Hubbard, West Moulton, Me.:

I claim, First, A wind wheel provided with oblique buckets, b, in connection with a vane, D, having a shield, E, attached and arranged to operate in the manner substantially as and for the purpose set forth.

Second, The gate, F, and wind wheel, C, constructed, arranged and operating in the manner substantially as and for the purpose set forth.

Third, The supplementary wind wheel, L, combined and arranged with the shaft, J, and with the cone, M, having the weight, N, attached and connected with the gate, F, substantially as and for the purpose specified.

50,004.—Fog Alarm.—George Hull, Wallingford, Conn.:

I claim the combination of a coil of tubing, C, and one or more whistles, E, when constructed and arranged in the manner described, so as to sound a prolonged alarm, for the purpose specified.

50,005.—Gate Post.—G. O. Hutson, Iowa City, Iowa:

I claim the combination of the gate post provided with shoulders or grooves, the bearers attached to the lower portion of the gate, and the band which forms the upper support, substantially as described and represented.

50,006.—Compound for Destroying Vermin.—J. Burrows Hyde, New York City:

I claim a mixture of extract of tobacco and petroleum, for the purposes set forth.

50,007.—Saddle Stirrup.—Andrew Ivion, Femme Osage, Mo.:

I claim, First, A stirrup made in two separate parts, hinged together at the bottom as described in the foregoing specification.

Second, The several parts of the stirrup, viz., the side pieces, A and A', the bottom piece, B, the spring, h, and the lugs, W and X, or their equivalents, when constructed and arranged as and for the purpose set forth.

50,008.—Shoe Lacing.—Timothy J. Kelleher, Boston, Mass.:

I claim the above described improved arrangement of the studs and the lacing with respect to the two flaps of the opening.

I also claim the combination and arrangement of the flaps and the studs with the two flaps, or the same and the lacing of the said opening, as explained.

50,009.—Churn.—Elisha Kenney, Livermore, Me.:

I claim, First, The arrangement herein described of the gear mechanism in reference to the dasher, in combination with the adjustable guide, substantially as set forth.

Second, The construction, arrangement and operation of the reciprocating dasher of churns, as described—that is to say, forming the same of bevel faces or inclined planes, in combination with apertures, substantially as set forth.

50,010.—Car Coupling.—John Lacey and George Watkins, Bristol, Wis. Antedated Sept. 10, 1865:

First, We claim the hook, B, arranged in respect to the drawhead, A, and operating substantially as and for the purposes set forth and shown.

Second, We claim the employment of two hooks, B B, combined and arranged with the drawheads, A A, substantially as and for the purposes delineated and set forth.

Third, We claim the combination and arrangement of the drawheads, A A, the hooks, B B, slots, C, rods, D, and blocks, E, as and for the purposes shown and described.

50,011.—Instrument for Opening Sealed and other Cans.—Samuel D. Lecompte, Leavenworth City, Kansas:

I claim an instrument for opening fruit and other sealed cans, constructed substantially as herein shown and described.

[This invention consists in the construction of a simple and easily operated instrument for opening that class of cans used for putting up fruits, preserves, etc., the same consisting of a bar provided with a suitable knife, which is adjustable, and one end pointed and bent in such a manner that a fulcrum will be provided in which to turn the instrument after the said end has been thrust through the top of the can.]

50,012.—Stop Motion for Knitting Machines.—Mark Lee, Needham, Mass.:

I claim the improved stop motion composed of the upright stand, A, the bars, E E, with the yarn scraper, F, the dropper or bar, H, and the bar, K, together with their appendages, constructed, arranged and combined so as to be used in connection with any loom or machine for making knitted cloth, substantially as herein specified.

50,013.—Mode of Supplying Railway Trains with Water.—Lewis H. Lezott, Washington, D. C.:

I claim the arrangement and combination of the sliding gate, D, with its grooved posts, U, lever, G, spring, J, and pump rod, K, the whole being attached to a railway, and operated by the passage of the cars, as herein described and for the purposes set forth.

50,014.—Artificial Hand.—Oliver Lindsay and Isaac Vance, Washington, Pa.:

We claim the steel ligatures, slide bar and ratchet, or series, in combination with the artificial finger joints, enabling the hand to operate as desired, and also the socket, as above described.

50,015.—Lubricating Compound.—Isaac Lossiel, Philadelphia, Pa.:

I claim a lubricating compound consisting of the combination of the ingredients herein described, in the proportions substantially as specified.

50,016.—Weather Strip for Doors.—Isaac F. A. Lynch, Roxbury, Mass.:

I claim the improved weather strip as made with the strip of elastic material or india rubber, c, c, to project in opposite directions from the lower and rear sides of the holder, substantially in manner as described.

And in combination with the elastic strip, c, c, to project from the rear part of the holder, as described, I claim the rebate, d, made in the holder, and arranged with reference to the said elastic strip, substantially as specified.

50,017.—Trace Buckle.—David F. Maine, Mansfield, Ohio:

First, I claim the use of a vise, constructed substantially as described, and for the purposes menioned above.

Second, I claim the cam and spring, constructed and used substantially as above described.

50,018.—Cultivator.—Abraham J. Manny, Freeport, Ill.:

First, I claim the employment of the lever, E, the bar, b, and the yoke, F, or its equivalent, for the purpose of giving direction to the machine from the seat, as is herein fully set forth.

Second, Attaching the plow beams to the hounds or side-pieces, A A, in such a manner that said beams can be brought closer together or separated by moving them forward or backward, as is herein represented.

Third, The combination of the triangular frame, with the devices for changing the direction of the machine, as and for the purpose specified.

Fourth, The combination of the levers, G and H H, with the plow beams, as and for the purpose herein specified.

50,019.—Lamp.—Charles F. Martine, Dorchester, Mass. Antedated Sept. 10, 1865:

I claim the perforated cylinder, B, with its flange or ring, c, in combination with a non-conducting base or support, b, to which the perforated cylinder is attached, operating substantially as set forth, for the purpose specified.

50,020.—Rock Drill.—John M. May, Janesville, Wis.:

I claim, First, Covering the race of broken pulleys used to lift and set free drills, and for other similar purposes, with leather, india-rubber, or other suitable slightly elastic material, substantially as and for the purposes described.

Second, A non-elastic or rigid bar faced with leather rubber, or other suitably elastic material, on its sides next to metallic pulleys, when used with metallic-faced pulleys, substantially as and for the purposes described.

Third, A hollow bar to receive the spindle of a drill, when the hollow bar is operated between broken pulleys, the hollow bar and spindle serving as a swivel to allow the drill and spindle to be revolved horizontally at the same time it is operated vertically as the drilling process.

Fourth, A gripe or vise connected by a swivel to the operating mechanism of a drill, when the vise is constructed substantially as and for the purposes described.

Fifth, The general arrangement of the pulleys, B' B', bar, L, shafts, C C, guides, S S and K, when combined and operated substantially as and for the purposes described.

Sixth, Elastic washer, m, of rubber, or its equivalent, between the top of bar, T, and washer, m', in Fig. 4, when used as and for the purposes described.

50,021.—Screw Driver.—James S. McCurdy, Bridgeport, Conn.:

I claim, as a new article of manufacture, the screw driver as constructed with slotted handle and with a blade, having two or more points pivoted into such handle, substantially as herein described.

50,022.—Construction of Cans.—Henry W. Millar, Utica, N. Y.:

I claim constructing the bottom and securing the same to the body of the can in the manner shown and described.

[This invention consists in constructing a bottom for a can, pail or other metallic vessel, in a conical form, or in the form of a frustrum of a cone, its apex or point extending upward into the cone, so as to strengthen the resisting power of the bottom, and, also, where it may be desirable, to afford a better opportunity for drawing off the entire contents of the can by faucet or the like.]

50,023.—Grate Bar Supporter.—W. F. Morgan and F. C. Bartlett, New York City. Antedated Sept. 6, 1865:

We claim, in combination with a grate bar or fagot of bars of any convenient form, the application of the truss bar, A, with the space, C, intervening between it and the main bars, B, and with the loops, X, or their equivalents, supporting the truss bar, A, in such manner that the expansion and contraction of the latter shall be allowed by sliding one upon the other, substantially as herein set forth.

50,024.—Spinning Jack.—H. L. Moulton, Camden, N. J.:

First, I claim the sliding bars, R and R', constructed and arranged in respect to each other substantially as described, and provided with such appliances that they shall be simultaneously elevated as the carriage approaches the limit of its inward movement, while one of the bars is at liberty to be depressed after the carriage has commenced its outward movement, without disturbing the other bar, all substantially as and for the purpose herein set forth.

Second, The combination of the bars, R and R', their wheels, Q and Q', operated by the worms, I, or their equivalents, and having adjustable pins, X' and X', together with the spring rods, V and V', the whole being arranged, constructed and operated substantially as and for the purpose herein described.

Third, The vertical bar, R, in combination with the clutch, c, on the driving shaft, and the devices herein described, or their equivalents, through the medium of which the bar, R, is caused to operate the said clutch.

Fourth, The combination of the clutch, c, on the driving shaft, with the system of delivering rollers, and the intermediate system of gearing described, or its equivalent, whereby a positive motion and certain starting and stopping of the delivering rollers are effected.

50,025.—Flour Sifter.—James Myers, Jr., New York City:

I claim a sieve for family use, constructed in the form of a semi sphere and provided with an oscillating frame, the lower part of which has a curved rod corresponding with the curvature of the sieve and having upon it a series of spheres or balls, all arranged substantially as shown and described.

50,026.—Boot Heel.—Erastus Niwahat, Lynn, Mass.:

I claim the construction of a heel, for boots or shoes, of vulcanized rubber, or its compounds, or other vulcanizable material, with a core of wood, substantially as and for the purpose specified.

50,027.—Fruit Jar.—P. Palliasard, St. Anne, Ill.:

I claim the hooked straps, f, f, catching under the flange, g, of the bottle, and perforated to receive the notched bridge piece, d, as herein described.

Second, The lateral openings, a' b', arranged in relation to the vertical openings, a b, in the corner, in the manner and for the purposes herein specified.

[This invention relates particularly to the means of filling the jar and of closing down its top. The top is provided with two openings, passing clear through it, one being intended to introduce the liquid with which the jar is to be filled, and the other to let the air escape from the interior of said jar. A bridge bar—the notched end of which catch is slotted hook straps, and which is provided with a suitable set screw—serves to press the top down upon the neck of the jar. The hook straps catch under the bead which encircles the neck, and they are easily removed and attached to jars of different size and diameter.]

50,028.—Bolt Machine.—Hugh M. Phillips, Indianapolis, Ind.:

First, I claim the bolt anvil, as described, when operating in connection with the gage block, G, substantially as and for the purposes set forth.

Second, The die rest, K, operating in connection with the die, B, to prevent the same from opening while the head is being formed, substantially as set forth.

50,029.—Apparatus for Carbureting Air.—E. A. Pond and M. S. Richardson, Rutland, Vt.:

First, In machines for generating illuminating gas by charging atmospheric air or hydrogen with the vapor of hydro-carbon fluids, we claim the employment of a vaporizer composed of pipe or tube, coated spirally, or otherwise, as and for the purposes hereinbefore set forth.

Second, In machines for generating illuminating gas by charging atmospheric air or hydrogen with vapor of hydro-carbon fluids, we claim in combination with the tubular vaporizer, as described, a supply reservoir to maintain said vaporizer constantly filled, substantially as herein set forth.

Third, In machines for generating illuminating gas by charging atmospheric air or hydrogen with the vapor of hydro-carbon fluids, we claim the employment of an elastic or flexible air-diaphragm air-pump constructed and arranged for operation substantially as herein set forth.

Fourth, In machines for generating illuminating gas by charging atmospheric air or hydrogen with the vapor of hydro-carbon fluids, we claim the employment, in combination with an air or gas pump, of a clock work, or other spring-power mechanism, arranged to operate the said pump, substantially as and for the purpose set forth.

Fifth, In machines for generating illuminating gas by charging atmospheric air or hydrogen with the vapor of hydro-carbon fluids, we claim the combination of the following elements:—

First, A flexible or elastic diaphragm pump, or other pump, operating without the use of water or other liquid.

Second, A tubular vaporizer, substantially such as herein described; and,

Third, A spring-power mechanism to operate the pump, substantially as described.

50,030.—Gaiter Boots.—Thomas Powell, Richland, Ind.:

I claim the employment or use in gaiters or shoes of a double-folding gore, B, stitched by the side of a vertical cut or slit made in the upper leather from the top downward, at the rear of the gaiter or shoe, and either with or without the horizontal cut, substantially as and for the purpose set forth.

50,031.—Snow Plow.—E. A. Putnam, Oakfield, Wis.:

I claim, First, The application to a car truck or railroad car of plows, arranged in such a manner that they may swing or work on pivots on a shaft, and by means of springs, or their equivalents, be kept to their work, and still allowed to pass over obstructions, substantially as set forth.

Second, The bars, B, provided with inclined surfaces and having the springs and plows attached to them in such a manner that the plows may be raised by moving or sliding the bars, and without meeting with any resistance from the springs, substantially as described.

Third, Operating the sliding bars, B, through the medium of the cranks and slotted plates, substantially as set forth.

[This invention relates to a new and improved plow for removing the snow from the inner sides of the rails, where the flanges of the wheels run. The invention consists in applying plows to a car truck in such a manner that they will be held down to their work with sufficient pressure to remove the snow, and at the same time be allowed to yield or give to obstructions, such, for instance, as a road-crossing or a switch track.]

50,032.—Barber's Chair and Stool.—Henry Remick, Portsmouth, N. H.:

I claim, First, The chair, A, constructed with folding legs and with receptacles, substantially as above described.

Second, I also claim the stool, P, constructed substantially as above described.

Third, I also claim the combination of the chair, A, and stool, P, substantially as above shown.

Fourth, I also claim the rests for the feet, W, constructed with an upholstered and a barred side, substantially as shown.

50,033.—Feed-water Apparatus.—G. Adolph Riedel, Philadelphia, Pa. Antedated May 11, 1865:

I claim, First, The vertical reciprocating receiver, C, constructed, arranged and operating substantially as described and for the purpose set forth.

Second, The combination of the rod, I, with the receiver, for the purpose of opening and closing the communication between the feed pipe and the pump or injector, substantially as described.

50,034.—Automatic Boiler Feeder.—G. Adolph Riedel, Philadelphia, Pa. Antedated July 26, 1865:

I claim, First, The oscillating receiver, H, for opening and closing the communication between the feed-pipe and boiler, combined and arranged with the valves, C and L, substantially upon the principle and in the manner above set forth.

Second, The lever, M, constructed substantially as described, and combined and arranged with the receiver, H, and valve, L, as and for the purposes above set forth.

50,035.—Automatic Boiler Feeder.—G. Adolph Riedel, Philadelphia, Pa. Antedated, May 11, 1865:

I claim the combination and arrangement of the receiver, C, with the valves, E, F, pipes, B, B', and levers, K, K', with reference to the feed-pipe and boiler substantially upon the principle and in the manner herein set forth.

50,036.—Machine for Manufacturing Sheet Lead.—John Robertson, Brooklyn, N. Y.:

I claim the arrangement of the water cylinder, the ram, the adjustable dies, and the supporting and adjusting nut of the central bolt which carries the male die, substantially as herein described, whereby provision is made for forcing out the lead in a downward direction, and convenience is afforded for adjusting the dies to regulate the thickness.

50,037.—Compass.—Paul Roessler, New Haven, Conn.:

I claim a reversible socket, presenting at one end a steel point and at the other a pencil, substantially as and for the purposes specified.

50,038.—Cigar Wrapper.—Christopher E. Roffee, Barrington, R. I.:

I claim making an artificial wrapper for cigars, by covering the common brown paper of commerce with a coating of paste made from tobacco, in the manner substantially as described.

50,039.—Composition for Refining and Hardening Steel.—Henry Rescoe, New York City:

I claim, First, The use of a composition, consisting of chlorate of potash and carbonate of soda, for hardening and refining steel.

Second, The use of borax, in connection with either chlorate of potash or carbonate of soda, or both combined.

[This invention relates to a composition which will render common steel fit for good tools—which will restore steel that has been destroyed by overheating, and which prevents steel from cracking in hardening.]

50,040.—Fleece Folder.—Charles W. Rudgers, Brecksville, Ohio:

I claim the hinged head block, D, and adjustable follower, H, in combination with the leaves, C, strap, F, and spring, B, or its equivalent, operating as and for the purpose set forth.

50,041.—Hand Loom.—John Seaman and Wm. Y. Henderson, Andover, N. Y.:

We claim, First, The drivers, t, u, and cam disks, a2 a2', in combination with the lay, L, and with the shutter of a loom, constructed and operating substantially as herein described.

Second, The method herein described of producing the motion of the heddles and that of the shuttle by the action of the batten, as and for the purpose set forth.

50,042.—Piano Stool.—George A. Sherlock, New York City:

I claim arranging the seat of a piano-forte stool upon its body in substantially the manner described and for the purpose specified.

I also claim, in combination with the above, the use of the guards, r, r', for the purpose explained.

[This invention consists in so arranging the seat of a piano-forte stool upon its body portion that it can be readily adjusted and set at any desired height from the floor, so as to adapt it to the varying heights of persons using it.]

50,043.—Graduating Boot and Shoe Patterns.—Nathaniel Silvester, Boston, Mass.:

I claim, First, The steps or gradators, constructed and arranged substantially as described, for the purpose of graduating boot and shoe patterns.

Second, The combination and arrangement of the arms, A, B, graduated scale, C, and gradations, a, b, c, d, e, f, or their equivalents, substantially as set forth and for the purpose described.

50,044.—Spinning Jack.—Augustus and George Simpson, Woonsocket Falls, R. I.:

We claim the disk wheel, C, and tappet, F, in combination with a spring latch, G, or their equivalents, arranged to operate substantially as described, for the purposes specified.

50,045.—Auger Handle.—D. Y. Smith, Joliet, Ill.:

I claim, in combination with the auger shank and head, and the handle and slotted turning band, the cam swell or ledge margining the slot, d, so as to compensate for, and take up, all the wear between the shank and its socket, and hold the auger always tightly to its handle, substantially as described.

50,046.—Means of Attaching Sheer Poles to Standing Rigging.—Edward Smith, New York City:

I claim the attachment of the sheer pole to the lower part of each of the sockets, B, B', which receive the shrouds, by means of two links, C, C', one in each side of the socket, the said links being attached to the said socket by means of the joint pins, c, c', which connect the said socket with the dead eye, all substantially as herein described.

50,047.—Baling Apparatus for Packing Tobacco.—I. H. Stone, St. Louis, Mo.:

First, I claim the retaining bars, E, and keys, x, for the purpose of holding the case together so it can be removed from the press as soon as the pressing operation is performed.

Second, I claim the employment of the T-lever, M, and the hinged props, L, in connection with the posts, L', and hooks, i, and plate, P, as and for the purpose set forth.

Third, I claim the joint bolts, b, when constructed and used as and for the purpose herein described.

50,048.—Breech-loading Fire-arm.—T. L. Sturtevant, Boston, Mass.:

I claim the combination for elevating the barrel, and operating the cartridge-shell discharger, in manner as described, the same consisting of the lever, D, the spring, h, the stud, i, and the spring latch, k, the whole being arranged together substantially as set forth.

50,049.—Lubricating Compound.—David C. Taylor, Goshen, N. Y.:

I claim a lubricating compound, made of the ingredients herein set forth and mixed together in the manner and about in the proportion specified.

[This invention relates to a compound which may be used to advantage for journals or bearings of any desired description, and which is particularly intended to prevent said bearings from running hot.]

50,050.—Snow Shovel.—D. N. Thayer, Mayville, N. Y.:

First, I claim a snow shovel, which is provided with a guard, C, extending transversely across its palm, and also a handle, c, or its equivalent, substantially as described.

Second, In a shovel, in which the handle and blade are on a straight line, and in the same piece, I claim the hand protector, d, applied to the guard, C, substantially as and for the purpose described.

50,051.—Car Brake.—W. W. Todd and John Vandercar, Brooklyn, N. Y.:

We claim the segmental cogged plates, A, A', operated by the foot, at either or both ends of the car at the same time, by means of levers, 1, 2, 3, 4, arranged in the manner and for the purpose substantially as described and shown in the drawings.

50,052.—Cultivator.—J. P. Tostevin, Racine, Wis.:

First, I claim the combination and arrangement of the tongue, A, when extending back and joined to the cross piece, C, substantially as shown, the bolts, J, J', the set screw, J, K, and frame, B, when constructed and operating substantially as and for the purposes set forth.

Second, The combination and arrangement of the cross piece, C, provided with the slot, a, the T-bolt, H, plow standard, E, provided with the slot, b, base, F, and rod, D, when operating substantially as described.

Third, The combination and arrangement of the cogged sectors, N and O, with the wheel and frame of the cultivator, when operating substantially as herein specified.

Fourth, The combination and arrangement of the lever, L, slide rod, U, notched standard, R, shaft, X, and sector, N, when constructed and operating substantially as and for the purposes herein set forth.

50,053.—Valve of Steam Engine.—C. W. Tremain, Memphis, Tenn.:

First, I claim the cylindrical steam chest, H, with grooves or pipes, A, partly encircling it, the same forming steam passages to the cylinder, substantially as described.

Second, I also claim, in combination with the grooves, A, the projections, B, B', which cover them, said projections forming seats for the valves or rings, R, and being perforated with numerous diagonal holes for the passage of steam, substantially as described.

Third, I also claim in cylindrical valves which have reciprocating motions in their chests, making openings throughout their length, to permit steam or other fluids to pass to that end of the chest which is furthest from the induction passage, I, substantially as described.

50,054.—Flour Sifter.—L. W. Turner, Meriden, Conn.:

I claim, as a new article of manufacture, a flour sifter, composed of a suitable case, a conical sieve and a revolving frame, when the frame is composed of spirally fitted blades, or a brush or brushes, and the whole is fitted for use, substantially as herein described.

50,055.—Beer Cooler.—Francis Uhrland, Buffalo, N. Y.:

First, I claim a beer cooler, with an adjustable cover, substantially as and for the purposes herein described.

Second, I claim the main tube, E, and the cover, A, in combination with tubes or pipes, D, D', D'', heads, B and C, substantially as and for the purposes herein set forth.

50,056.—Beer Cooler.—Gardner Waters, Cincinnati, Ohio:

I claim the cooling of beer or other liquids, by passing the same continuously through a cooling medium, or vice versa, the cooling medium through the beer, by means of the rotating lantern cylinder, B, or its equivalent, and the outer case, A, combined and arranged for the purpose, substantially as herein specified.

50,057.—Shoe.—Fitch Weed, Middleboro, Mass.:

I claim a shoe, as made with the back piece, e, inverted between and sewed to each of the quarters, a, a', of the upper, and running from the top down to the heel of the sole, substantially as hereinbefore specified.

50,058.—Instrument for Canceling Postage and Revenue Stamps.—C. S. Wells, Chicopee, Mass.:

I claim the tube, D, provided with a spiral groove or slot, d, and having a cutter, e, at its lower end, in combination with the rod, C, provided with a lateral pin, c, fitted in the groove or slot, d, of the tube, D, the above parts being within a case, A, which constitute a gage resting firmly on the paper and remaining stationary, while the cutter turns within it, and all arranged in connection with a spring, E, to operate in manner substantially as and for the purpose herein set forth.

50,059.—Trunk.—J. H. Whitfield, Buffalo, N. Y. Antedated Sept. 15, 1865:

I claim a double trunk, opening front and back, with the cot opening in front, the cot having double bars, D and E, of wood and iron, stays, I, at their joints, and folding legs, L, with hooked stays, M, and the lid, B, as a rest or place for the pillow, and shelter for the head, when arranged and combined as herein described, and for the purposes set forth.

50,060.—Horse Rake.—H. C. Whitney, Coxsackie, N. Y.:

I claim the combination of the revolving rake head, g, lever, k, forks, l, and projections or cams, i, with the arms, f, and lever, s, substantially as specified.

50,061.—Air Engine.—Stephen Wilcox, Jr., Westerley, R. I. Antedated Sept. 9, 1865:

First, I claim automatically regulating the proportions of air passing over and through the fire, by the variations in the pressure of the air, substantially in the manner and for the purpose herein set forth.

Second, I claim causing the induction valve, I, to act as a variable throttle valve while maintaining a uniform or nearly uniform point of cut-off, substantially in the manner and for the purpose herein set forth.

Third, I claim mounting the safety valve, o, on the compressing piston, a2, of a hot-air engine, substantially as and for the purpose herein set forth.

Fourth, I claim constructing the cylinder, A, or pump, a', or both, of sheet metal, in the manner and for the purpose herein set forth.

Fifth, I claim, in connection with the last, the ventilated jacket or protection, A3, constructed and arranged substantially in the manner herein set forth.

Sixth, I claim the within-described arrangement of the bonnet, Q, and the valves, F and G, with their seats and passages cast on the cylinder, and arranged substantially in the manner and for the purposes herein set forth.

50,062.—Hot-air Engine.—Stephen Wilcox, Jr., Westerley, R. I.:

First, I claim the pipe, 3, connecting the interior of the furnace, B, with the upper portion of the reservoir, I, for the purposes herein set forth.

Second, I claim the loaded piston, t, in combination with the cock, 4, adapted to regulate the area of the orifice in the cock, 4, through which the petroleum flows from the reservoir, I, to the furnace, B, according to the fluctuations of pressure obtaining in the furnace, B, substantially as and for the purpose herein set forth.

Third, I claim the arrangement of the heat-conducting spurs, 13, burner, 9, and evaporator, 12, substantially as and for the purposes herein set forth.

Fourth, I claim connecting and combining the fly ball or equivalent speed governor, R, with the piston, 11, or its equivalent, for controlling the issue of hydro-carbon vapor into the furnace of an air engine, substantially as and for the purpose herein specified.

Fifth, I claim, in combination with an air engine adapted for the use of hydro-carbon vapor in the manner substantially as specified, the jet-holes, 10, and one or more pistons or stops, 11, arranged immediately adjacent thereto, so as to jet with the full velocity, even when partly closed, all substantially as and for the purposes herein set forth.

Sixth, I claim the employment in an air engine of an elevated reservoir, 1, evaporating device, 12, and a regulating device, 11, acting on the hydro-carbon after its change to the vaporous form, the several parts being arranged to operate together substantially in the manner and for the purposes described.

Seventh, I claim the arrangement of the vapor burner 9, metallic globe, 14, fresh-air passages, 20, and jets, 10, relatively to each other and to the evaporating pan, 12, or its equivalent, adapted to receive heat from the metallic globe, 14, substantially in the manner and for the purposes herein set forth.

50,063.—Bottle Stopper.—J. A. and G. E. Woodbury, East Cambridge, Mass.:

First, We claim the hinged disk, B, provided with the packing, e, and hasp, C, or their equivalents, in combination with the wire, F, applied to the mouth and neck of a bottle, substantially as and for the purpose described.

Second, The fixed ring or seat, M, provided with lugs, n, n', projection, h, and packing, e, and hinged to the disk, B, substantially as set forth and for the purpose described.

Third, Forming of the twisted ends, h, of the wire, F, a catch for the hasp, C, substantially as described.

50,064.—Seat for Water Closets.—Eber Woodruff, Chicago, Ill.:

First, I claim the combination and arrangement of the hinged seat, D, and pivoted cover, C, C', when operating substantially as and for the purposes specified.

Second, The combination and arrangement of the hinged seat, D, and pivoted cover, C, C', and wedge shape pieces, L and J, when arranged and operated substantially as and for the purposes herein described.

50,065.—Seed Planter.—Alpheus Bugbee (assignor to himself and Andrew J. Foster), Elkhart, Ind.:

First, I claim the construction and combination of the spurs, F, with the carriage axle or single shaft, B, to operate the seeding slide and agitate the grain, as herein described.

Second, I also claim suspending the teeth, C, at their backside to the rear ends of the arms, I, as described.

Third, I also claim the arrangement, construction and combination of the plates, U, with their vibrating bar, W, operating in a slotted V-shaped hopper, S, as herein described, for the purpose of sowing grass seeds.

50,066.—Harvester Rake.—Wm. F. Cochrane (assignor to himself, B. F. Warder and J. C. Child), Springfield, Ohio:

First, I claim the combination of the goose-neck or arched rake arm, having both a vertical and a horizontal turning movement on its pivot, with the guide slot and switch latch, substantially in the manner and for the purposes described.

Second, The combination of the guide slot, the switch and the goose-neck vibrating sweep rake with the mechanism for driving said rake, when arranged and operating substantially as and for the purposes set forth.

Third, The combination of the rake head, swivel ring and adjusting washers, arranged and operating as described.

50,067.—Paint Brush.—Samuel P. Faught, Foxboro, Mass., assignor to himself and William T. Cook, Boston, Mass.:

I claim the double socket, A, provided with a partition, a, in combination with the conical wedge, D, and screw, e, substantially as set forth.

50,068.—Paint Compound.—Darwin P. Flinn, Geneva, N. Y., assignor to Wm. S. Miller, New York City:

I claim a paint compound composed of oxide of zinc, lime, resin, linseed oil and milk, in about the proportions herein specified.

50,069.—Heat Radiator for Stove Pipes.—N. F. Goodrich, Meriden, Conn., assignor to himself and Isaac L. Holmes, Haydenville, Mass.:

I claim the central pipe, C, provided with a damper, D, in combination with the pipes, B, and chambers, A, A', all arranged substantially as and for the purpose specified.

[This invention relates to a new and useful improvement in a heat radiator for stove pipes, and is a good, simple and economical device for the purpose.]

50,070.—Brick Machine.—Isaac Gregg (assignor to Isaac Gregg, Jr.), Philadelphia, Pa.:

First, I claim starting the pistons or followers of the molds, together with their contained bricks, separately or in succession, by means of the inclined, B, B', or their equivalents, acting upon the stems, a, of the said pistons, substantially in the manner described, for the purpose of saving power and relieving the lifting levers of the said brick machine from the great strain consequent upon their starting, and lifting, as heretofore, the whole of one set of the pistons and bricks at one operation.

Second, I claim periodically changing the direction of the current of clay in the hopper from the set of filled molds to the set of empty ones under the hopper by means of the moving partition, c, or its equivalent, operating substantially in the manner described, for the purposes specified.

Third, I claim the arrangement of the steam-heating chambers, D, D', in combination with the plates, d2 d2', near the ends of the hopper, C, substantially as and for the purposes described.

Fourth, I claim giving the described alternating motions forward and backward to the two lubricating sweeps or mold clearers, E, E', by means of the divided rock shafts, M, M', and pinions, m2 m3, or their equivalents, arranged to operate the said sweeps or mold clearers, as and for the purpose described.

Fifth, I also claim controlling or starting or stopping the machine at will, by means of the apparatus consisting of the hand wheel, H, rollers, K and o, ratchet wheel, K', pawl, K2, treadle, N, and cord, P, supported in a suitable frame, L, and connected with the friction roller, G, by means of the cords, P, p, or their equivalents, so as to operate substantially as described and set forth.

50,071.—Cooking Stove.—Marcus L. Horton, Claremont, N. H., assignor to Sidney Smith, Greenfield, Mass.:

I claim the open space, D, and apparatus and register, A, as ar-

ranged and in combination, operating as described and for the purposes set forth.

50,072.—Cooking Stove.—Marcus L. Horton, Claremont, N. H., assignor to Sidney Smith, Greenfield, Mass.:

I claim the E, with cap, A, and improved flue, C, as arranged and in combination, operating as described and for the purposes set forth.

50,073.—Coal Stove.—Zebulon Hunt, Hudson, N. Y., assignor to himself and Wm. J. Miller:

First, I claim the double flue, D D', in combination with the circular hot-air chamber or flue, F, when both are constructed and arranged in manner and for the purpose set forth.

Second, I also claim the bridge flue, H, in combination with the circular flue, G, when arranged substantially as and for the purpose set forth.

50,074.—Machine for Shaping Crimping Forms.—J. H. Jellison (assignor to C. and J. R. Pierce & Co.), Milford, Mass.:

I claim the combination and arrangement of the rotary cutter wheel, A, and its shaft, with the mechanism, substantially as described, for moving such cutter head vertically, either slowly or suddenly, as may be required, the whole being applied to a table, as explained.

I also claim the combination of the rotary cutter wheel, its shaft, the mechanism for moving the wheel vertically, as set forth, and the two carriers, E and F, made substantially as specified.

50,075.—Gas Burner.—Hugh L. McAvoy (assignor to himself and E. S. Hutchinson), Baltimore, Md.:

I claim the gas burner provided, as described, with three or more parallel or nearly parallel slits.

50,076.—Apparatus for Carbureting Air.—Hugh L. McAvoy (assignor to himself and E. S. Hutchinson), Baltimore, Md.:

I claim, First, The described gearing and shafting by which the motor shaft, O, is connected with the forcing wheel shaft, F, through a point in the side of the chamber above the fluid level.

Second, The air pipe, R, which supplies the air to wheel from the chamber in which the regulator operates.

Third, The described form of regulator, inclosing an air space between a cylinder and conical frustum, and whose sectional area of displacement is increased as it sinks in the fluid.

Fourth, The automatic valve, J, in combination with the chamber, A, pipe, C, and supply pipe, R.

Fifth, The valve, I, suspended from the regulator and controlling the lower orifice of the pipe, H, which supplies carbureted air to the regulator.

Sixth, The reservoir, Y, situated above the gas-generating chamber, and communicating therewith by the pipe, Z, guarded by the valve float in the chamber, D.

Seventh, The combination of the upper reservoir, Y, chamber, A, and regulator, B C, with the lower chamber, D, and air-forcing wheel, E, communicating with each other by the passages for fluid, air and carbureted air, substantially as described.

50,077.—Apparatus for Purifying Kaolin, Etc.—Thomas Moore, Cornwall, Conn., assignor to John Ellerby, New York City:

First, I claim passing the mineral to be dressed, in connection with a current or currents of water or other suitable liquid, through a drag or drags, or their equivalents, having a series of one or more flood gates arranged in such a manner as to be opened and closed at pleasure, by means of which gates the said passage of the water with the mineral can be regulated according as may be necessary, substantially as herein described.

Second, Delivering the mineral, after having been dressed, in any proper manner, to one or more suitable receivers or tanks at or near the bottom thereof, substantially as and for the purpose specified.

Third, Removing the clay from the receivers of the cleansing or dressing apparatus, through any suitable opening or openings in the bottom of the same, substantially as set forth.

50,078.—Rocking Horse.—Leven C. Percival (assignor to himself and E. H. Deemer), Philadelphia, Pa.:

First, I claim the hobby horse constructed substantially as denoted—that is to say, supported underneath by a pivoted attachment to a standard erected on the wheeled platform, the hind feet attached to the crank on the rear axle, while the forward parts are left free, substantially as described.

Second, The guiding line connecting from the bit to a place near the pivotal point of the horse, and from thence with the forward axle, as described.

Third, The use of the swinging frame, x x, for lifting the platform, arranged as described, and for the purpose specified.

[This invention relates to a novel arrangement of a rocking horse, by the rocking movement of which its carriage is propelled, and consists principally in the steering devices for guiding the carriage in any desired direction, and also in the use of frames connected in such manner to the carriage that its wheels can be lifted from the ground, and thus the propulsion of the carriage prevented as the horse is rocked.]

50,079.—Leather Roller.—D. H. Priest (assignor to himself and B. S. Harrington), Boston, Mass.:

I claim, First, So applying the adjustable table as to allow it to rise and fall automatically with the various depths of skin about the roller or shaft.

Second, I claim the combination of the toggles and the levers with the adjustable bed, provided with a feeding roller and the winding roller or shaft.

50,080.—Cotton Gin.—Francois Durand (assignor to E. P. H. Gondouin), Paris, France:

I claim, First, The combined operation and arrangement of the two ginning rollers, I and I', the surface of the roller, I, of which is provided with a series of inclined annular or endless elliptical corrugations or grooves, situated parallel to each other and the surface of the other roller, I', being smooth, the said corrugated or grooved roller acting in combination with the smooth ginning roller, I', provided with a slip of parchment, substantially in the manner and for the purposes set forth.

Second, In combination with the rollers, I I', the general arrangement and combination of the parts, acting in concert therewith, substantially as described and illustrated in the annexed drawings, and for the purposes set forth.

50,081.—Process of Collecting Spirit During the Refining of Sugar.—Francis Reid, Liverpool, Eng. Antedated June 21, 1865:

I claim solely the collecting and saving of such spirit or alcohol as may be generated and thrown off during the process of boiling or refining raw sugars, concrete, melado and molasses, substantially in the manner and for the purposes hereinbefore described and set forth.

50,082.—Manufacture of Gun Cotton.—J. J. Revy, Vienna, Austria:

I claim an explosive compound, made substantially in the manner and for the purposes described.

50,083.—Manufacture of Gun Cotton.—J. J. Revy, No. 28 Grosvenor Street, Eaton Square, Eng.:

I claim, First, The preparing the cotton for use, in the manufacture of gun cotton, by washing it in an alkaline solution.

Second, The process of dipping or steeping the cotton, as hereinbefore set forth, in a dripping vessel containing a condensed, one after the other, in a dripping vessel containing a condensed quantity of acid, the contents of which are, after each operation, brought back to the proper strength by the addition of fresh acid, to compensate for that removed by the portion of cotton last dipped.

Third, The general arrangement of the apparatus hereinbefore described and shown in the annexed drawings.

Fourth, The separating the acid from the exterior of the gun cotton fiber by saturating the cotton with water and then again extracting this water by means of a centrifugal machine. Also the treating the acid from the interior of the gun-cotton fiber by separation of the cotton in layers on suitable perforated shelves and arranging the cotton to filter or percolate through it.

Fifth, The treating gun cotton with water glass by means of a centrifugal machine, as hereinbefore described.

Sixth, The employment for treating gun cotton, of water-glass solution, in a cool, in place of in a boiling, state, as heretofore.

50,084.—Mode of Making Bars, Shafts, and Other Articles Composed of Iron and Steel.—Charles Sanderson, Sheffield, Eng.:

I claim the manufacture of railway bars, shafts, girders, ship plates, boiler and bridge plates, and other articles, from masses of wrought iron and cast steel, or of wrought iron and homogeneous iron or steel (made by, and known as, the Bessemer or pneumatic process), and the uniting of large masses of the above metals, in which the combination is effected, in the manner herein described.

50,085.—Apparatus for Preserving Beer and Other Liquids.—Thomas Byrne, New York City:

I claim, First, The preservation of liquids or liquors on draught, substantially as and for the purpose herein set forth.

Second, The application of a flexible vessel for containing, and from which to serve, liquors on draught, substantially as described.

50,086.—Chimney Cap.—E. Hinkley and G. W. Crowell, Cleveland, Ohio:

We claim the cap, A, the standard, D, and link, b, in combination with the plate, C, the several parts being constructed and arranged as and for the purpose herein set forth.

REISSUE.

2,073.—Manufacture of Iron.—John D. Williams, Alleghany City, Pa. Patented Aug. 8, 1865. Antedated July 9, 1865:

I claim the use of the ingredients herein named, and their equivalents, and the mode of using them, and the manner of operating the furnace, substantially as described, and for the purpose set forth.

DESIGNS.

2,173.—Bust of Abraham Lincoln.—Henry Manger, Philadelphia, Pa.:

2,174.—Carpet Pattern.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.

2,175.—Carpet Pattern.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.

2,176.—Carpet Pattern.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.



GRANTED FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for new inventions in the United States and in all foreign countries during the past seventeen years. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after eighteen years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers.

Yours very truly,

CHAS. MASON

[See Judge Holt's letter on another page.]

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy.

Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of \$5 accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, etc., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention to the Government fee for a caveat is \$10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent Office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Pamphlets of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO.'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignment of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft or Postal Order on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution or rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, etc.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is \$15. Other changes in the fees are also made as follows:—

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 Re-issue.....	\$30
On application for Extension of Patent.....	\$30
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

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of proceeding in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO., No. 37 Park Row, New York.

Back Numbers and Volumes of the "Scientific American."

VOLUMES IV., VII., XI. AND XII., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, \$3.00 per volume, by mail, \$3.75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplied.

Queries

Mechanic.—It is not uncommon for "doctors" used in turning shafting to vary the size of the work. It would seem that if the tool were started true and were well fitted that the shaft would be uniform except in the wear of the cutter. It is not so, and irregularities are often caused by taking too much cut; by small pieces of iron getting caught in the parts that fit the shaft. Too much cut is a frequent cause of trouble; 1-32 is ample to remove at the last finish if the work has been well roughed off.

C. J. L., of Ill.—Mr. Jurgens's magnet would tend to stop the rotation of his lower wheel rather than prolong its revolutions.

S. C., of Ky.—It has been questioned whether a message was ever transmitted by the first Atlantic cable, but no one who has examined the evidence has any doubt on the subject. A considerable number of messages were sent before the cable gave out. Water is slightly compressed by great pressure, but not enough to float the cable—it goes to the bottom. All your suggestions have been very thoroughly considered by able electricians. In writing for 40,000 people to read you should never write hastily—it is inexcusable.

E. H. M., of Conn.—The French consul at this port would probably forward you all the information that you may wish in regard to the Paris International Exhibition of 1867.

S. A. W., of Mich.—Your explanation of the rolling of a glass rod toward the fire when resting near its end on two parallel bars has already been published. The heat expands the side next the fire, causing a curve, which drops down, thus rolling the rod.

J. W. B., of Ohio.—We have illustrated magneto-electric machines, invented by H. N. Baker, Birmingham, N. Y., and by Mr. Beardsley, of Greenpoint, L. I. They are also manufactured by B. Pike, Jr., of this city. The current is a succession of waves.

J. S. L., of Ill.—If you will send us an intelligible description of your drying house, carefully prepared, and legibly written in ink on one side of the paper, we will publish it.

F. N. B., of Cal.—We are unable to tell you in what number of the paper you will find the statement you refer to.

J. S. M., of Ky.—Any grease will make paper watertight. If you want something tasteless and free from any chemical action, probably paraffine would best answer your purpose.

A. H. T., of Pa.—Benjamin Pike & Sons, No. 518 Broadway, in this city, manufacture microscopes.

J. H. G., of N. Y.—Your plan for producing perpetual motion, by having a water-wheel pump up the water which passes through its buckets, to be used over again to drive the wheel, is one of the oldest schemes for perpetual motion. With a good overshot wheel you could raise about 70 per cent of the water, and with the very best turbine, 88 per cent.

A. B., of West Va.—It is not probable that the shale which you send contains any silver. It will cost you \$5 to have the sample tested so as to settle the question.

A Subscriber, from Nantucket, sends us a good plan for unloading hay, which, we think, could be patented.

P. J., of Pa.—We received your drawings and money, which we acknowledged by letter, August 22. On the 1st of September we sent report of preliminary examination, also by mail; and we have lately written you again. Our letters were all directed as specified in your letter.

G. F. G., of N. J.—Putting out fires by steam is old. Operating railroad brakes by steam is also an old idea.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of \$2. 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 always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our receipt of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

ANNULAR (DIAMOND) DRILL.—THE ANNULAR Drill Company, of New York, are now prepared to furnish their machines to order, for all purposes of mining, tunneling, quarrying and rock blasting. County and State Rights for sale. Subscriptions to a part of the working capital stock received at office of Riker & Co., No. 73 Broadway; Batterlee & Co., No. 70 Broadway; Morris & Wheelwright, No. 72 Beaver street, or at the Office of the Company, No. 10 Pine street. **J. WALES, Treasurer.**

A PRACTICAL CHEMIST, FOR SEVERAL YEARS connected with a large manufacturing establishment, desires an engagement. Best references given. Address **CHEMIST, Box 167, New York City.**

OFFICE DEPOT COMMISSARY.
FORT MONROE, Va. September 27, 1866.
GOVERNMENT SALE OF WHISKY.—SEALED PROPOSALS (in duplicate) are invited and will be received by the undersigned at this depot until 12 o'clock M. on the 13th day of October, 1866, for the sale of one thousand seven hundred and fifteen (1,715) barrels of whisky, more or less, as follows, viz:—
Lot No. 1.—Consisting of ten hundred and sixty seven (1,067) barrels of Rectified Whisky, originally inspected in April, May and June, 1864, and January, 1865, containing about forty two thousand three hundred and forty five (42,345) gallons. Proposals for ten (10) barrels and upward of this lot will be received.
Lot No. 2.—Consisting of four hundred and sixty (460) barrels of Pure Copper-distilled and Superior Bourbon Whisky, originally inspected in February, 1865, containing about eighteen thousand four hundred and ninety eight (18,498) gallons. Proposals for five (5) barrels and upward of this lot will be received.
Lot No. 3.—Consisting of one hundred and twenty (120) barrels of Pure Rye Whisky, originally inspected in February, 1865, containing about four thousand eight hundred (4,800) gallons. Proposals for three (3) barrels and upward of this lot will be received.
Lot No. 4.—Consisting of sixty-three (63) barrels Pure Old Rye Whisky, originally inspected in February, 1865, containing about two thousand five hundred and twenty (2,520) gallons. Proposals for two (2) barrels and upward of this lot will be received.
Lot No. 5.—Consisting of five (5) barrels Pure Old Bourbon Whisky, originally inspected June, 1864, containing about one hundred and sixty-three (163) gallons. Proposals for one (1) barrel and upward of this lot will be received.

The whisky was originally selected with great care, and is all pure and of prime quality. The Rectified was designed for issue to the troops in the field, and the Bourbon and Rye for sale to officers, and are equal if not superior to any whiskies now in the market; has all been regauged within the present month, and is in excellent order, packages being of the best quality.

Samples of the whisky can be seen and blank proposals can be obtained at the offices of the following-named officers of the Subsistence Department, viz:—

Colonel H. F. CLARKE, A. D. C. and A. C. G. S., New York.
Brevet Brigadier-General THOS. WILSON, C. S., Baltimore, Md.
Major GEORGE BELL, C. S., Washington, D. C.
Captain THOMAS C. SULLIVAN, C. S., Richmond, Va.
Captain E. D. BRIGHAM, C. S., Boston, Mass.
Captain J. B. WIGGINS, C. S., Philadelphia, Pa.

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The Hon. Thomas C. Theaker, who has just been appointed by President Johnson Commissioner of Patents, is emphatically a self-made man. His education—eminently qualifying him for the honorable and responsible position he now occupies—has been acquired in the workshop. Though a practical mechanic, of great and varied experience, he has all his life aimed at something higher than mere practical skill as an artisan, and has made himself a proficient in the science of mechanics. He is an inventor, also, and has, previous to his official connection with the Patent Office, taken out several patents for ingenious and useful improvements in the mechanic arts.



HON. THOMAS C. THEAKER.

Mr. Theaker was born on the first of February, 1812, in York County, Pennsylvania. In 1830, when eighteen years of age, he removed with his father's family to Belmont County, Ohio. Soon afterward he became a house carpenter and joiner, commencing his apprenticeship to the business in Zanesville, Ohio, and concluding it in Wheeling, Virginia. While still quite young, he learned, also, the art of machine pattern making. Subsequently he became a skillful millwright, which business he successfully followed a number of years in various parts of Ohio. About twenty years ago, Mr. Theaker established an engine and machine shop at Bridgeport, Belmont County, Ohio, and carried on the business some twelve or fifteen years, giving all the various branches of work there done his personal supervision, and becoming master of all.

In the fall of 1858, Mr. Theaker was elected to Congress from the Belmont district, and was a member of the House of Representatives during the two stormy sessions which immediately preceded the breaking out of the late rebellion.

On the incoming of Mr. Lincoln's Administration, he was strongly recommended by numerous members of Congress with whom he had served, and others, for the office to which he has just been appointed; but, on the accession of Mr. Holloway to that place, he accepted an appointment tendered him by the President on the Board of Examiners-in-Chief, which had just been created by an act of Congress. In that capacity, as most of our readers are aware, he has served with ability ever since.

Mr. Theaker's past history gives an assurance to that valuable class of our fellow-citizens with whom the great majority of useful inventions originate—the mechanics, artisans and workingmen—that his sympathies will always be with them, and that the interests of inventors will be safe in his hands.

Aluminum.

Dr. N. C. Fowler, of Yarmouth, who has been experimentally working in aluminum for several years, exhibits, at the Boston Fair, many articles of dentistry and ornamental work fabricated from that new material. His specimens were reduced from Cape Cod clay by himself, and attest in a remarkable manner the hardness and strength, as well as the light-

ness and material, of this singular metal, the processes of working which are in such singular contrast with the methods of treating other minerals. It is not oxidizable, and its specific gravity is below that of rubber, 25 sheets of aluminum, which Dr. Fowler exhibits, weighing but five-eighths of a grain, while the same number of gold sheets of equal size weigh six grains. Some beautiful specimens of embossing with this material are shown.—*Boston Advertiser.*

[Aluminum is less readily attacked by acids than most metals, but it is not strictly true that it is not oxidizable. A considerable portion of every brick wall and every bank of clay is the oxide of aluminum. Clay is the silicate of alumina—silica and alumina—and alumina is the oxide of aluminum.—*Eps. Sci. Am.*

On the 4th inst., a rope swinging from a water tank on the Chicago and Northwestern Railroad, by a curious result of the laws of motion, wound itself around the neck of N. W. Danks, of Chicago, who was standing on the platform of a car looking off, and as the train dashed by he was jerked off and hung suspended till the train passed by, when the rope unwound and he fell to the ground insensible, but was restored to consciousness. So relates a Chicago paper.

In a vacuum, all electrified bodies speedily lose their excitement, while in a dry, dense air, they retain it longest. Nevertheless, slight electrical excitement can be produced in a vacuum by friction.

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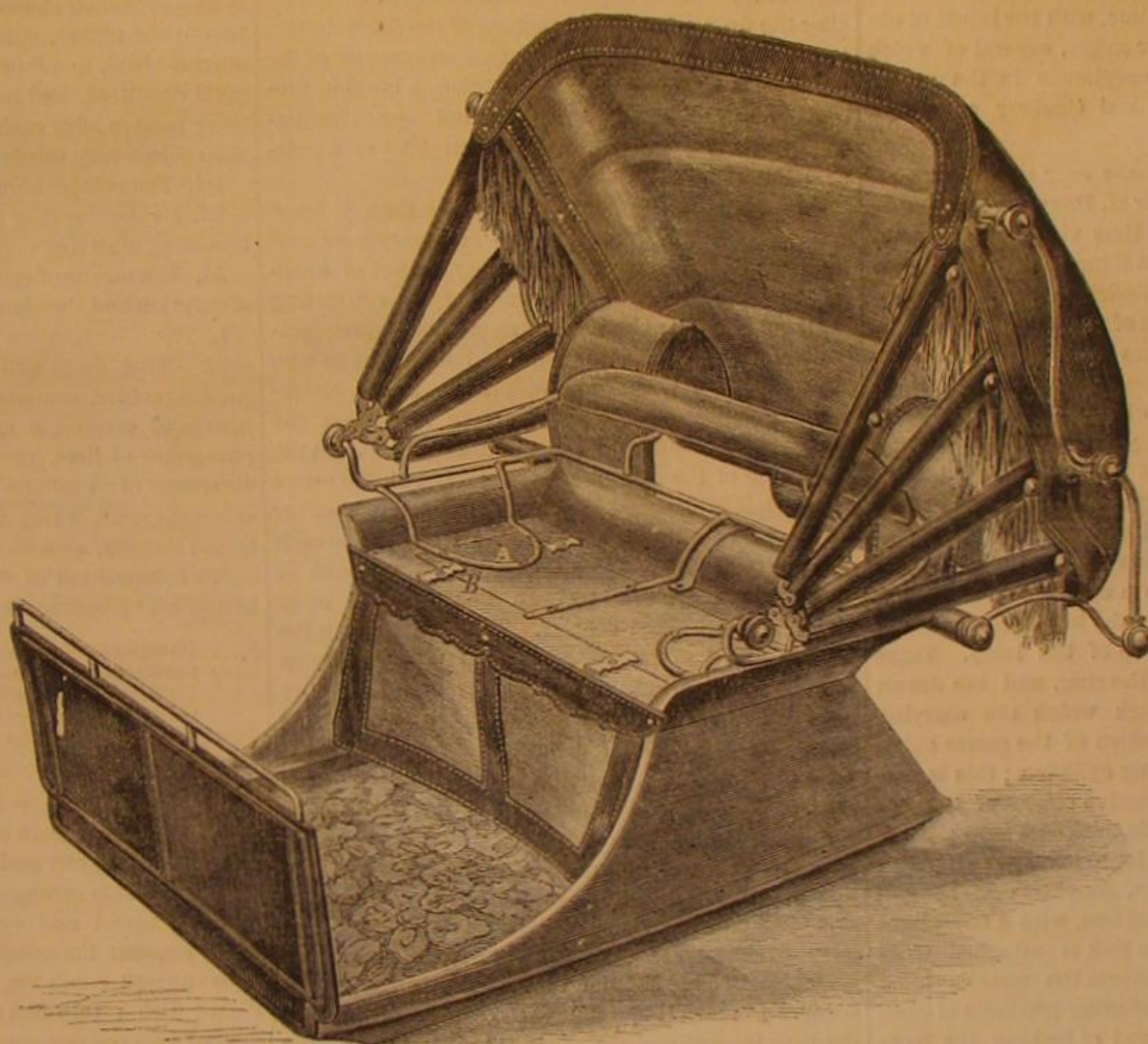
Improved Carriage Top.

The seat of a buggy is usually made with a frame and a bottom fastened therein. In this improvement the frame is provided with two bottoms, but instead of being fastened permanently, fits loosely. The first or upper bottom is about an inch thick, and has the arms, which support the top, bolted or riveted to it; when the top is on the vehicle it is held in position by the buttons, B. The second or lower bottom, in Fig. 2, may be made of half-inch stuff, with pieces fastened across the under side to strengthen it. This bottom sinks below the level of the seat frame, the thickness of the first bottom, and has a piece of leather fastened upon it to form a handle by which to lift it out, which also forms a kind of spring for the first bottom to press upon and prevent rattling. This bottom rests on two metal bars, which are provided with journals or pivots, D, not in the center, but entirely on one side, and are suspended in hangers let in and screwed to the inside edge of the seat frame. The first or upper bottom, when on the vehicle, rests on the seat frame on the irons, which project over the ends and sides.

To remove the top, turn the buttons, lift it out of the frame and set it aside, then raise the lower bottom by means of the leather strap, turn up the bars, C C, which leaves a depth equal to the thickness of the bottom below the level of the seat frame; place the bottom on the bars—which are provided with flanges to prevent them from turning down—and turn the buttons. The

requiring some time and considerable patience to detach the top.

In this improvement the top can be taken off in a few minutes, and leaves no indication that there ever was one on the vehicle; besides, it is more substantial—taking all the weight and strain off the sides and back of the seat, which will, in the old plan, in a short time, break the joints in the corners.



KING & GARDNER'S CARRIAGE TOP.

These shifting tops can be made at the same cost as the old ones, except the expense of the two bars and their hangers, which are of malleable iron, and weigh about one pound and a half.

We regard this as a most convenient and durable arrangement. It was patented May 30, 1865. For further information or the purchase of rights, address the inventors, King & Gardner, Lexington, Ky.

Petroleum as Fuel.

A correspondent says:—At well No. 37 they were burning crude oil for fuel, and used two and one-half to three barrels per day. As oil is worth about \$2 net, the cost is \$5 to \$6 per day. Wood or coal would cost two or three times as much. A pan is placed on the ash-pit containing a layer of broken brick or other porous earthy material. A pipe with an elbow on the end, to turn the mouth up, leads from a reservoir and delivers the oil slowly over the middle of the pan, in suitable quantities, regulated by a cock.

The Boston correspondent of the Springfield Republican reports that the Hoosac Tunnel workers have met with great obstacles at the west end, and that a hundred thousand dollars or more have been wasted there in attempts to excavate, which cannot succeed on account of soft rock and water,

Crayons.

Slender, soft, and somewhat friable cylinders, variously colored for delineating figures upon paper, usually called chalk drawings. Red, green, brown, and other colored crayons, are made with fine pipe or china clay paste, intimately mixed with earthy or metallic pigments, or in general with body or surface colors, then molded and dried. The brothers Joel, in Paris, employ as crayon cement the following composition: 6 parts of shellac, 4 parts of spirit of wine, 2 parts of turpentine, 12 parts of coloring powder, such as Prussian blue, orpiment, white lead, vermilion, etc., and 12 parts of blue clay. The clay, being elutriated passed through a hair sieve, and dried, is to be well incorporated by trituration with the solution of the shellac in the spirit of wine, the turpentine, and the pigment; and the doughy mass is to be pressed in proper molds, so as to acquire the desired shape. They are then dried by a stove heat.

In order to make cylindrical crayons, a copper cylinder about two inches in diameter, is employed, and $1\frac{1}{2}$ inches long, open at one end and closed at the other with a perforated plate, containing holes corresponding to the sizes of the crayons. The paste is introduced into the open end, and forced through the holes of the bottom by a piston moved by a strong press. The vermicular pieces that pass through are cut to the proper lengths and dried. As the quality of the crayons depends entirely upon the fineness of the paste, mechanical means must be resorted to for effecting this object in the best manner.

General Lomet proposes the following composition for red crayons. He takes the softest hematite, grinds it upon a porphyry slab, and then carefully elutriates it. He makes it into a plastic paste with gum arabic and a little white soap, which he forms by molding, as above, through a syringe, and drying, into crayons. The proportions of the ingredients require to be carefully studied.

Various formulæ have been given for the formation of lithographic crayons. One of these prescribes, white wax, 4 parts; hard tallow soap, shellac, of each 2 parts; lamp black, 1 part. Another is, dried tallow soap and white wax, each 6 parts; lamp black, 1 part. This mixture being fused with a gentle heat, is to be cast into molds for forming crayons of a proper size.—Dr. Ure.

The Polytechnic Association resumed its sessions on the 28th of September. The meetings are opened at 7½ P. M., every Thursday, and are free to all.

The Fair of the American Institute closes on the 19th inst.

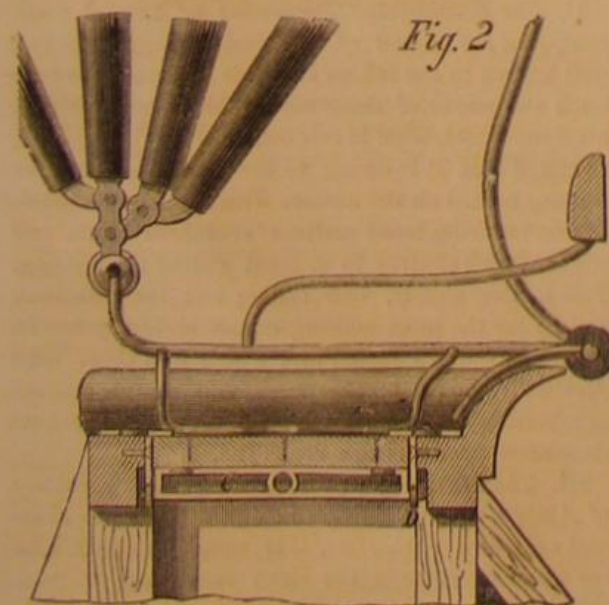


Fig. 2

seat is now level and ready to receive the cushion. The ordinary mode of attaching and detaching the top is by means of a number of nuts; these are liable to be lost or have the threads stripped, besides

SAFETY LAMPS.

The safety lamp, as originally introduced by Sir H. Davy, in 1816, consists essentially of a common oil lamp, whose flame is isolated from the external atmosphere by a metallic envelope perforated with numerous small holes, a cylinder of wire gauze being generally employed. The holes are large enough to allow air to pass into the flame, and the products of combustion to flow freely; but owing to the cooling effect of the wire bars or walls of the apertures no gases in a state of ignition can pass through, the temperature being reduced by the metal below that necessary for the production of flame, so that in fiery mines, where carbureted hydrogen gas is present in the air in sufficient quantities to form an explosive mixture, only such portions as may be brought into direct contact with the flame of the lamp can be ignited, the explosion being confined within the wire cage, if the apertures be sufficiently small. The limit of safety for gauze of iron wire is placed at 28 parallel wires to an inch, or 784 apertures to the square inch, or about 1-5,000th of a square inch surface for each hole.

Various modifications of the above principles have been adopted from time to time, with the intent of obtaining more light or greater safety, several of which are represented in the 23 specimens in the collection at the Museum of Practical Geology at Jermyn street.

The Two First Safety Lamps ever used in a Coal Mine.—They were sent by Sir H. Davy, in 1816, to the Rev. John Hodgson, at the time vicar of Heworth, and presented by him to Miss Emma Trevelyan. They are of small size, having cylindrical copper oil vessels surmounted by chimneys of thin brass wire gauze, of a much finer mesh than has been employed subsequently. The gauze is protected by a cage of three vertical bars of stout iron wire fixed to a flat brass roof, into which the carrying ring is secured by a swivel joint. These are not to be confounded with Sir Humphry Davy's first experimental lamp, in the possession of the Royal Institution.

Common Davy Lamp.—This is one of the simplest forms of safety lamp. It has a cylinder of black iron wire gauze of 784 apertures to the inch, set in a brass ring, which screws on the top of the lamp. Three upright wires are fixed to the ring, and are drawn into a loop at the top, through which the carrying link is secured. The top portion of the gauze chimney is made of two overlapping cylinders; this is rendered necessary by the destructive effects of the hot gases on the iron wire, a single thickness being liable to be burnt into dangerously large holes at this point.

Davy Lamp, by H. Watson, Newcastle-on-Tyne.—This resembles the preceding one, with a few slight modifications. The carrying link is attached to an arched brass roof, which protects the miner's hand from being scorched by the escaping products of combustion. The common method of locking the Davy lamp is also shown. This consists of a simple screwed bolt pointed at the end, with a square head fitted with a key resembling a common watch key, which passes through a nut cut in a square boss attached to one side of the oil vessel, until the point is received in a hole drilled through the lower brass ring of the cage carrying the gauze. The bolt is of such a size, that when the lamp is locked the key end is sunk level with, or a little below, the outer face of the boss, so that it cannot be unscrewed by the mere use of the fingers. In all cases a vertical wire hooked at one end is provided for trimming the wick; it slides through a tube passing through the body of the lamp.

Davy Lamp, for Burning Gas.—This is an extra large lamp, which was, for experimental purposes, for the use of the Royal Commission on Mines. It has no special peculiarities, beyond the substitution of a common single jet gas-burner, for the oil lamps of the preceding examples. The gauze case is doubled through a considerable portion of its length, only about one inch immediately above the flame being single.

Davy Lamp, with Condenser, by Newman.—The gauze of this lamp is doubled in a similar manner to that of the following. The single part is covered by a plano-convex or bull's-eye lens, set in a square brass frame, attached to two of the stay bars of the cage, for the purpose of concentrating the light.

Davy Lamp, from Helton Colliery.—This is more slightly built than the preceding lamps, and is almost entirely made of brass. A curved horn shade is arranged so as to slide on two of the stay bars; it is added to protect the light from being directly acted on by currents either of air or gas. Many accidents have taken place with Davy lamps when exposed to sudden discharges of gas from coal; when the gauze becomes red-hot, and if the flame is blown to one side, the wire network is no longer capable of preventing the external atmosphere from taking fire, as the flame will, under these circumstances, pass through the holes.

Dr. Clanny's Safety Lamp.—This differs from the Davy lamp in having the lower portion of the gauze cylinder, the part immediately above the flame, replaced by a stout glass tube for the purpose of giving more light. The glass is of larger diameter than the gauze cylinder; it is mounted between two brass rings, connected together by six vertical stays, and is attached by one locking bolt to the lamp below, and by a second to the cage carrying the gauze above. The air for feeding the flame enters through the lower part of the gauze, and has to travel downward, but there is no special contrivance directing it, or for forcing the draught. The advantage of the glass in this lamp is more apparent than real, as on account of the great thickness of the glass envelop, a notable proportion of the light is absorbed, and the illuminating power is not much greater than that of a common Davy lamp.

Self-extinguishing Lamp, used at the Earl of Lonsdale's Collieries at Whitehaven.—This lamp is so contrived as to become extinguished by the act of opening, in order to prevent the miner from converting his lamp into a naked light, as is not unfrequently done with the common locked lamp by men who have obtained possession of private keys. Externally it resembles a common Davy lamp, but the lower ring or cap of the cage is unusually deep. On the inner side of the cap, above the thread of the screw by which it is attached to the lamp, is a thin shelf or plate of iron cut through in two places opposite to each other, leaving two notches about half an inch in width, which are filled by two wedge-shaped arms movable about fixed centers. The tube holding the wick is also cut through, having two narrow slits opposite each other, extending through its entire height. To the top of the oil vessels are attached two unequal-armed levers, but in such a manner that the arms make an angle of about 100° with each other; the longer ones are tapered to a narrow chisel edge, somewhat less in breadth than the slits in the wick-holder, and are maintained by steel springs in a nearly vertical position when not in use, the shorter arms being at the same time horizontal. The latter have peculiarly shaped tails, forming transverse wedge-shaped blocks, the thickened ends having the corners rounded off. When the cap is screwed on the long tapered wedges attached to the cap pass over the upper surfaces of the wedge-ended arms of the angle levers without moving them, but on reversing the motion the points of the hinged wedges come in and pass underneath those on the shorter arms of the levers, so that the longer arms are depressed, and drive the wick downward in its tube. The action of the springs bring the longer arms back to the vertical position, as soon as the notched part of the plates arrive opposite to them, but they are immediately driven down again by the second hinged wedge, the result being an irregular jerking pressure on the wick, which extinguishes the flame before the cap and gauze cage are completely unscrewed from the lamp.

Self-extinguishing Lamps.—The lamps of M. Du-brulle, Lille, France, are similar in principle to that last described, but are differently constructed. The oil vessels are urn-shaped, and are made of zinc; one has three equi-distant studs projecting from its outer surface, which fit into three corresponding clutches in a covering plate forming the lower part of the cage. The locking bolt is a bent iron wire contained within the oil vessel, with a straight portion at the upper end, which passes through a hole in the top of the lamp, and is received into a hollow boss lined with brass in the covering plate. The bolt is maintained in position by a curved copper spring, also within the oil reservoir. The wick, formed of a single thickness of flat cotton plait, is held at the lower end by an iron clip

with a short projecting arm, carrying a screwed nut, through which passes a vertical screw for raising or lowering it. The iron locking bolt is also provided with a projecting arm, with a round socket or eye, through which the vertical rod passes loosely, and it is only when the lower edge of the collar on the wick-holder is brought in contact with this arm that the bolt can be withdrawn; but this can only occur when the flame is extinguished by the withdrawal of the wick within its case. In putting the cage on, when the lamp is trimmed, the open parts of the clutches are brought over the studs, sufficient pressure being exerted to press back the locking bolt; the cage is then turned through a small angle to make the clutches take hold of the studs, and when the latter are in position the bolt springs up into its seat, and cannot be again withdrawn without screwing down the wick, as described.—*London Mining Journal.*

ON THE REVIVIFICATION OF ANIMAL CHARCOAL

BY HENRY MEDLOCK, PH. D., F. C. S., M. P. S.

The principal source of expense in a sugar refinery is that of animal charcoal, and it is a great desideratum to the refiner, commencing with the use of new animal black, to adopt a means of keeping his coal in good condition, and retaining unimpaired its decolorizing powers after each successive use. I will treat the subject very briefly under the following heads:—

1st. The composition of bone and animal charcoal.
2d. Its decolorizing property, and the causes of its becoming inactive.

3d. The means of restoring its primitive powers of absorption and decolorization.

I. *The Composition of Bone and Animal Charcoal.*—Bone, as is well known to anatomists, is a solid structure, composed principally of phosphate of lime and osseine, a modified form of gelatin. The phosphate of lime, or solid portion of the bone, is composed of an infinite number of minute, almost microscopic cells, which are filled up by osseine, and bound thereby, as with a cement, into a solid mass.

The composition of bone, after the removal of adhering fat by boiling, is as follows:—

	Per Cent.
Phosphate of lime.....	63.1
Carbonate of lime.....	1.4
Phosphate of magnesia.....	2.1
Other salts.....	2.4
Osseine.....	31.0
Total.....	100.0

When submitted to heat in a closed vessel, to which air cannot gain access, the osseine is decomposed, evolving oily and ammoniacal products, which are, by suitable arrangements, collected and applied to many useful and economical purposes. In the retort remains the cellular structure of the bone in a most porous condition, each cell and pore being coated with a thin film of finely divided carbon, resulting from the decomposition of the organic osseine.

The purely chemical reasons why the porous animal charcoal should possess such extraordinary decolorizing and general absorptive properties, is a question I need not enter into, but I shall do so fully in a forthcoming pamphlet.

II. *The Decolorizing Properties of Animal Charcoal, and the Causes of its becoming Inactive.*—It is well known to the refiner that his charcoal too soon loses the power of decolorizing his sirups, and the question arises, what is this owing to? It is, *a priori*, assumed that it is owing to the grains of coal becoming coated on the surface with the slimy aluminous and mucilaginous matters contained in the raw sugar, which destroy to a great extent its porosity. This is, doubtless, one cause; but the principal, and by far the most serious, cause is the presence of lime in the raw sugar, and which in a short time effectually chokes up the pores, and in the process of reburning cannot be removed, although the mucilaginous materials are destroyed.

III. *The Means of Restoring its Primary Powers of Absorption and Decolorization.*—When the charcoal ceases to decolorize, it is usually washed with hot water to remove the sirup remaining therein, and then reburned in closed furnaces of various construction, the object of reburning being to carbonize the coloring matters extracted from the sirups. This restores to some extent the decolorizing powers of the charcoal; but at each successive reburning

the coal continues to lose its properties, and at last ceases altogether to act as a decolorizer, unless it is mixed, after each reburning, with a certain portion of new charcoal.

Another process, and one frequently adopted, is to destroy the organic matters by keeping the charcoal in water and allowing it to ferment for several days, adding fresh water containing about $\frac{1}{4}$ to $\frac{1}{2}$ per cent of hydrochloric acid. The little acetic acid formed, and the hydrochloric acid added, dissolve a small quantity of lime, and so far act beneficially. But the good effect is more than neutralized by the fact of the acids attacking the structure of the bone itself, namely, the phosphate of lime, thus rendering the coal friable, and consequently making much dust and waste.

Having referred to the two methods in common use of revivifying the decolorizing powers of charcoal, and alluded to their inutility and defects, I will describe a new method, as simple as it is ingenious, of rendering old and comparatively useless charcoal as good, and, indeed, better than new. Corenwinder, an eminent German chemist, has, by numerous experiments, established the following axiom, namely:—

"That the decolorizing power of charcoal used in sugar refining is correlative to its power of absorbing lime."

In other words, the more the pores of the coal become choked up with lime the less is its power of decolorizing. Now, to remove the obnoxious lime without attacking the structure of the bone itself, is a question which has occupied for many years the ingenious mind of my friend, Edward Beanes, C. E., F. C. S.

Mr. Beanes, who, by his chemical researches on the sugar plantations of Cuba, has enabled the planters not only to produce much finer qualities of sugar, but considerably to augment their produce, has recently patented a process of restoring to charcoal its primitive properties of decolorizing sirups. Mr. Beanes found that charcoal, perfectly dry and hot, absorbs dry hydrochloric gas with the greatest avidity and in enormous quantity. The gas combines with the lime and converts it into soluble chloride of calcium. After the charcoal has been treated with gas, a portion of untreated charcoal is mixed up with it; the combined gas remaining in the pores of the former is taken up by the latter, and the whole becomes neutral; the chloride of calcium is then washed out—requiring only a few hours—and the charcoal is afterward burned in the usual way. It is then found that the decolorizing power of the charcoal is augmented at least 100 per cent.

The advantages of Mr. Beanes's process are as follows:—

1st. It removes the whole of the lime and carbonate of lime from the pores without attacking the phosphate.

2d. It augments the decolorizing powers of the coal upward of 100 per cent.

3d. It requires no expensive apparatus, and the process is almost costless, two saleable products being obtained nearly equal in value to the materials employed.

I have thus ventured to introduce Mr. Beanes's process to the notice of English refiners, not simply from feelings of personal friendship, but from the firm conviction that by its general adoption he will confer as great a benefit on his own countrymen as he has already conferred upon the sugar manufacturers of Cuba.—*London Chemical News.*

THE FAIR OF THE AMERICAN INSTITUTE.

The room is now filled with articles on exhibition, and the large attendance promises to make the fair a pecuniary success—a more favorable result than has been realized in many years. We continue our notice of objects of interest.

FRENCH SELF-FASTENING BUTTONS.

This invention is interesting principally on account of the high price for which the patent was sold—\$125,000 in money. The shank is made separate from the button; it consists of a small plate, which comes against the back side of the cloth, and a central stud or hook. The hook is caught into the eye of a stout needle, which is passed through the cloth, dragging the hook after it; an india-rubber

washer is then slipped over the hook, and the button is pressed upon it and given a quarter turn, which fastens it securely. A button is thus put on in an instant without any sewing. The agent of the company is W. B. Watkins, No. 80 Reade street, New York.

COLLECTION OF MINERALS.

Mr. C. Chipman exhibits an interesting collection of minerals, among them two masses of copper ore, weighing, one 300 pounds, and the other 240 pounds. They are mixtures of red oxide and native copper, containing 90 per cent of metal. They are from Del Norte County, California. The vein is from six to eight feet in width, five miles in length, and of unknown depth—one of the most valuable mines in the world. In the collection are the following minerals, all picked up by Mr. Chipman on this island:—

Serpentine, pyroxene, staurolite, graphite, tourmaline, mica, talc, molybdenite, apatite, amianthus, garnet, actinolite, vivianite, lamellar feldspar, apophyllite, rutile, epidote, pyrites, stilbite, quartz, magnetic iron.

TRAVELING INSTRUMENT.

Messrs. Schon & Hull, of Lafayette Ind., exhibit a very novel and ingenious machine for running lines of levels in surveying and making profiles of the ground. Two brass wheels, about 2½ feet in diameter, and following one after the other, support a light carriage which bears a heavy pendulum connected with clock-work. The pendulum maintains its vertical position, and the inclination of the carriage varies the position of a pencil pressing against a slowly revolving cylinder, so as to draw a line corresponding with the profile of the ground passed over; at the same time index hands are turned to give the altitude in feet and fractions. In ascending, the pencil must be carried outward along the cylinder with a rapidity proportioned to the rapidity of the ascent; in descending, it must be drawn in the opposite direction with the same relative motion; while on level ground, it must be held in a constant position. These motions are effected by a very simple device. A horizontal wheel has a vertical wheel pressing upon it and driving it by friction—the position of the vertical wheel depending upon the inclination of the carriage. When the vertical wheel presses upon the center of the horizontal wheel, the latter is not turned in either direction; when the vertical wheel is on one side of the centre of the horizontal wheel, the latter is turned in the direction to carry the pencil outward along the cylinder; and when upon the opposite side it is turned in the direction to carry the pencil inward.

This instrument would enable one man to run five to ten miles of levels in a day, instead of the three men usually employed to run from one to three miles, and it is probable that the levels would be sufficiently accurate for preliminary surveys. Of course, no engineer would trust to such a machine in the final location of a line, or in laying rails, though it might answer for taking cross sections and setting slope stakes.

BRICK-MAKING MACHINE.

Messrs. Chambers, Brother & Co., of Philadelphia, exhibit a working model of their novel brick-making machine. It consists of a conoidal iron vessel, with a rotating shaft in its axis, the shaft being furnished with spiral blades, which cut and temper the clay, at the same time forcing it along toward the smaller end of the vessel, where it is finally pressed out through a rectangular opening, in a continuous bar, of the proper size for a brick. This bar is borne along on an endless belt to a revolving wheel, carrying a knife, which cuts the bar into pieces of suitable length for brick.

THE PEOPLE'S CLOTHES WRINGER.

This machine has its rolls constructed from cork; in other respects it is like those usually sold. It is said to be very efficient and durable, being particularly adapted to wringing clothes hot. No. 494 Broadway, New York.

PLASS'S NIGHT-LAMP ATTACHMENT.

This invention consists of a novel appliance for closing the wick of a kerosene lamp so as to diminish the flame. It is stated to be free from the disagreeable odor attending the common method of lowering the flame. No. 110 East 29th street, near Third avenue, New York.

THE "KAPUO KATHAIRIO."

This somewhat ponderous title is affixed to several highly-finished wooden pipes of peculiar shape. It is defined by the inventor as "smoke purifying," and is intended to deliver smokers from the bad effects of the nicotine in the weed. It is constructed with a cavity at the bottom for the oil and another near the top of the bowl on one side, and still another cavity at the bottom; these are connected by passages which look like the letter N, the cavities being at the angles of the top and bottom. A piece of sponge is placed in the top, and the smoke is purified in passing through it.

LEAD BURNING.

A curious specimen of workmanship is shown by Paul Marcellin of No. 13 High street, Brooklyn; it consists in a peculiar process whereby sheets of lead are joined homogeneously by being burnt to each other—the point of junction being invisible and the surface almost as smooth as the sheet itself. It is very strong, and is much used by chemists and manufacturers.

BOILER-TUBE BRUSHES.

Brushes of wire arranged spirally have been used for some time in cleaning tubes which have become incrustated with soot and ashes. The New England Tube Brush Company exhibit some of these brushes made of flat wire, not round. They are made of spring-tempered steel wire, and act as cutters by reason of the square ends.

TOSHACH'S WINDOW CATCH.

This article is a very efficient one for the purpose. Car windows, as generally furnished with these things, are continually out of order, and can be set at certain points only. This catch allows the window to be set anywhere, and is easy to manufacture. Wm. Toshach, No. 54 William street, New York.

OSCILLATING ENGINES.

Wm. D. Andrews & Bro. make a large display of their peculiar oscillating engines. The cylinders of these engines take steam by vibrating past ports in a fixed chest at the bottom, and they work with great rapidity and ease. They are shown in connection with Andrew's centrifugal pumps, No. 414 Water street, New York.

CANNED FRUIT.

C. C. Williams, of No. 9 Barclay street, exhibits some beautiful specimens of canned fruit in self-sealing jars. Nothing can exceed the clearness of the sirups or the perfection of the colors in the several varieties.

A POCKET LANTERN.

This is a neat little affair, intended to shed light in dark places, and to be always found when wanted; in a word, to be carried in the pocket. It is made of tin, neatly lacquered; it folds up about the size of a small testament, and is a very useful thing to travelers and others. New York Lamp Company, No. 259 Pearl street.

A. & F. BROWN'S ENGINES.

This firm exhibit one of their oscillating engines and steam pumps; the engine is exceedingly neat in design, strong and well proportioned, and receives steam through an ordinary slide valve worked beneath the cylinder. Such an oscillating engine can be easily repaired, if necessary, by any mechanic, and is quite economical of fuel. Any length of stroke can be had, which is not the case with some other kinds. The exhibitors of these engines append a card to them stating that they will be shown in motion when steam is up. From this we infer that steam is not generally "up," and we have been waiting some time to learn why. The pump shown by Messrs. Brown is highly approved of.

NO STEAM.

We have been waiting some time to see the steam pumps in operation, but have not been gratified. For some reason or other no steam is furnished to one half the machines, and those who go in the morning, as we do, are apt to be disappointed.

This is the second week of the Fair, but yet the concern is not complete or perfect, and engines are being erected and other operations carried on which ought to have been finished before the Fair opened. If the machinery is to be shown in motion, why not put it in motion, and not disappoint hundreds of people who come from a distance?

Improved Grain Separator and Cleaner.

This machine is intended to clean and separate grain at thrashing—by one and the same operation—from smut, chaff, cockle, bad grain, seeds, and all other impure stuff, as dust, chaff, sticks, and all kinds of rubbish which destroy its appearance and market value. It delivers the grain direct from the machine to the sack, ready for shipment. The inventor says that this machine is the most effective known; there is no shaking motion about it to impair its durability, but it runs regular and steady.

This machine is also economical for thrashing and cleaning barley; it delivers it separated and clean of beards in the sack ready for market; most other machines deliver barley so bearded that it must be

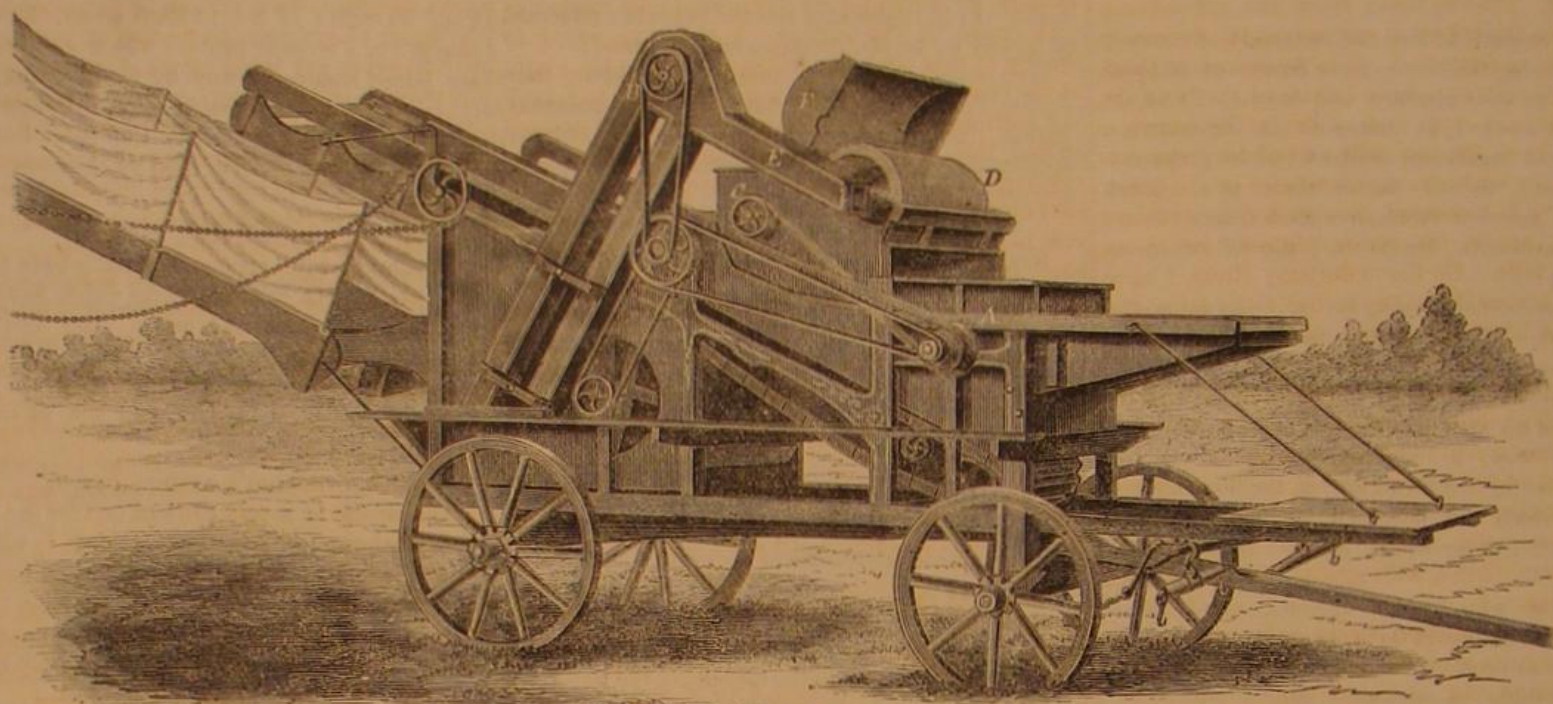
After the grain is thrashed and deprived of its straw and chaff, it runs from the coarse riddle with all the heads, sand, seeds and stuff mixed with the grain, to the elevator at the bottom of the thrasher. The elevator carries it up and empties it in the spout, E; this leads it to the revolving screen, which has two different sizes of mesh—the first one fine, which sifts all the fine particles out through a chute, from which it emerges, finally, into any receptacle. The heavier and coarser particles run further, to the coarser mesh, from whence the good grain subsequently drops into the screw conveyer; still coarser stuff—such as wheat heads, stones, sticks of wood and weeds, drop out at the end of the screen into another chute. A small conveyer, not shown, driven

FARMERS' CLUB.

After its summer recess, the Club, on the 26th of September, resumed its weekly sessions, which are held Tuesday afternoons, at Room 24, Cooper Institute—the meetings opening at half-past one o'clock, P. M., and being free to all who choose to attend. As usual, the faithful President, N. C. Ely, Esq., was in the chair. The SCIENTIFIC AMERICAN not being an agricultural paper, it is our practice to select for publication only such portion of the proceedings of the Club as we suppose will be of general interest to our readers.

PLANT LICE.

Dr. Trimble, in reply to a correspondent, stated

**CLEES'S GRAIN SEPARATOR AND CLEANER.**

tramped with horses or otherwise, and cleaned over with a winnowing mill before it can be sold. It is small, light and requires but little power; it can be built at a comparatively low price; it is not in the way around the thrashing machine, and is easy on the operatives; it sets on the top of the thrasher, out of the way, and is run by a single belt.

The machine has six different outlets—the first for sand and small seeds of all kinds; the second for wheat, grain heads or unthrashed grain and coarser stuff; the third for the clean wheat or grain; the fourth for a second quality of grain, if it should be needed, for seed; the fifth for chaff, defective grain, cockle, and other seeds valuable for stock feed; and the sixth for dust, smut, chaff and other light stuff of no value, which is all blown back in the straw. Sprouted grain is taken out separately. The apparatus can be built larger or smaller to suit the thrasher for horse or steam power. It is here represented on a large steam thrasher, the photograph from which this was made being taken in the field where it operated.

This separator is shut up all round; none of the machinery or grain can be seen from the outside. It is thus well protected, and nothing can fall in accidentally to stop or break any part, and the operatives cannot be caught in it; the running parts can be oiled outside while the machine is at work, and any detail can be reached by opening the several doors and hand holes provided—items of great consideration in running machinery.

The arrangement of this separator is as follows:—the thrashing cylinder shaft has two pulleys, A and C, the smaller one driving the beater shaft, and a small pulley on the beater shaft driving the elevator, B, and pulley. The larger pulley on the cylinder shaft drives the fanning-mill pulley, at a high velocity. The fanning-mill shaft has a left-hand screw on it inside the frame, which turns a spur wheel above; the spur-wheel shaft has a bevel wheel at the other end, which drives the revolving screen, D, slowly round. There is also a screw conveyer running at a moderate speed. On the other end of the revolving screen shaft is a pulley which drives a small elevator, to convey all wheat heads dropping out of the revolving screen at the end to the thrashing cylinder; this conveyer is not seen or represented.

by the pulley on the screen shaft, carries these things back to the thrashing cylinder.

The grain which drops into the screw conveyer is carried along in a chute, from whence it falls into a suction blast tube, and finally out of the machine into a hopper; from thence into a sack, ready for market. All particles lighter are lifted up by the power of the suction blast; or, if of such a weight as to be useful, they drop on a sliding board, which is hinged at the upper end, and opened and closed as desired by an iron rod and ring; such grain drops in a middle apartment on the flap which opens after a certain weight is on it and lets the grain run out, or it can be kept separate if desired. Still lighter grain is lifted up and round in the tube and dropped out after a certain weight presses the flap open. This can be kept for stock feed if wanted. Smut, chaff, light stuff and dust are sucked in through a square and serrated opening to the suction mill and blown out over the straw.

The lifting power of the suction blast can be regulated to any degree desired by suitable mechanism. A large door can be seen at F, which opens to the revolving screen, so that it can be taken out to change the wire cloth on it with a finer or coarser mesh in a moment if wanted. There are other hand holes which are opened to do anything inside.

This separator and cleaner can be built on any thrasher now in use, old or new, without adding pulleys and belts, with a small addition of weight and but little more power; for several parts of the thrasher are removed as useless, which this separator takes the place of, so that the additional cost will be small in new machines. It has been used for two seasons with the greatest success, and on thrashers of different patents; it stood the hardest trials in all kinds of grain.

It was patented July 5, 1864, through the Scientific American Patent Agency, by J. N. Clees, of Darbyville, Pickaway County, Ohio. All manufacturers of thrashing machines interested should address the patentee at that place for State rights or other information.

ONE hundred and eighty houses in Paris are engaged in the manufacturing of piano-fortes. They employ over 2,300 workmen.

that each species of plant lice has its peculiar plant on which to live. The species are positively distinguished from each other by the number of lenses in their eyes, which may be counted by the aid of a microscope. Man has no power over these pests, but nature has provided three enemies by which they are held in check; the larvae of certain flies, the warbling birds, which, in their annual migration northward, stop during the prevalence of the aphids, and still more efficient, the lady bugs, which devour the lice in innumerable multitudes. These enemies generally obtain mastery of the aphids in the course of two or three years. At one time our hop growers were nearly discouraged by the destruction of their vines by plant lice, but the pests have now disappeared. The opinion prevails somewhat extensively that the eating of the hop vines by aphids was prevented by sowing buckwheat, but this is a mistake—the result of a mere coincidence; the aphids which live upon buckwheat are a different species from those that devour the hop plant, as the speaker had ascertained by counting the lenses of their eyes.

SIXTEEN HUNDRED DOLLARS AN ACRE FOR CULTIVATED CRANBERRIES.

Dr. Trimble invited the members of the Club present to visit Ocean county, in New Jersey, and see the fields of cultivated cranberries growing there; stating that \$1,600 had been offered this year for the product of a single acre.

THE WAY TO KEEP CIDER.

Solon Robinson, in reply to the question of a correspondent, said that the way to keep cider good, is to get it clean by repeated racking, and fining with isinglass, and then put it up in new, clean, and tight barrels. He had drunk cider put up in this way which was 17 years old, and it was equal to wine; it was the finest cider that he ever saw.

ARSENIC.—Of all metalloids arsenic is most easily isolated by electricity, for it is almost as good a conductor as a metal. By means of an apparatus (known as simple in electro-chemistry), all the metalloids they contain may be very rapidly extracted from arseniferous substances. Place a solution of arsenical matter in a platinum vessel, plunge a zinc wire into the liquid, and the arsenic will appear on the platinum; by prolonging the action the whole of the arsenic is ex-

tracted from its compound. This method may be varied in different ways, and renders valuable service in medico-legal researches; it is much superior in sensibility to the process actually in use.

FISSURES IN SAND ROCK THE RESERVOIRS OF PETROLEUM.

BY H. P. STEVENS.

[For the Scientific American.]

The paleozoic, or sedimentary strata, west of the Alleghany Mountains, have three important systems of fissures or shrinkage cracks. One generally running with the magnetic lines, or north and south; another at right angles, and the third perpendicular to the above. Besides these there are subordinate ones, crossing the others at various angles, from only a few degrees to forty-five. It is by means of these fissures that the limestones and slates of the West are so easily removed from their beds in the quarries. The longitudinal fissures will extend to great distances. In the lead-bearing limestones of the Black River country I measured one in a due east and west course, across the entire plateau, for three-fourths of a mile. On the Alleghany River, I have traced them across the valley to quite the same distance, and, in Virginia, one has been traced for many miles.

The perpendicular fissures will often reach through the whole thickness of a particular series of rocks, forming chasms many hundred feet deep.

In the great bed of coarse, pebbly, and fine-grained sandstone forming the base of the coal rocks of Pennsylvania, these latter fissures divide the rocks into immense square blocks, with spaces 10, 15, and even 40 feet between.

These fissures in ancient times were often water channels, and have since become filled with the result of such drainage, viz., cemented sands, pure silex, clays and ores. In this way we account for the iron ores of the trap rocks of Nova Scotia, the veins of jasper, spar and other minerals in the same rocks; the veins of lead in the Shawangunk Mountains, as the Erie and Ellenville lodes, and probably also the gold and silver mines of our Western States and territories. When the veins become filled with material, the course of water drainage is changed, and the waters seek some new channel. Lately we have seen in Nova Scotia the central fissure of the vein filled with mud. This is almost always seen in the lead and hematite caves of Missouri and the Galena region. One of these fissures, east and west, in the Alleghany Mountains is thus spoken of by J. P. Lesley, Esq., of Philadelphia:—"There stands this vertical, east and west running vein of solid petroleum, an evidence both of the abundance and of the antiquity of the Devonian petroleum."

A peculiar feature attending these perpendicular fissures may here be noticed. In their downward extent they will most usually be cut off by the intervention of a stratum of dissimilar nature, or composed of different material. Thus, fissures of limestone will be interrupted by a very thin layer of sandstone or sandy shale. Thus, in the great lead region of the upper Mississippi, sand rocks always cut off the veins of lead.

Another important feature of veins in mountain systems we will also notice.

It has long been well established by M. E. Beaumont, of France, and Prof. J. Dana, of our country, that mountain ranges are upheaved along great fissures in the rock strata of the earth, pursuing definite directions, according to the age of the upheaval, as, for instance, the Alleghanies have a general north-east and south-west direction. In these mountains all the main fissures will have the same direction, and the veins of iron ore, copper or graphite will obey the same law, while the subordinate fissures will be at right angles, or north-west and south-east.

In the Shawangunk Mountains the course of the mountains is north 20° east; the longitudinal fissures have the same course, while the cross fissures run south 60° east, and north 60° west. The Galena veins of these mountains are in the latter system.

Besides the fissures already mentioned there are innumerable other ones, running horizontally with the strata, and minor cross cracks, due in part to shrinkage, and in part to repeated upheavals and down throws. These, when viewed separately, seem

of minor importance, but, when viewed in the aggregate, become very important in the amount of any fluid they may hold, whether of gas, oil or water.

When we stand by the side of any of the great spouting oil wells of Oil Creek, as, for example, the Empire, in its flowing stage, and see it flowing at the rate of 1,000 barrels of oil per day for many months in succession, we naturally look for the original reservoir hidden in the rocks below, which is capable of holding such an immense quantity of fluid.

To the fissures of the third sand rock must we look for this reservoir. Unfortunately, this rock is hidden 500 feet beneath the surface, at the point of penetration by the bore of the Empire well. It is, therefore, impossible to descend into it; we must reason by analogy, or search for subterranean tanks where this rock comes to the surface. Fortunately, owing to the dip of this, and all contiguous rock to the south, at the rate of about eleven feet to the mile, by traveling northward and ascending the dip we are enabled to find this sandstone coming to the surface. Accordingly, on French Creek we can see it, cut up by its numerable fissures—so much that it is quite difficult to find any very large-sized mass. In similar sand rocks I have measured fissures 10, 12 and 15 inches wide running many rods in linear extent.

The whole of the Devonian series of rocks, wherever seen in chasms, ravines and river bluffs, is always cut up by the system of fissures already described. Now, these Devonian rocks are our great receptacles of oil, whether in Canada or the United States. Alluding to the quantity of fluid these cavities can contain, the writer already quoted has so ably stated the subject, we shall continue to quote from him.

"Some of the main fissures are known to be four inches wide. Suppose them of all sizes, from four inches to a quarter of an inch in width, and at various distances, as under from 5 to 50 feet, and to be limited to the sand rock itself, say 30 feet in height; suppose we take the contents of the fissures to be equal to $\frac{1}{100}$ th of the mass of the rock. Now, supposing the oil to occupy but $\frac{1}{10}$ th of the space in each fissure, the rest being occupied by gas and water, we have a yield of oil from each square mile of sand rock, amounting to nearly 50,000 barrels of oil."

Another source of oil has been demonstrated by excavations in the oil-bearing sand rocks of Ohio, and this is, the pores of the sand rock itself. The rock is saturated with oil to that degree that from open cuts it oozes out in sufficient amount to become an economical investment to cut into this rock by deep and lateral excavations.

P. Sterry Hunt, of Montreal, has made some experiments testing the capacity of sand rocks to hold water or other fluids. The mean of his results will give seven gallons per minute for thirteen years from one mile square and one hundred feet thick. From a rock as porous as the oil-bearing rocks of Venango County, this quantity should be increased five-fold.

The able author from whom we have already so largely quoted, has also made some calculations upon this point of our subject. He thus says:—"Every foot of gravel-rock may be considered to consist of three-fourths quartz, etc., and one-fourth cavity, occupied by water and oil. If we suppose only the uppermost four inches of the whole formation charged with pure oil, that would give an absolute layer of oil one inch thick, underspreading the whole country as far as the sand rock extends, or about 4,000 millions of square inches under every square mile; or, in other words, 17½ millions of gallons, equaling 551,706 barrels."

When we consider that there are many sand rocks thus charged—not less than fourteen, and possibly as many more—extending over many hundred square miles of territory, much of which has yet been unexplored, we may rest in the fullest confidence that petroleum, in its regular supply and permanent quantity, will not fail of becoming one of the most important mining enterprises of our country, as well as one of the most remunerative, to capital judiciously invested and economically expended.

Lightning Arresters.

Lightning arresters have attracted considerable attention of telegraphers from time to time, and many have been introduced, used for a while and then thrown aside. None have been invented that

have answered fully the purposes for which they are intended, and when we take a philosophical view of the subject, it seems quite difficult, if not impossible, to accomplish it perfectly. The desideratum to be arrived at is an arrester which will, at all times, carry off the great bulk of the atmospheric electricity, thereby preventing its passage into the helix or cable, and retain its arresting power unimpaired, and also leave the conductor uninjured. In other words, to separate the atmospheric from the battery electricity, convey the former to the ground, and secure the passage of the latter over the conductor, to the terminus of the line for which it was intended.

The one mostly in use at the present time is that of two plates of brass, separated by thin strips of glass, isinglass, hard rubber, or gutta-percha tissue, the upper plate forming a portion of the conductor, and the lower one being attached to the ground for the purpose of providing a medium for the atmospheric electricity to pass off, which it will do, provided the conductor does not present a better medium for its transit than the space between the plates. The plates being larger than the conducting wire, the question arises, does not this plate become, so to speak, a reservoir for the electricity, and must it not become surcharged before it will leave the one plate and pass through the space, which is non-conducting, to the other? If so, it is plain that the principle of plates is erroneous. These plates, to be effective, must be placed as closely together as possible, and not touch, so that if the electricity does pass off in this way, it is almost sure to fuse the two plates, thus giving a ground circuit to the line.

If this theory is correct, there seems to be a field for the inventive genius of our telegraphic friends, and our telegraph companies should look carefully after any improvements that will supply the deficiency which now seems to exist.—*The Telegrapher*.

SUBSTITUTES FOR ALCOHOL AND METHYLENE AS SOLVENTS FOR ANILINE DYES.

BY M. GAULTIER DE CLAUDRY.

With the exception of fuchsine and the violet of Perkin, the tinctorial substances coming from aniline and in its congeners, naphthalin, petroleum, the phenic compounds, etc., are insoluble in water, and can be employed in dyeing only in solution in alcohol. Many fruitless attempts have been made to replace this vehicle by substances of a less elevated price. It is the solution of the following problem which occupies us, and the results obtained are to-day sanctioned by experience:—To find substances which will render these colors soluble in water, without modifying their characters, permitting the dyeing and printing of tissues in the conditions habitual in the manufactories, furnishing colors well united and of all tints, of an easy employment, exercising no action injurious to the health of the workmen, and reducing in a large proportion, the price of the manufactured products.

The violets, taken as an example, are composed of red and blue elements—the first more soluble in divers vehicles, the second very difficult sometimes to dissolve.

The alcoholic solution, mingled in suitable proportion with water, furnishes a bath which, abandoned to repose, allows spontaneously to precipitate a very large part of the color, and retains only the red; the light ebullition to which it must be raised for dyeing, disengages easily this alcohol, augments the precipitation, and determines the production of an unequal deposit of the color on the threads and tissues, which explains at the same time the difficulty of obtaining tints perfectly united, and the liability of this class of colors to be rubbed from off the tissues on which they are deposited, (*le caractère que present plus ou moins les objets teints avec ce genre de produits de tacher le linge par le frottement*). The colors obtained by aid of the solutions which are the subject of this memoir, are, on the contrary, easily obtained, they are of a uniform tint, and the coloring liquid which impregnates them is expelled by washing and wringing on coming out from the bath.

A great number of substances give to water the property of dissolving colors, which, heretofore, have been dissolved only by alcohol; we shall signal among them gums and mucilages, soap, and, in particular, that of almonds, glucose, dextrin, jellies of starch,

lichens and fucus, and, in particular, of *fucus crispus*, glycerin, gelatin and animal jellies; but those which offer the results the most advantageous and the most practical are decoctions of the bark known in commerce under the name of *panama* (*Quillaja saponaria*) and the root of saponaire of Egypt (*Gypsophila struthium*). *Saponaria officinalis* may also be employed, but it acts less energetically. All these substances have the common character of thickening the water and making it froth. The solution of the coloring products is easily effected by pouring on their powder the boiling solutions, agitating, decanting, and, if a portion remains undissolved, recommencing the operation. These liquors may be evaporated to extracts; but a long ebullition—above all, if the water contains sulphate or carbonate of lime—may modify the colors. But it is preferable to use extract of saponaire of Egypt, for example, with which the color in fine powder is triturated; the water added afterward successively dissolves, with suitable care, the whole of the product; but in this case, as in the preceding, the first liquors remove the more soluble reds, while the blues are dissolved with more difficulty, so that it is necessary to thoroughly mingle all the liquors.

The same modes of operating and the same precautions are necessary, when the operation is on blue colors formed also of divers products unequally soluble. No particular precaution is required in using these solutions, and tints perfectly united are obtained with the greatest facility. If it is desired to continue the use of alcohol, a much smaller quantity will be necessary; the coloring product may be first infused in a small quantity of alcohol, finishing the solution with the saponaire extract; or the extract may be first employed, and the solution completed with a little alcohol."

[We find this article in *L'Invention*, credited to *Comptes rendus de l'Académie des Sciences*, and we make our translation as literal as possible.—Eds. Sci. Am.]

How to Cast Sugar Candies.

We extract the following from a very interesting article on the subject, in a recent number of *Once a Week*:

"What an atmosphere of dust meets us as we enter the manufactory! The shop we are in is powdered from rafter to floor with a fine impalpable powder, that reminds us of the interior of a flour mill, and the workmen are moving ghosts, even the fringes of their eyelashes are whitened to their tips, just as the hoar frost whitens every tiny filament it can lay hold of. The dust is that of fine starch, the substance used as a matrix for a certain class of cast sugar goods. We are in that part of the factory now where those 'sweets' are made which are demi-opaque—like snow water frozen. The sugar is not boiled to a great heat, but is allowed gently to simmer on the fire, while the molds in which it is to be cast are being prepared. This is done by spreading the fine starch over boards, quite evenly, and then inverting another board over it, studded with the forms it is intended to cast. The man we are looking at is about making annulets, or sugar rings, and as he lifts the inverted board from the smooth starch, we see that it is covered with molds of these indented rings placed at regular intervals, and as close together as they can go. Another workman now approaches with a tin receptacle filled with sugar, fitted with six spouts. With great skill and knack he pours out the sugar, and fills ring after ring indented in the starch, as fast as his arm can conveniently travel from left to right. Not a drop is spilt, the sugar standing in each ring with a slightly curved surface, just as a drop of water would do that had fallen upon dust. These starch molds are used for all those sweetmeats which contain fluid or liquor in the interior. The liquor is mixed with the melted sugar indiscriminately, and both enter the mold together, but, curiously enough, the latter instantly crystallizes on the outside of the former, and thus, by a natural law, the liquid, flavoring essence becomes imprisoned. It was thought very foolish of George III. to ask how the apples got into the dumplings, but we have little doubt that the manner in which these liquors get inside the sugar plums has puzzled many a head wiser than his. The casting of these liquor sweets employs a large number of persons, and the most extraordi-

nary molds are obliged to be invented to meet the requirements of the trade. Balmoral boots, Tyrolean hats, scissors, knives, fish, and all kind of things, animate and inanimate, are thus produced, the only limit to the design being the size and weight of each article."



Effects of the Earth's Rotation.

MESSRS. EDITORS:—In the "Annual of Scientific Discovery," for 1864, page 82, article, "Effects of the Earth's Rotation," it is stated that the effect of the earth's rotation on a projectile pointed north will cause a variation toward the east, but when pointed toward the south the variation will be toward the west. It is also stated, as a result of the same cause, that the right hand wheels of carriages on railroads running north and south will be most worn. Can it be that these statements are correct? Would not the force of rotation be in some measure lost during the passage of the projectile? and, the earth continuing to move, would not the projectile strike the earth, whether it was projected toward either the north or the south, with a variation from its intended object toward the west? C. M.

South Boston, Sept. 19, 1865.

[The earth's rotation carries bodies at the equator from west to east at the rate of about seventeen statute miles per minute, while in this latitude, the distance round the earth on a parallel of latitude being less, the motion is at the rate of not more than twelve miles per minute. Consequently, if a cannon ball were fired from the equator to New York, when it reached this city it would be going eastward five miles per minute more rapidly than bodies here; its deviation, therefore, in relation to these bodies, from a north course, would be to the eastward. On the contrary, if the ball were fired from New York to the equator, it would there find the surface of the earth running around toward the east five miles an hour more rapidly than itself, and its duration in relation to this surface would be westward. This principle has been cited to explain the westward course of winds approaching the equator—the northeast and the southeast trades—and the eastward deviation of the Gulf stream as it runs toward the north.—Eds.]

Fresh Water Apparatus.

MESSRS. EDITORS:—In your issue of 23d inst. I notice an article in relation to an improvement on my "Fresh Water Apparatus," patented by Thomas Callan, of Philadelphia, which is so erroneous in detail that I ask leave of you to correct the same, as the description of my invention, as therein set forth, is so entirely wrong that it may work to my injury among the parties that require such an apparatus. I suppose, from the wording of your article, that Mr. Callan's improvement relates to my patent "refrigerator," instead of a "condenser," as set forth in his claim as patented.

My refrigerator is intended to cool the injection water from a condensing steam engine—the engine having the ordinary jet condenser, air pump and hot well—the water of condensation and the condensing water being brought by the air pump to the hot well, the amount of water of condensation (being the water produced by the steam exhausted from the cylinder) is returned back to the boiler, the amount of condensing water is taken into the refrigerator to be cooled, to be taken back to the jet condenser, to subserve its purpose anew of condensing the exhaust steam. As both these quantities are constant (minus leakages), the first requires to be taken back to the boiler to preserve the proper head of water there, and the other to be taken to the refrigerator to supply the amount of water taken from it to the jet condenser.

The exhaust steam from the cylinder does not reach the refrigerator—the water produced by the condensation of that steam being mingled with the injection water, and the amount thereof being taken off from the hot well to the boiler.

—It would be a matter of utter impossibility to use this water for the injection, for the reason that it is

too limited in quantity, as the water of injection requires to be from fifteen to thirty times the quantity of the water of condensation—dependent upon the pressure of the steam used in the cylinder—and for the further reason that all the water of condensation, or the amount thereof, requires to be returned back to the boiler.

My apparatus does not require to be made very "long and expensive" to produce its proper effect. It occupies less space, and costs less, than any other apparatus heretofore devised for the purpose, in proof of which I can furnish you, or any party interested, abundant testimonials.

As my only object in this communication is to be set right before the readers of your journal in relation to my invention, I trust that you will favor me with its insertion.

WILLIAM A. LIGHTHALL.

No. 5 Bowling Green, N. Y., Sept. 23, 1865.

Machinery Wanted for Texas.

MESSRS. EDITORS:—We are about raising a company to go to Texas for the purpose of raising sugar on a large scale, and would like to have you inform us which is the best firm to procure engine and boilers of—say, 150 horse-power, smoke-consuming apparatus with the best method of saving fuel, as wood is of great scarcity, and coal not procurable at any price. We will want vacuum pans and the very best of purifying apparatus; in short, a modern first-class sugar house, capable of manufacturing from 1,200 to 1,800 hogsheads of common sugar. We want a horizontal and roller mill. If you can inform us where to procure such machinery you will confer a great favor.

W. R. ATHERTON.

Stenben, Huron Co., Ohio.

[By publishing Mr. Atherton's letter we make his wants known to the great mass of the manufacturers of machinery throughout the country. The communication is evidence of a movement southward, which we have other evidence is going forward on a large scale. There was never a time when manufacturers of machinery of all kinds found it so profitable to advertise their business.—Eds.]

FOREIGN SUMMARY.

NEW ROTARY STEAM ENGINE.—Mr. R. W. Thompson, F.R.S., described a new rotary steam engine, in which the difficulties arising out of the use of the stop or abutment are got rid of, by dispensing with the steam stop entirely; and in which the inconvenience connected with keeping the packing steam tight is obviated by giving the packing straps the same curvature as the inside of the cylinder, causing them to bear equally and steadily against the steam, as in the packing of an ordinary piston. Mr. Thompson exhibited diagrams and wooden models of the engine. He said, from the experience he had in connection with the new engine, he believed that for many purposes it would supersede the ordinary form of steam engine. The engine, when manufactured under the same advantages as those under which the common engine was now produced, would be turned out at a cost less than half that of an ordinary engine. Gas exhaustives, constructed on this principle, acted with an efficiency exceeding that of any of the machines hitherto in use. One had been in operation at the Edinburgh and Leith Gas Works for some time, and it went with much less power, and discharged a much greater percentage of gas than any of the machines hitherto in use. A few remarks from several members followed the reading of the paper, after which Mr. Thompson received the cordial thanks of the section.

SILICIUM IN IRON.—In a recent paper, Dr. Phipson of England, said it was well known that silicium existed in cast iron, not only in the free but also in the combined state. Dr. Phipson had been led to examine the subject of silicium in iron from the fact that he found several samples of iron which were reported as yielding very different qualities of Bessemer steel, to be of precisely similar chemical composition, and following up the subject, he came to the conclusion that the difference in the quality of steel arose, not from differences in the total quantity of silicium, but from the manner in which it occurred, as free or combined. This matter was of great importance, as the author was now enabled to determine, by ascertaining the amount of combined silicium, as to the suitability

of an iron for the manufacture of Bessemer steel, that iron which yielded the smallest quantity of combined silicium being most suitable for this purpose.

Mr. Abel said that had Dr. Phipson been present, he would have been glad to have heard in what manner that gentleman distinguished between combined and uncombined silicium.

Capt. Noble stated that no iron was so deficient in tensile strength as hematite iron, but he had determined that this weakness was not due to the silicium the metal contained.

In reply to a question by Dr. De la Rue, Mr. Bell stated that borax—an element very closely allied to silicium—had not been found in any analysis of iron, and that the character of an iron would vary very much, although precisely similar materials were used in its production.

Dr. Miller suggested that the spectroscope should be used, in order to determine the presence of barium, the lines given by this element being very characteristic.

A DWARF ENGINE.—One of the most curious articles of the Wakefield Exhibition is, perhaps, a steam engine and boiler in miniature, and described as the "smallest steam engine in the world." It stands scarcely 2 inches in height, and is covered with a glass shade. The fly-wheel is made of gold, with steel arms, and makes 7,000 revolutions per minute. The whole engine and boiler is fastened together with 38 screws and bolts, the whole weighing 14 grains, or under $\frac{1}{4}$ ounce. The manufacturer says of it that the evaporation of 6 drops of water will drive the engine 8 minutes. This piece of mechanism is designed and made by a clock manufacturer at Horsforth.—*London Mining Journal*.

[This is much larger than the steam pump, consisting of a steam and water cylinder, made by Charles Fichtel, of Philadelphia, in 1860. This pump was auxiliary to a model of a steam fire-engine. The steam cylinder was one eighth of an inch in diameter, and the whole affair would go into a common thimble.—Eds. Sci. Am.]

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Artificial Dentures.—The object of this invention is to facilitate the operation of securing or fastening artificial teeth to a base of vulcanite or other plastic or fusible material. In order to effect this purpose the teeth are provided on their inside or back part with a rim, which is perforated with round, square or oblong holes, and furnished with dovetailed cavities, extending from the inside of the gum back to the extreme edge of the rim; the bottom of said cavities grading down from the rim to the gum. The extreme edge of the gum is also perforated with holes similar to those in the rim, and pins which are straight, bent or headed are inserted into the dovetailed cavities in such a manner that, by the combined actions of the perforations, dovetailed cavities and pins, the base is firmly united with the teeth and the gum, and the danger of cutting through and exposing pins in finishing up is entirely avoided. S. C. Taylor, Monroe, Mich., is the inventor.

Machine for Finishing Hats.—This invention consists in new and improved machinery and devices for finishing hats, whereby much of the manual labor now required is performed by mechanical means. The hat blocks are set on spindles, arranged around a common center with the irons, the arms of the irons being hollow. The hat blocks have a pulley set centrally in their bases, to operate the cord which binds the hat on the block. The cord is double, and passes from the pulley through one side of the block at its base, and the hat is perforated near its brim, to let the cord pass through—the cord being then divided or opened into a loop, which is stretched over the hat—and the pulley is then wound up by a wrench, a ratchet in the hub of the pulley being engaged by a detent, in order to keep the pulley from running back. The arms on which the irons are mounted all belong to one system, and are capable of vertical motion on their axes; and they are so mounted on their axes as to be capable of yielding upward when passing over an uneven surface below them, as when

going over a crooked brim. Each iron is hollow, and is capable of revolving on its arm. Beyond the irons, on each arm, is a "lurer," capable of turning on the arms, and which has at one side a sponge for wetting the hat, and at the other an elastic or flexible rubbing surface. Roche & Stewart, Williamsburgh, N. Y., are the inventors.

Surgical Apparatus for Excisions.—The object of this invention is to provide an apparatus to be worn by those who have suffered excisions of the shoulder joint, or humeri, elbow joint and radius, or either of them, or of portions thereof, whereby the functions of the arm, are, in a main degree, restored, and the patient is enabled to perform most offices of usefulness and convenience to himself and others. It has been common hitherto, whenever a patient has suffered the loss of any of the bones or joints of the arm, or of the shoulder joint, or whenever it has been thought necessary that any of them be removed, to amputate the arm, for the reason that the foundation and support of the muscles having been removed, they were, thenceforth, not able to fulfill their functions, and, therefore, the better course, was to remove the arm itself below the place of excision or destruction of the bone, as being a useless appendage. This invention is meant to save the patient from amputation, and to provide an artificial substitute, so to speak, for the bones and joints destroyed or excised. E. D. Hudson, M. D., Clinton Hall, Aster place, New York City, is the inventor.

Fruit Jars.—This invention consists in using upon the mouth of the jar, can or other article in which the preserved fruit is placed, a secondary vessel or receiver, the joint being made air-tight, in any proper manner, into which receiver when so attached a sufficient quantity of the fruit from the jar is placed, by opening its cover—the air first having been exhausted from the receiver by any suitable mode, so as to produce a vacuum in it, whereby the receiver can be charged with the fruit without the air coming in contact with it, after which the cover of the jar is closed, and the receiver with the fruit then detached from the preserve jar; the fruit remaining in the jar, thus being kept as pure and sweet as if none of it had been removed. Allen Sherwood, Auburn, N. Y., is the inventor.

Smoking Pipe.—This invention consists in the use in a tobacco pipe of a perforated disk or diaphragm arranged below the smoke passage leading from the bowl to the stem, and in such manner that the smoke will come in contact with the said disk or diaphragm (which is made of metal) before entering the stem, and thus be cooled and caused to deposit the nicotine and other poisonous matter it may contain upon the said plate, the same running through the apertures therein, to be caught and retained in a nicotine chamber below the bowl of the pipe, from which it can be removed at pleasure. This pipe possesses the advantage of extracting the nicotine, etc., from the smoke without compelling it to pass through a nicotine chamber, which latter is often so foul that it infects the smoke instead of purifying it. The draught of the pipe is in no wise interfered with, and all the metallic parts can be readily removed from the pipe in order to clean them. The inventor of this improvement is Edwin Hoyt, of Stamford, Conn.

Hand Spinning Machine.—This invention has for its object the improvement of the hand spinning machine commonly called the railroad wheel, in which the spindle is mounted on a carriage that travels to and fro on the frame. It consists, among other things, in shortening the bench, changing the position of a portion of the gearing, placing the treadle so that it is operated from the end of the frame instead of from the side, providing a box to receive the carriage, etc. Jesse Byrkit, Fairfield, Iowa, is the inventor.

Paddle Wheel.—This invention relates to a new and improved paddle wheel, or that class which are provided with feathering buckets, and it consists in a novel and improved means for operating the buckets, and in an improved construction and arrangement of certain parts pertaining thereto, whereby several advantages are obtained over other paddle wheels of the same kind. James Burson, of Yates City, Ill., is the inventor.

Ruffler and Gatherer.—The object of this invention is to produce an apparatus, to be used upon a sewing machine, for the purpose of making ruffles and

gathers in cloth. It consists in an upper and lower spring plate, which tend constantly toward each other, and which come in contact with spur wheels that are geared together by means of an intermediary wheel. When two pieces of cloth, one of which is to be gathered, are to be united by sewing, one of them is placed between the lower spring plate and its wheel, and the other between the upper plate and its wheel, and when the cloth is fed along, the upper gear is made to rotate by reason of the pressure produced on the cloth by the upper spring plate, and the lower gear, by reason of the small intermediate gear, is made to revolve at a higher speed, and thereby ruffle and produce gathers in the cloth which is held against it by the lower spring. Leonard C. Riggs, Florence, Mass., is the inventor.

Clamp for Boot-crimping Devices.—The object of this invention is to obtain a clamp for boot-crimping devices which will not injure or tear the leather while the same is being stretched or drawn over the tree. To this end the invention consists in inserting in the sides of the clamp which grasp the leather pieces of wood, gutta percha, or other material, which, on account of its softness, will not injure the grain of the leather, and still be firm enough to grasp it securely. Edward Simmons, of South Providence, R. I., is the inventor.

Thill Coupling for Vehicles.—This invention relates to a new and useful improvement in couplings for attaching thills to the axles of wheel vehicles, and it consists in attaching a spring catch or fastening to the pin of the ordinary thill coupling, and having a recess made in one of the ears, between which the thill iron is fitted to receive the spring catch; all being arranged in such a manner that the pin, which passes through the eye of the thill iron and the ears on the axle, will be held in position or prevented from casually passing out of place, and also prevented from turning. H. K. Waterhouse, Factory Point, Vt., is the inventor.

Brick Press.—This invention relates to a new and improved brick press, of that class in which a screw or auger is employed for forcing the clay into the molds. The invention consists in constructing the screw or auger with a concave flange, the concave surface being at the face side of the flange, whereby the clay, as the screw or auger rotates, is gathered toward the center of the box in which the screw or auger works, and the latter rendered far more efficient in its operation than those hitherto used. The invention also consists in arranging the screw or auger directly under the mud mill or clay-tempering box, whereby the machine is greatly simplified. The invention further consists in the employment or use of a jointer, arranged with a spring, and in connection with the mold cylinder, in such a manner as to face or smooth off the clay in the molds in a perfect manner. John J. Alvord, Tecumseh, Mich., is the inventor.

Oil Can.—This invention relates to a new and useful improvement in oil cans, such as are used for lubricating machinery and for like or similar purposes, and are provided with an elastic bottom for ejecting the oil from the can. The invention consists in the employment or use of a wire or rod attached to the elastic bottom, and extending through the spout or nozzle, for the purpose of preventing the clogging or choking up of the same. The invention also consists in the application of a valve to the rod to regulate the flow or discharge from the can; and in a bell-shaped terminus for the spout or nozzle to prevent the drip of oil from the same from running down the outer side of the can. Henry E. Stager, Milwaukee, Wis., is the inventor.

STEAM JETS.—It may be interesting to know that the application of the steam jet can be traced back to the time of the ancient Romans. Ewbank, in his work on "Hydraulics," gives some interesting particulars on the subject, and shows that blowing fires by a jet of steam, either into the fire or up the chimney (like the modern (?) steam jet), is of very ancient application.

ALL applications for admission to the Paris Exposition of 1867 must be made before the 31st of October, 1865. The application must be accompanied by a description of the articles to be presented.

Twist Drills, Collets and Chucks.

For many years twist drills have been made by machinists for the purpose of constructing fine, delicate machinery when exactness was absolutely necessary to carry out the ideas of inventors and mechanics. The old-fashioned tedious method of forging, twisting, centering, turning and filing into shape—made a drill of half-inch in diameter cost from \$2.50 to \$3.50; even at that price it was considered cheap, as it did work which could not be performed by any other drill. To cheapen the cost of production, many of our best machinists who carried on business largely, got up small fixtures attached to lathes to cut the grooves in the drills after they were turned, and then finished them as usual by hand. Thus each company were obliged to make tools first before they could make drills, and then could only make a limited number of sizes. Here, then, was a demand for a new business, and Mr. S. A. Morse, of East Bridgewater, Mass., perceiving it, set about the invention of a machine which should take a piece of steel turned to size, and complete a drill ready for hardening, almost at one operation. This was effected in May, 1862, when he produced a drill upon which he obtained a patent; the features are a groove so cut

direction by means of the screws before mentioned. To fasten this tool to the lathe, a mandrel must first be fitted to the spindle and turned on the outer end to fit the hole in the shank, G, of the chuck.

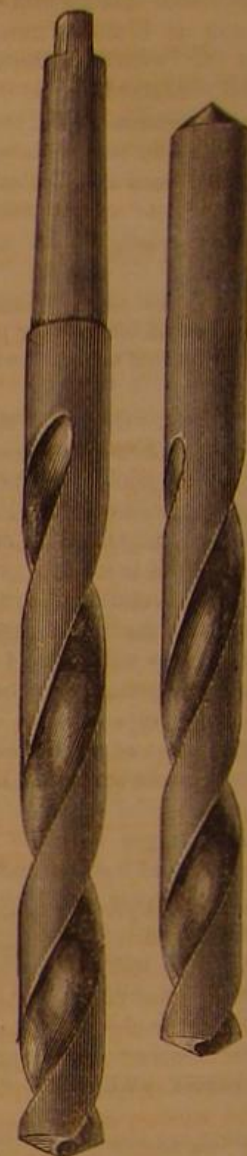
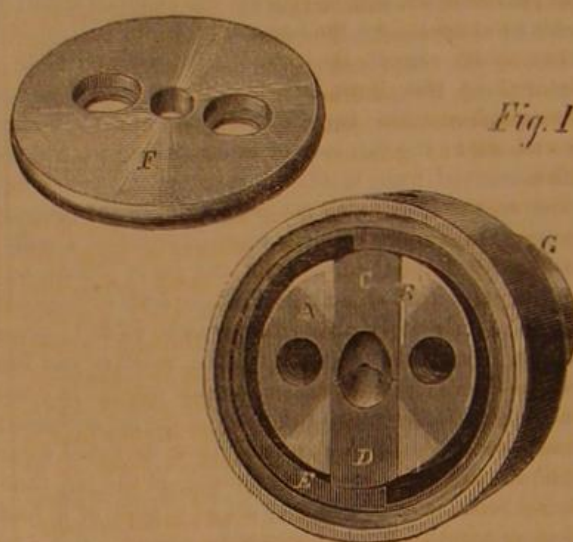
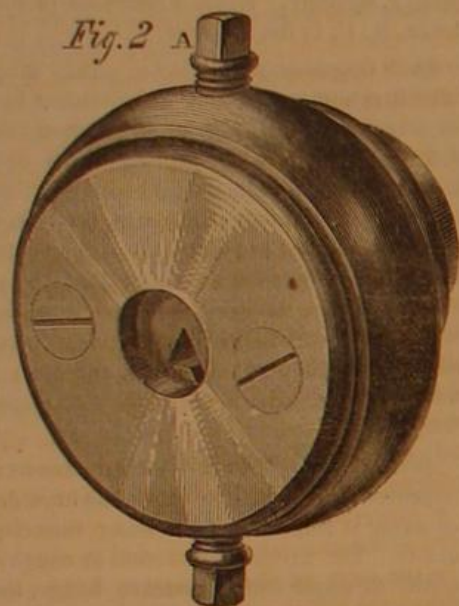
Fig. 2 is a cheaper adjustable chuck for holding drills from one-sixteenth to one-half inch in diameter. It is constructed like the others, except in the place of the cams there are two screws, A, to adjust the drills in the center; a wrench for the screws accompanies the chuck.

These drills are first-class tools in all respects; they drill a round hole to the shank without removing them from the work. Metal workers know that there is nothing more obstinate or annoying to drill than a composition of copper, tin and lead; this catches every sharp-edged tool which works in it, but we have found these drills to run through it with ease, removing the metal in long spiral shavings, without being heated or clogged. If a drill will work in this metal, it will in anything, and the celerity with which a hole is bored through cast or wrought iron, is surprising. These are first-class goods, and are now in use in most of our large shops, armories and private establishments throughout the country. They are now manufactured at New Bedford, Mass., by the

in the engraving, the cravat and collar can be used as man and nature intended them to be.

This appendage consists of a pin, A, formed with a spring back, B, so that when it is applied, as shown in Fig. 2, section, both the cravat and collar will be

Fig. 3.

**MORSE'S TWIST DRILLS, COLLETS AND CHUCKS.**

or formed as to present a straight cutting edge to the metal, with a decrease in the angle of the groove as it advances towards the shank, the groove being a taper from near the point to the shank; at the same time the width of the groove is increased in the same direction in order to give as great capacity for borings at any point in the drill as there is at the cutting end, while the drill is thus made stronger as the groove advances. The small drills are made from Stubbs's steel wire, including all the sizes of his steel wire gage. Some gages have 80 sizes. The larger drills, from three-eighths to one and one-fourth inches, are made from the best cast steel, with taper shanks turned to fit sockets, which are so made as to be readily fitted to any drilling machine or lathe.

The steel-wire gage, as is well known, embraces 60 different sizes, from 4-100 to 23-100 of an inch. It was, therefore, important to have a tool that would hold all and each of these drills without any loss of time in adjusting them firmly and always true to the center.

The self-centering collet, patented May 4, 1864—an engraving of which is shown in Fig. 1—was designed and is manufactured by the Morse Twist Drill and Machine Company. This collet is made entirely of steel, and consists of only six pieces—the body, A, with slot, B, jaws, C and D, cam ring, E, plate, F, and screws, which hold the arm to the chuck. The jaws are accurately fitted to the slot, B; one is V-shaped on the inside, and the other fits into it; both are countersunk on the outside edge, so that when the conical end of the drill (see Fig. 3), is pressed against them, they will be easily pressed apart to receive it, thereby doing away with springs, which, on account of their liability to break, are objectionable. The cam ring fits over the body, A, and closes the jaws by being turned half round. This will hold the drills tight in most cases, if set up with the hand, but there is a wrench fitted to the chuck to be used as needed. The plate, F, covers the end of the body and jaws, and secures the latter from motion in that

Morse Twist Drill and Machine Co. All sizes of drills up to half-inch always on hand. The larger sizes and chucks furnished in small quantities at present; the company will soon have facilities, however, for furnishing all sizes as ordered. All orders should be addressed to S. A. Morse, Superintendent of the Morse Twist Drill Co., New Bedford, Mass.

BARNES'S CRAVAT HOLDER.

This invention is designed to relieve an annoyance common to the newly-invented paper or other garrote collars and the thin flimsy cravats so generally

Fig. 1

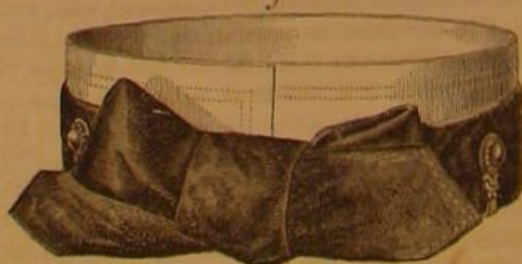


Fig. 2



worn. Individuals who bedeck their persons in these attractive articles, are frequently humiliated and embarrassed by finding the cravat and collar endeavoring to change places—one surmounting the other. By the use of a simple ornamental appendage—shown

caught and firmly held. This pin is applied at either side of the bow, where it presents a highly unique appearance. With this attachment, no solicitude is caused, and bashful gentlemen may keep their hands off their clothing when in the presence of ladies, in perfect confidence that all is as it should be, and that they do not present a ridiculous spectacle by reason of the annoyance fully set forth previously.

This invention was patented through the Scientific American Patent Agency June 27, 1865, by W. S. Barnes. For further information address Barnes & Robinson, Providence, R. I.

MARKET FOR THE MONTH.

The prosperity mentioned last month continues, but there are signs of a gradual extension of credits. Some stocks, especially that of cotton, are accumulating, and there has been a check in the demand for cotton goods, which has caused a material fall in the price.

	Price Aug. 30.	Price Sept. 26.
Coal (Anth.) 2,000 lb.	\$9.50 @ 10.50	\$12.00 @ 12.50
Coffee (Java) 26 lb.	26 @ 26 1/2	29 @ 30
Copper (Am. Ingot) 26 lb.	30 1/2 @ 32	32 1/2 @ 33 1/2
Cotton (middling) 26 lb.	44 @ 45	44 @ 45 1/2
Flour (State) 26 lb.	\$6.80 @ 9.25	\$7.60 @ 8.35
Wheat 26 bush.	2.10 @ 2.40	2.15 @ 2.50
Hay 100 lb.	.60 @ .70	.60 @ .65
Hemp (Am. drs'd) 26 lb.	270 @ 300	325 @ 350
Hides (city slaughter) 26 lb.	10 @ 10 1/2	11 1/2 @ 12
India-rubber 26 lb.	.47 @ .70	.36 @ .70
Lead (Am.) 26 lb.	.925 @ 9.30	9.50 @ 9.62 1/2
Nails 26 lb.	.55 @ .60	.80
Petroleum (crude) 26 gal.	.32	.38 @ .38 1/2
Beef (mess) 26 lb.	8.00 @ 14.50	9.00 @ 15.50
Salt-peter 26 lb.	.22	.22
Steel (Am. cast) 26 lb.	.13 @ .22	.13 @ .22
Sugar (brown) 26 lb.	.11 @ .16 1/2	.11 1/2 @ .17 1/2
Wool (American Saxony fleece)		
26 lb.	.75 @ .77	.75 @ .77
Zinc 26 lb.	.13 1/2 @ .13 1/2	.14 @ .15
Gold	1.44	1.44
Interest (loans on call)	.4 @ .4	.5 @ .6

In Leipsville, Penn., there is a quarry so deep that when a teamster calls to his oxen a spectator on its bank hears nothing. A stone cast from the same bank occupies thirteen seconds in descending.

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NEW YORK, SATURDAY, OCTOBER 7, 1865.

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

Contents:

(Illustrations are indicated by an asterisk.)

*King & Gardner's Carriage Top.....	223	Machinery Wanted for Texas.....	223
Petroleum as a Fuel.....	223	Foreign Summary.....	223
Orayons.....	223	Recent American Patents.....	229
Safety Lamp.....	224	*Morse's Twist Drills, Collets and Chucks.....	230
On the Revivification of Animal Charcoal.....	224	*Barnes's Cravat Holder.....	230
The Fair of the American Institute.....	225	Market for the Month.....	230
*Clee's Grain Separator and Cleaner.....	225	Our Roll of Honor.....	231
Farmer's Club.....	226	Pure Alcohol for Brandy Peaches.....	231
Pictures in Sand Rocks the Reservoirs of Petroleum.....	227	Boilers of the Iron-clads.....	231
Substitutes for Alcohol and Methylene as Solvents for Aniline Dyes.....	227	Flow of Solids Under Pressure.....	231
How to Cast Sugar Candles.....	227	Sales of Patents.....	231
Effects of the Earth's Rotation.....	228	Naval trial—Report of the Experiment.....	232
Fresh Water Apparatus.....	228	Patent Claims.....	232, 233, 234, 235
		Notes and Queries.....	235
		*Bradford's Tack-leathering Machine.....	238
		*Putnam's Beefsteak Breaker.....	238

OUR ROLL OF HONOR.

Almost down to the present century the writers of literature have depended for support upon the patronage of kings and nobles, and their productions have consequently been filled with sycophantic praise of their patrons, with arguments in defense of royal and aristocratic forms of government, and with denunciations of opposing systems. Hence the repetition from century to century of the saying: "Republics are ungrateful"—a saying contradicted in different lands and times by the most conspicuous events of history. The maxim has been uttered with great bitterness by many disappointed politicians, who have sought to use their position in republics for the gratification of their personal ambition; but all, in every age, who have served any community with disinterested public spirit, have awakened in the people emotions of gratitude such as, in the constitution of human nature, it is impossible for kings or nobles to feel. With what filial affection did the people of Athens obey, through long years of unexampled trial, the paternal advice of Pericles! In the long roll of those who have filled the kingly office, what man has shown such gratitude as that which was manifested by the whole people of Syracuse to the devoted and noble Timoleon? What subject ever received from his sovereign such evidences of grateful love and remembrance as those which surrounded the heroic life and followed the bloody death of the first William of Orange? Among the inhabitants of Europe, the people of strongest emotions are they whose homes are nestled in the mountain dells of Switzerland; and the warmest feeling of their hearts is gratitude for the service of Tell. The homage of the people of this country to the memory of Washington, the gifts of fortunes and houses to Farragut, Grant, Sherman and other officers, and the enormous subscriptions to the Sanitary and Christian Commissions for the benefit of our soldiers, are not proofs of peculiar generosity on the part of Americans, they are manifestations of the gratitude which has always characterized democratic communities toward those who have served their country faithfully and well—a quality diametrically opposed to the lying maxim that has been so often and so thoughtlessly repeated.

We are reminded anew of the falsehood of this maxim by the receipt of a pamphlet from the War Department, entitled: "Roll of Honor. Names of Soldiers who Died in Defense of the American Union, Interred in the National Cemeteries at Washington, D. C., from August 3, 1861, to June 30, 1865."

No longer ago than the time of Frederick the Great there were no medical departments in the organization of armies. Sometimes, when a soldier

was wounded, his commanding officer would cut off his leg and sear the stump with a red-hot iron to stop the bleeding; but, generally, if a man was permanently disabled, it was considered best to let him die, in order that the kingdom might not be cumbered with his support. The care which our private soldiers have received has not been, indeed, all that they deserved, but it was the tenderness of maternal love compared with that which has ever been bestowed upon the common soldiers of any other army. This care ceases not even with the termination of life, but smooths the pillow of their last repose, and transmits to their relatives all that affection would know in regard to their final resting place.

"On fame's eternal camping ground
Their silent tents are spread,
And glory guards, with solemn round
The bivouac of the dead."

PURE ALCOHOL FOR BRANDY PEACHES.

Mr. Moore, who owns a distillery situated at the corner of Thirty-ninth street and Tenth avenue, in this city, says that he has drank imported French brandy, direct from the bonded warehouse, which was proved to his satisfaction to have been distilled at his establishment. The corn whisky was bought of him at 55 cents per gallon, sent to France and doctored by the addition of sundry drugs and by other manipulations, and then returned to this country and sold as genuine French brandy at \$6 per gallon.

The essential ingredient of all ardent spirits is alcohol. In addition, they all contain a large proportion of water, and a very small proportion of essential oils, which give them their peculiar flavor. If the spirit is leached through animal charcoal, these oils are absorbed by the charcoal, and the spirit comes out white and nearly tasteless. There is, however, a foreign substance that is not absorbed by the charcoal, this is fusel oil or amylic alcohol. It is a colorless liquid, of a peculiar, nauseous, suffocating and most persistent odor, and of an acrid taste. As the boiling point of fusel oil is 270°, while that of alcohol is only 168½°, it is easy to separate the two by distillation.

When the peculiar flavor of brandy is required, it must be taken before the rectification with charcoal, but in brandy peaches the flavor is given by the fruit, and for this purpose the purer the alcohol the better. At the Boston Distillery, 122 Elm street, in this city, and probably at other distilleries, a very pure article is sold under the name of spring water spirits. It is alcohol subjected to a second distillation after the rectification by charcoal, in order to eliminate the fusel oil. This spirit is purchased by grocers, diluted by adding its own volume of water, and sold under the name of white brandy, expressly for making brandy peaches. It is most suitable for the purpose, and we should suppose would be most suitable in any case where alcohol in any form is to be taken into the stomach. We believe it is generally prescribed by the homeopathic physicians, and there seems to be no reason why it should not be adopted by the profession generally whenever alcohol stimulus is indicated.

Except under the advice of a physician, it is doubtless best to avoid the use of alcohol in all its forms; but, damaging as it is to the system, it is probably less so than the poisonous drugs with which it is mingled to convert it into "French brandy."

BOILERS OF THE IRON-CLADS.

There are a mile and a half of iron-clads now laid up in the Delaware River, at League Island—a mile and a half of war ships whose ports are closed, whose guns are silent, from whose escape pipes no steam curls upward to the air. These vessels, which have done the country so much service, are practically dismantled, and left to rest in peace until they are again needed.

To the dreamer, the sight is suggestive, but the mind of the practical man instantly reverts to the mechanical details, and to the preservation of them intact. As to the engines of these iron-clads there is no cause for anxiety, but, in regard to their boilers, there is apprehension. Engineers know very well that when a ship is laid up idle the boilers are ruined in a short time, unless great care is taken and

constant supervision given. With all the precaution, it not unfrequently happens that tubes have to be cut out of vertical flue boilers and renewed. The condensed moist air, or "sweat" which collects on the tubes is the cause of this injury, and a remedy for it would save a great many dollars to ship-owners and the country.

It is customary, in some cases, to kindle a fire in the furnaces with the hope of dispelling the moisture by drying it off. This may be a temporary, or an apparent, remedy, but it is of no value, and even if the flues are not removed by reason of corrosion, their endurance is greatly impaired, and the life of them, so to speak, shortened. Where scale deposits at the bases of the tubes then the danger of destroying them is greatly augmented, for the hygroscopic nature of those salts of lime that constitute scale causes them to absorb moisture, which furrows the external surface of the tubes like cutters.

What course has been taken with the boilers of the iron-clads we do not know, but it is probable that they will receive such attention as the nature of the case demands. Cylinder boilers that are blown out are easy to preserve by a coating of oil, but in vertical or horizontal tubular boilers, where the spaces are so small that one can hardly get a finger in, it is a difficult thing.

THE FLOW OF SOLIDS UNDER PRESSURE.

The most common mode of making lead pipe, is to melt the lead and run it into a massive cylinder, which has a hole in the bottom corresponding in size to the external diameter of the pipe; to the cylinder is fitted a solid plunger piston, which has a steel spindle, equal in diameter to the interior bore of the pipe, projecting from its lower end downward through the center of the die in the bottom. So soon as the lead has cooled sufficiently to become solid, but while yet very warm, the piston is forced downward by a powerful hydraulic press, squeezing the lead through the annular opening, and forming the pipe. A better form of the apparatus is to have a hole through the piston and let the spindle or core rise up through this hole from the bottom of the cylinder; on applying the pressure, the lead rises upward through the annular opening and flows over in an endless pipe. With this form of cylinder, pipe may be made from perfectly cold lead, and even from the still harder metal, block tin. Tin, indeed, can be worked only in the cold state, as it crumbles to pieces like sand if manipulated while hot.

It is manifest that the particles of the metals, when pressed through these openings, must slide upon each other in precisely the same way as the particles of water, or any other liquid, while flowing through similar openings. The resistance to motion in relation to each other of the particles of a liquid and those of a solid, seems to be merely one of degree. When the form of a bar of iron is changed, by either hammering or rolling, the particles must slip one over another, though they are not separated sufficiently to destroy their cohesion for each other.

This is an instance of the fading into each other of all divisions in nature. Nothing could seem more sharply defined than the distinction between solids and fluids; but if we change the conditions, if we subject the solid to sufficient pressure, it is found to flow through narrow openings, like the most mobile liquid.

SALES OF PATENTS.

More money is being paid, at the present time, for valuable patents, than ever before. In our reports of the Fair of the American Institute, on another page, will be found a mention of the French self-fastening button; we are told by the capitalists who bought the patent of this little invention, that the sum paid for it in cash was \$125,000.

An ingenious inventor in Ohio has recently made an improvement in machinery for cutting nails. It is stated very directly from the inventor that he sold one-half interest in the patent for \$10,000 in cash, and the purchaser says that he has been offered \$80,000 for it.

A clergyman of our acquaintance has been offered \$50,000 for the United States patent in an invention we lately secured for him in this country and Europe. Another of our customers has been offered \$30,000

for a patent in a machine for making hats, recently issued; and almost every day cases are brought to our knowledge of patents being sold for large amounts.

The Naval Trial—Report of the Experts.

New York, Sept. 26, 1865.

SIR—In obedience to your orders of the 26th of July, for the competitive trials of the machinery of the steamers *Winooski* and *Algonquin*, to test the relative economy of fuel and power, we would state that the trial commenced on Friday, the 22d instant, and we respectfully make the following report:—

Though not required by your letter of instructions to report upon the trial until the completion of the same, we believe it will be of interest to the department to know at this time the result of the first trial, which commenced for the purpose of ascertaining the relative economy of fuel.

The trial commenced according to the programme of the Board of Civilian Experts. The fires were started at 10:15 A. M. of the 22d instant, were hauled at 4 P. M., and again started for the regular trial of ninety-six hours, and continued until brought to an abrupt termination by the bursting of the *Algonquin's* pipe, which necessitated the drawing of the fire from the boilers. When the accident occurred the experiment had lasted fifty-four hours and eight minutes. The whole duration was to have been ninety-six hours. Owing to this accident we cannot give the results ascertained exactly in the manner recommended by the Board of Experts, but we can give the results as ascertained in the manner directed by your original order, and which we believe to be accurate. In that order we were directed to run the engine several hours, to bring the fires into steady action, and the machinery into proper working condition. We were then to commence the trial, noting the state of the fires. At the end of the trial, we were to leave the fires, steam pressure, water level, etc., the same as at the commencement.

At the time of the bursting of the *Algonquin's* pipe the fires under the boilers of both vessels were in good condition, and the steam pressure and water level about the same as at the commencement. We consider that at 8 P. M. of the 22d instant, the engines of both vessels having been run about three hours from the commencement of the trial; the fires were in steady action, and the machinery in proper working condition.

From this time to 11 P. M. of the 24th instant, a few minutes previous to the breaking down of the *Algonquin's* engine, is fifty-one hours, the mean results of which are as follows, namely:—

	<i>Winooski</i>	<i>Algonquin</i>
Total time of trial in hours.....	51	51
Total number of revolutions of wheels.....	45,149	44,918
Total number of pounds of anthracite.....	80,400	79,239
Average number of revolutions per minute.....	14,754.6	14,679.1
Average number of pounds of coal per hour.....	1,576.5	1,553.7
Average pressure of steam in boilers.....	16.8	70.79
Average point of cutting off.....	0.475	0.111

According to the above figures obtained from the log, which was accurately kept on both vessels, the economical performance of the machinery of each was equal.

At the time of the failing of the machinery of the *Algonquin* the water in her boilers had reached a density which required "blowing off," and for the remainder of the trial she would have been subjected to a considerable loss of fuel on this account.

The *Winooski* easily runs the whole ninety-six hours without a necessity of this character. The machinery of the *Winooski* worked throughout in the most satisfactory manner, showing it to be durable and reliable. Its arrangement is the simplest and most convenient possible, and its economy of fuel equal to that given by the very complex design of the machinery of the *Algonquin*.

We are, very respectfully, your obedient servants.

Chief Engineer ROBERT DANBY,

Chief Engineer EDWIN FITHIAN,

Chief Engineer MORTIMER KELLOGG.

HON. GIDEON WELLES, Secretary of the Navy, Washington, D. C.

HON. N. O. MITCHELL's gang of four men sawed 17,800 feet of square-edged lumber in his mill at Gardener, in five hours, one day lately. The world is invited to beat it.



ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING SEPTEMBER 26, 1865.

Reported Officially for the Scientific American.

— 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.

50,087.—Keeping Oil Cool in Lamps.—John Allen, M. D., Washington, D. C.:

I claim the placing of water on the top or around the reservoir, A, as herein described, and for the purpose set forth.

50,088.—Brick Press.—J. J. Alvord, Tecumseh, Mich.:

First, In combination with a rotary mold cylinder, M, a screw or angle, L, having the face side of its spiral flange, F, of concave form, substantially as and for the purpose specified.

Second, The placing of the screw or angle, L, directly under the cylinder, D, which forms the case or box of the mud wheel, so that the tempered clay will be forced direct from the mud mill into the box, C, which contains the screw or angle, as described.

Third, The joints, T, in combination with the mold cylinder M, and the spring, U, or its equivalent, substantially as and for the purpose set forth.

50,089.—Cotton Bed Planter.—Frank M. Bacon, Ripon, Wis.:

First, I claim a horizontal hopper, with a central discharge opening, in combination with the stainers or agitators, actuated substantially as specified.

Second, I claim the adjustable regulator, O, or the shaft, I, in combination with the hopper, M, and agitators, for the purpose and substantially as specified.

50,090.—Pipe Joint.—Phineas Ball, Worcester, Mass.:

First, I claim the combination with the end of the pipe, R, of the hinged guide clamps, A, A.

Second, The combination with the clamps, A, A, of the flanges, F, F, and pins, d, d, substantially as and for the purposes set forth.

Third, The combination with the bottom of the clamps, A, A, of the supporting ribs, e, e, for sustaining the lower half of the sleeve while being filled, as described.

Fourth, The combination with the overlapping parts, P and S, of the ears, g, g, and screws, x, x, for the purposes set forth.

50,091.—Step Ladder.—Joseph Barnett, Dayton, Ohio:

I claim the employment of the strips, a, a and e, e, in connection with the side piece, A, A, and arranged with the slotted bar, d, d, and eyes, C, C, the several parts being used as and for the purpose herein specified.

50,092.—Hydrometric Apparatus.—Louis Brawer, Memphis, Tenn. Antedated Sept. 18, 1865:

First, I claim registering the quantity of high wine as it flows from the cooler of a distilling apparatus, by means of an apparatus which is so constructed that the registering mechanism thereof will be automatically controlled by the strength of the flowing liquor, so as to be stopped when the liquor is below proof, and started again by liquor above, substantially as described.

Second, Providing the case, A, A, with an inlet pipe, a, a, leading to the cooler of a still, a pipe, G, for receiving the buoy, J, and a discharge pipe, H, for conducting the liquor from the apparatus substantially as described.

Third, Providing the wheel, B, with one or more projections, p, in combination with a buoy or float, J, operating g, substantially as described.

Fourth, The combination of an alarm wheel, b, or its equivalent, with the wheel, B, which actuates a mechanism for registering gallons and barrels, substantially as described.

Fifth, Automatically controlling the testing mechanism or device by the strength of the flowing liquor, substantially as set forth.

50,093.—Cultivator.—William J. Burton, Turtle, Wis.:

I claim the bows, C, C—thus I claim broadly—the whole arranged as and for the purpose described and set forth.

50,094.—Hand Spinning Machine.—Jesse Byrkit, Fairfield, Iowa:

First, In hand spinning machines placing the main driving wheel outside the frame, and an intermediate wheel, B, beneath the bed of the frame, so that neither wheel shall interfere with the run of the carriage up to the driving end, substantially as shown, thereby enabling me to shorten the bench, and to run the carriage to the driving end.

Second, I also claim in hand spinning machines so placing the crank or driving wheel and the treadle for running the carriage in and out that the spinner can sit behind the end of the machine while at work, substantially as described.

Third, I also claim in hand spinning machines providing a box at the outer end of the bench to receive the carriage, substantially as described.

50,095.—Curling Iron.—Hibbard Christian, New York City:

I claim a hollow curling tube adapted to receive and retain a supply of hot water as a heating medium, substantially as set forth.

50,096.—Skate.—Selah H. Clark, Philadelphia, Pa.:

I claim the within-described skate, composed of the runner, A, and detachable foot-piece, B and B', the whole being constructed and arranged substantially as and for the purpose herein set forth.

50,097.—Machine for Making Drain Tiles.—Thomas A. Collins, Josiah D. Evans and Thomas J. Smedley, Smyrna, Del.:

First, We claim the use in a tile machine of two plungers, each operating in a separate chamber, which communicates with the mixing box, said plunger being applied in combination with a double crank, substantially as and for the purpose set forth.

Second, Casting the arms of the mixer separate, each with its distinct hub, substantially as and for the purpose described.

50,098.—Sash Supporter.—William Conner, Wilmington, Del.:

I claim constructing or arranging a sash supporter composed of a friction wedge and spring set in a box of corresponding shape with the friction or wedge, parallel to and pressing against the edge side of the sash frame, rising upward therefrom in the manner herein set forth, so that by pressing the arm or thumb rest of the friction wedge the sash is raised with ease, and upon a removal of the pressure from said arm or thumb rest the sash is held at the height raised.

50,099.—Shutter Hinge.—Daniel G. Coppin, Cincinnati, Ohio:

I claim the arrangement of double ratchet plate, H, with the teeth, paws or talons, E and M, upon the fixed and movable members of the hinge respectively.

50,100.—Washing Machine.—Joseph Davenport, Nesqueum, Wis.:

I claim the rubber suspended or hung from the shaft, C, by a single rod, D, which is pivoted in a shaft, F, at one end of the rubber, to admit of a lateral adjustment of the same, as well as a forward and backward movement, in connection with the concave of

rollers, I, all being arranged to operate substantially in the manner as and for the purpose set forth.

[This invention relates to a new and improved clothes-washing machine, of that class in which a swinging rubber is employed, and arranged to work over a stationary or fixed washboard. The invention consists in a novel way of hanging the rubber, whereby the same is rendered capable of being operated or manipulated with the greatest facility, and in such a manner as to conform to the clothes on the washboard, and subject all parts of the clothes to a requisite degree of rubbing and friction to insure a thorough cleansing of the same.]

50,101.—Amalgamator.—Austin G. Day, New York City:

I claim the combination of a suitable fire-chamber or furnace flue, A, A, or its equivalent, with the amalgamating cylinder, or its equivalent, substantially in the manner and for the purpose herein set forth.

I also claim the feeding and discharging apparatus of the cylinder, in combination with the feed of mineral and vapor of metal, as set forth.

I also claim the distributor, D, as set forth.

50,102.—Mode of Making Clasps for Hoop Skirts.—John H. Doolittle, Ansonia, Conn.:

I claim forming the clasps, or other similar articles, by means of a succession of sets of rotary dies where the strip of stock fed to the dies is divided into several parts, in the manner substantially as hereinbefore described.

I also claim forming blanks of sheet metal by one set of rotary dies, and close together, substantially as described, so that in their subsequent separation and forming up no stock is wasted.

50,103.—Apparatus for Carbureting Air.—C. M. Drennan, Boston, Mass.:

First, I claim the uneven angular or curved edges of the partitions, F, as and for the purposes herein specified.

Second, In combination with the revolving bucket wheel, I, within the closed case, A, the air pipe, G, and receiver, E, substantially as and for the purposes set forth.

Third, In combination with the closed case, A, and revolving bucket wheel, I, the removable top, C, constructed as and for the purposes specified.

Fourth, The combination of the curved partitions, F, and heads, I, with the box, U, and escape pipe, R, M, substantially as and for the purposes specified.

Fifth, The combination with the receiver, E, with the valve, b, and pipes, G H g, as and for the purposes specified.

50,104.—Plate for Pressing Gunpowder.—Lammot Du Pont, Wilmington, Del.:

I claim the use of plates, made of hard or indurated rubber, for pressing gunpowder, as and for the purpose substantially herein described.

50,105.—Molding Lamp Chimneys.—Edgar Eltinge, Kingston, N. Y.:

I claim, in molds for pressing glass chimneys for lamps, forming a depression on the side, in connection with an air hole for forming a tube in the sides of such chimneys, substantially as and for the purpose specified.

[This invention relates to an improvement in the construction of molds for pressing glass lamp-chimneys, and it consists substantially in providing the mold with a depression in its side, for the purpose of forming a lateral tube in the side of the chimney, opening therein at such a height as to permit easy access to the wick of the lamp with a match or taper.]

50,106.—Combined Knife, Tweezer and Ear Spoon.—C. B. English, Springfield, Mass.:

I claim, as a new and improved article of manufacture, the device herein described.

50,107.—Steam Gage.—Hampton W. Evans, Philadelphia, Pa.:

I claim, First, Combining one or more spring rings, B', with the diaphragm spring plate, B, for increasing its strength and elasticity, substantially as herein set forth.

Second, The combination of the link, L, with elliptical foot piece, J, and toothed quadrant, M, substantially as and for the purpose above described.

Third, The combination of the spring, K, with the elliptical foot piece, J, substantially as described and for the purpose above set forth.

50,108.—Machine for Disintegrating Fibrous Plants.—Joseph Evans, Newark, N. J.:

I claim the use, for the object specified, of toothed or plain-edged screws, constructed and operated in the manner herein set forth; also the coiler, with the inside projections, when used in combination with a screw or screws.

50,109.—Steam Generator.—Edward Faron, New York City:

I claim, First, The construction of a steam boiler in which all the steam generators shall pass through the superheating tubes, as and for the purpose set forth.

Second, The construction of a steam boiler in which the generating and superheating tubes are arranged horizontally, or nearly so, and entirely within the furnace, substantially as described.

Third, The perforated plugs, J, J, in the receiving ends of the superheating tubes, for the purpose of equalizing the flow of steam in all the superheating tubes alike.

Fourth, The perforated plate, K, in combination with the generating tubes and the superheating tubes, as and for the purposes set forth.

Fifth, The water guard, L, in combination with the superheating tubes, in the manner and for the purpose described.

Sixth, The arrangement of the generating tubes, B, B, and the superheating tubes, C, C, in such a manner as that the fire passes around the outside of both, as set forth and described.

50,110.—Composition for Cleansing the Teeth.—Eliza J. Field, Waltham, Mass., executrix of Francis Field, deceased:

I claim the within-described dentifrice, made of the materials specified, and mixed together in about the proportions set forth.

50,111.—Gas Pipe Coupling.—De Lancy Freeborn, New York City:

I claim the combination of the inner cylinder, a, and the slotted thimble, B, between which F is inserted and compressed, and the compressing thimbles, C, all substantially in the manner and for the purpose herein set forth.

50,112.—Kettle Scraper.—Ensign C. Fuller, Lowell, Mass.:

I claim the scraper described as a new article of manufacture, for the purpose specified.

50,113.—Fruit-drying Frame.—C. Gardner, Freedom, Ohio:

I claim the adjustable standard, A, hubs, D, wires, d, braces, I, and arms, C, when especially arranged and operating conjointly as and for the purpose set forth.

50,114.—Brace for Carriage Springs.—Christopher C. Gleason, Wauconda, Ill.:

I claim the specific arrangement and adjustment as described, to wit: attaching the revolving levers to the bottom of the carriage box, and attaching the braces to said lever and the front and rear axles, substantially as set forth.

50,115.—Quartz Mill.—Nathaniel Goodwin, Jr., Newburyport, Mass.:

I claim, First, The arrangement in a single case or chamber, F, of the two grinding or crushing wheels, M, M, revolving toward each other, substantially as set forth and for the purposes described.

Second, In a grinding or crushing mill thus constructed, for the purposes specified, the central ridge or deflector, G, in combination with the wheel, M, M, substantially as and for the purposes described.

50,116.—Bobbin for Spinning.—John Goulding, Worcester, Mass.:

I claim the combination of a metal spring or springs with the base of the bobbin, substantially as and for the purposes set forth.

50,117.—Sewing Machine.—Charles Hale, Bangor, Me.:
I claim, First, The application to the needle thread of sewing machines of a current or blast of air, which will deflect the thread in the right direction for the formation of the loop and stitch, as herein described and shown.
Second, I claim the combination of the air pump, M, and tube, O, substantially as and for the purpose specified.

50,118.—Bed Bottom.—R. L. Hall, Lowell, Mass.:
I claim the combination of the elastic springs, b b b, the windlans, d d, and slats, a a a, for the purpose described.

50,119.—Sawing Machine.—Thomas Harper, West Manchester, Pa.:
I claim the arrangement of the drum, B, pulley, C, sliding frame, D, screw, E, pulleys, I 2 and 3, levers, I m and n, and shifting pieces, O, the whole being constructed, arranged and operating substantially as herein described and for the purpose set forth.

50,120.—Door Bolt.—W. H. Hart, New Britain, Conn.:
I claim providing a support at the extended end of the main shaft or bolt of a Z or neck-shaped bolt, substantially as shown and described.

50,121.—Petroleum Burner for Cooking, Etc.—John P. Hayes, Philadelphia, Pa.:
I claim in a hydro-carbon burner for heating and cooking, the combined arrangement of a bent heating tube, A B, and a heating chamber, C, so constructed as to operate together substantially as described and set forth, for the purposes specified.

50,122.—Churn Dasher.—Jonas Hobbs, North Sanford, N. Y.:
I claim a churn dash, constructed of two cross bars, a a, provided with oblong openings, b b, and with inclined bars, c, attached to the outer ends of the cross bar, a, and to the dash staff, A, and provided with openings, d, substantially as herein shown and described.

[This invention consists in constructing the dash or dasher in such a manner that the air, during the process of churning, will be incorporated with the cream, and the latter subjected to a considerable degree of agitation, whereby all the butter contained in the cream will be produced in a short space of time.]

50,123.—Foot Warmer.—Hermann Hock and Jacob Zitz, Philadelphia, Pa.:
We claim, as a new article of manufacture, the foot-warming stool herein represented and described, consisting of the external case, A, upholstered hinged cover, a b B, sheet-metal water-box, D, fitting closely within the case, non-conducting lining, C, and feet, F, all as specified.

[This invention consists in a foot warmer, so made as to permit of its use in all places of exposure, as well as in sheltered places (like the apartments of a house), it being very portable and easily prepared for use.]

50,124.—Neck Yoke and Whiffletree Socket.—C. C. Holman, Clayville, N. Y.:
I claim the mode of securing the angle lever, D e, in its place, by casting the chamber socket, B b, on to it, so that the joint and the spring, E, which holds the lever, D, closed against the hook, C, will be protected, all constructed, as and for the purposes herein described.

50,125.—Breech-loading Fire-arm.—Charles Howard, New York City:
I claim, First, The combination of the plunger, P, the link, N, and the lever guard, F, said lever guard being so constructed and adapted to the other parts as to connect to the plunger by means of an opening for the insertion of the cartridge in the under side of the barrel, and also to perform the several functions of a trigger guard, a lever for operating the plunger, and a recoil block between the plunger and a fixed portion of the gun, substantially as and to the effect hereinabove set forth.

Second, I also claim as my improvement the plunger, made with a head screw into the back end to hold the spiral spring, and to guide the hammer rod; also, the groove in said plunger for the sliding hook to travel in, substantially as and for the purpose set forth.

Third, I claim the form of the center percussion pin, L, being formed with a large flat head fitting the whole caliber of the plunger, and covering the head of the percussion pin so that when the center pin is struck by the head of the hammer it drives the small side pin also, and also holds the small pin in its place, substantially as and for the purpose set forth.

Fourth, I claim the making of the hook and the spring that holds the hammer rod both in one piece, and of fastening the same to the upper instead of the lower strap of the breech-piece, substantially as and for the purpose set forth.

Fifth, I also claim the peculiar construction of the stirrup, K, as being made so that it braces the end of the hook, spring, hammer rod and trigger, holding the hammer rod firmly to the hook when the gun is cocked; it also pulls the rod from the hook when the trigger is pulled to fire the gun, substantially as and for the purpose set forth.

50,126.—Tank for Transporting Oil, Etc.—G. W. Howard, Pontiac, Mich.:
First, I claim the closed tank for transporting or storing oils securely, when arranged and operating substantially in the manner described.

Second, Accommodating the expansion or contraction of oils in closed tanks by the resistance of a column of water, substantially in the manner described.

Third, The combination of the tank, cisterns and reservoir, substantially in the manner and for the purpose set forth.

50,127.—Tobacco Pipe.—Edwin Hoyt, Stamford, Conn.:
First, I claim the disk or diaphragm, C, arranged in the bowl of the pipe below the smoke passage, substantially as specified.

Second, The combination of the tube, a, and diaphragm, C, with the bowl, A, and nicotine chamber, D, substantially as shown and described.

50,128.—Surgical Apparatus for Exsections.—Erasmus D. Hudson, New York City:
First, I claim the apparatus for exsections of bones and joints of the arm and of the shoulder joint, constructed substantially as described.

Second, I also claim the scapular and saddle pad, a, for the shoulder, constructed substantially as described, and I also claim it in combination with the universal joint which connects it to the case, e, substantially as described.

Third, I also claim, in combination, the scapula and saddle pad, a, the case, e, and the joint, d, constructed substantially as described.

Fourth, I also claim, in combination, the elastic bands, P O and U, with the scapula and saddle pad, a, and as humeri case, e, constructed substantially as described.

Fifth, I also claim the thumb-piece, j, in combination with the cord or tendon, k, and the grooved elbow joint, whereby the hand is turned over when it is raised, constructed substantially as described.

Sixth, I also claim the cords or tendons, m, representing the biceps or flexor muscles of the fore arm, in combination with the stanchions, n, on the frame of the elbow joint, and with the case, h, of the fore arm, constructed and arranged substantially as described.

Seventh, I also claim the flexible aponeurotic bands, f l, applied to the rigid cases, e and h, substantially as described, for the purpose of banding and confining the muscles.

50,129.—Churn.—William L. Imlay, Philadelphia, Pa.:
I claim constructing the dasher of a single flat disk or wheel set at an angle of 45°, or thereabout to the axis of the shaft by which it is rotated, the body of the churn having such length and diameter that the oblique disk sweeps near the inner surface of both end and side, as and for the purpose specified.

50,130.—Machine for Dressing Wagon Wheels.—Silas T. Jackson, Sheboygan Falls, Wis.:
I claim the combination of a bearing wheel, D, planers, G, and smoothing disks, I, operated and operating substantially as and for the purpose set forth.

50,131.—Washing Machine.—Wm. Jackson and Frank Robinson, New York City:
We claim the combination with a corrugated or roughened board, A, of the rubbing surface, H, grooved roller, B, and handle, F, mounted in a sewing frame, the whole constructed and operating substantially as described and specified.

50,132.—Manufacture of Spirits of Turpentine.—John Johnson, Saco, Me.:
I claim the employment and use of water, steam, air, or gases and solvents, when circulating around, among and through wood, timber or lumber, in proper receptacles, at a temperature sufficiently low to receive the exhaustive terebinthinate and resins free from empyreumatic odors.

I claim the mode of procuring resin and spirits of turpentine by heating the lumber or wood placed over a stratum or sheet of water, which condenses the volatile products of the wood therein, and frees the resin, when the same is used in combination with the seasoning of lumber or timber by hot air or steam, substantially as specified.

I claim the mode of using two boilers successively for economizing the heat and avoiding waste of terebinthinate products, substantially as specified.

I claim the mode of increasing the temperature of the liquid for extracting the volatile products by the use of any suitable soluble salt, substantially as specified.

I also claim passing heated air over the surface of a liquid to, and in taking up, the volatile products previous to their entry into condenser, substantially as specified.

I claim pressing wood after steaming to eliminate the oleoresins, substantially as specified.

50,133.—Damper.—William Johnson, Milwaukee, Wis.:
I claim a damper with convex side, hollow in the center, with openings for the smoke to pass in, and a passage for its exit, substantially as described.

50,134.—Grain Drill.—James D. Jones, Pittsburgh, Pa.:
I claim suspending the hopper or seed-box, C, on a stationary bar, x, and imparting to the hopper or seed-box an oscillating motion, the whole being constructed, arranged and operating substantially in the manner herein described, and for the purpose set forth.

50,135.—Drag Bar and Teeth for Grain Drills.—James D. Jones, Pittsburgh, Pa.:
I claim the use of the attachment plate, A, furnished with the receiving hopper, B, and used in combination with the drill, D, and distributing tube, C and e, constructed, arranged and operating substantially as herein described, and for the purpose set forth.

50,136.—Sash Fastening.—Oliver S. Judd, New Britain, Conn.:
I claim the handle, J, united to the turned button, G, by a shank, L, in combination with the spring hasp, D E, substantially as and for the purpose described.

50,137.—Mop Head.—Corydon Karr, Buffalo, N. Y.:
I claim the combination and arrangement of the jam nut, C, with the threaded collar, B, and screw shank, A, operating as and for the purposes set forth.

I also claim, in combination with the jam nut, C, and collar, B, the pivoting of the screw shank, A, in the stationary jam, D, whereby the opening and closing of the jaws may be effected by turning either the head or handle of the mop, substantially as described.

I also claim, in combination with the threaded collar, B, and screw shank, A, forming the contiguous surfaces of the jam nut, C, and collar, B, conical or of equivalent shape, substantially in the manner and for the purposes set forth.

50,138.—Coupling Shaft of Boring Tools.—Edward Kaylor, Pittsburgh, Pa.:
I claim so constructing the male screw for the joint of boring tools as that the body of the screw at the base of the threads shall be tapering from the fillet upward, while the diameter of screw at the circumference of the threads shall be cylindrical, for the purpose of strengthening the screw at its base, substantially as hereinbefore described.

The inclined eccentric bearing on the face of the male screw, in combination with the socket and its set screw, constructed substantially as and for the purpose hereinbefore set forth.

50,139.—Machine for Finishing the Cascade of Guns.—Edward Kaylor, Pittsburgh, Pa.:
First, I claim the use of a revolving cutter guided, as hereinbefore described, by means of a point pressing against that part of the face of the cascade which has been operated upon by the cutter, in combination with the tool and screw carrier for moving the cutter toward and from the axis of the gun, for the purpose of planing the cascade of guns.

Second, The use of a revolving cutter, having a guide point revolving with it and pressing against the face of a forming disk, in combination with the tool carrier and screws for moving the guide point toward the center of the disk as the cutter moves toward the axis of the gun, for the purpose of planing the cascade of guns, in any required shape, substantially as hereinbefore described; also combining in one machine the tools for ratcheting and planing the cascade—all constructed and arranged and operating substantially as hereinbefore described.

50,140.—Wheat Drill.—John F. Keller, Greencastle, Pa.:
First, I claim the above-described check link for the purpose of limiting the motion of the bar or lever, G, substantially as set forth.

Second, The arrangement and combination of the link, H, the bar or lever, G, and the boot, A, with the spring for giving flexibility to the boot and shovel, substantially in the manner and for the purposes set forth.

50,141.—Cultivator.—W. H. L. King, Princeton, Iowa:
I claim the plow beams, E E, attached to the frame, A, by means of the universal joints, F, in combination with the uprights, G G, and slide, H, and foot levers, J J, all arranged to operate in the manner substantially as and for the purpose set forth.

I further claim the pivoted frame, Q, connected to the shaft, M, substantially as shown, when used in connection with the plow beams, E E, connected to the shaft, M, and all arranged substantially as and for the purpose specified.

[This invention relates to a new and improved cultivator of that class which is provided with laterally and vertically adjustable plows, in order to admit of the latter being moved to conform to the sinuities of the rows of plants, and also to raise and pass over them. The object of the invention is to obtain a simple device for the purpose specified, and one which may be readily operated or manipulated by the driver.]

50,142.—Mode of Sinking Well Tubes.—Chas. W. Kinne, Cortland, N. Y.:
I claim forming the opening point, F, as a part of the interior rod, B, and said same, in combination with the tubing, A, in such a manner that a separate point for each well is dispensed with, substantially as herein set forth.

I also claim coupling the adjustable collar, C, with the tubing, A, by means of the screw threads, a c, and connecting the said collar with the interior rod, B, by means of the set screw, g, and holes, h, the whole arranged substantially as herein specified, for the purpose of preventing the brushing of the end of the tubing and for retaining the same in place.

I also claim the arrangement and combination as a whole, consisting of the interior rod, B, with fixed point, f, tubing, A, with sharp edged extremity, a, and adjustable collar, C, connected by the screw threads, a c, substantially as described.

50,143.—Mode of Lubricating Journal Boxes.—Joseph F. Light, Worcester, Mass.:
First, I claim the combination with the box of a journal or bearing of a tube or tubes, G, and wick or wicks, c, substantially as and for the purpose set forth.

Second, The combination with the oil cup or drip pan and lower half, A, of a journal box or bearing of a hollow supporting stem, D, and wick, c, substantially as set forth.

50,144.—Wooden Coffin.—Mahlon B. Margerum, Trenton, N. J.:
I claim the forming and constructing the sides and rounded head of wooden coffin with one single or entire piece of wood, and bending the same so as to form the coffin, substantially as above described and herein set forth.

50,145.—Wagon Brake.—A. B. Mattoon, Niles, N. Y.:
I claim the pulley fulcrumed levers, E P N E P N, the revolving brake block, B, the short single lever, S, and the rod, T, combined and arranged as described.

50,146.—Apparatus for Enameling Moldings.—Benjamin McEachren, San Francisco, Cal.:
I claim as my invention and improvement in enameling baths a movable bottom for raising the work or moldings up out of the enamel or paste, substantially as described; and, in combination with the enameling bath, I claim the steam chamber for heating the bath, and keeping it hot, substantially as described.

I also claim the combination of the transversing carriage, hopper

and enameling tool, substantially as described, for the purpose set forth.

50,147.—Ventilating Pad.—James P. McLean, Brooklyn, N. Y.:
I claim the spring plate, A, having an opening or openings, N N N N, either separate or in combination with the volute or cone-shaped spiral spring or springs, S S S S, operating in the manner and for the purpose set forth.

Second, I claim the volute or cone-shaped spiral spring or springs, S S S S, either separate or in combination with the spring-supporting surface, A A A, with openings, N N N N, as applied to a riding saddle or harness tree for ventilative and other purposes, substantially in the manner and for the purposes set forth and shown in the drawings.

50,148.—Car Coupling.—Amos Melot and Jeremiah T. Try, Reading, Pa.:
We claim the arrangement of the trough, T, spiral springs, F, chain, G, and lever, L, when constructed and combined with the frame and rubber lining, as herein described, and for the purposes set forth.

50,149.—Curtain Fixture.—Purches Miles, New York City:
First, I claim a friction knob, button or analogous device, in combination with the cord passing from the spool of the curtain roller, and a spring or its equivalent, to take up the slack of said cord, substantially as and for the purposes set forth.

Second, I claim the inclined slots or notches, formed in the bracket, d, for the reception of the axis of the curtain roller, so that the bracket can be used at either end of the roller, in the manner and for the purpose set forth.

50,150.—Hay Derrick.—William Minick, Kansas, Ill.:
First, I claim the swivel upright, E, applied to the permanent upright, B, in combination with the inclined box, F, secured to E, and connected to the lower part of B by the bar, H, all arranged substantially as shown, to form a new and improved crane for a hay elevating device.

Second, The segment, I, attached to the bar, H, in combination with the rope, J, pulley, K, and the hoisting and branch ropes, L L', all arranged in combination with the crane, to operate in the manner substantially as and for the purpose set forth.

Third, The bracing of the inclined bar, F, by means of the transverse bar, G, and iron rods, d d, substantially as and for the purpose described.

[This invention relates to a new and improved machine for elevating hay, and it consists in a novel construction and arrangement of the parts, whereby a very simple and efficient device is obtained for the purpose, and one which may be operated with but little labor.]

50,151.—Pressure and Gravitation Machine.—Charles Monson, New Haven, Conn. Antedated Sept. 15, 1865:
First, I claim the double utilization of vapor and weight of the same fluid, for the purpose and substantially in the manner as herein set forth.

Second, The use of two fluids, a denser and a lighter, substantially in the manner and for the purpose described, but as having the slot, d, in the said lever, to enable the latter to slide upward on its fulcrum, under circumstances and for the objects as hereinbefore explained.

50,152.—Car Coupling.—Loring Moody, Malden, Mass.:
I claim as my improvement in the car coupling, as made not only with the pendulous pin, C, combined with or applied to the lever, H, and so as to operate therewith, in manner and under pressure of the link, substantially as described.

50,153.—Apparatus for Ejecting Refuse Moth from Steam Vessels.—John Palmer, Sandfield, Mass. Patented in England July 23, 1863:
I claim the construction and arrangement of apparatus, substantially as herein specified, for expelling solid and liquid substances from ships and other vessels into the water below the water line, and for other analogous purposes, as herein set forth.

50,154.—Water Pipe.—John S. Patrie, Victor, N. Y. Antedated Sept. 18, 1865:
I claim a pipe composed of wooden hoops spirally wound, substantially as shown and for the purposes herein set forth.

50,155.—Hydrant.—R. P. Patterson, Cincinnati, Ohio:
I claim the arrangement of main pipe, A, valve chamber, B, slotted aperture, E, axial plunger, D, branch, C, discharge pipe, F, and drip or waste way, H, the same being combined and operated substantially as set forth.

50,156.—Let-off for Looms.—Job Phillips, Pawtucket, R. I.:
I claim combining the vibrating bar, J, with the shield, H, by means of the arm, L, rigidly attached to the bar, all constructed and arranged as described.

50,157.—Sewing Machine.—Louis Planer, New York City:
I claim the employment and use of a braider, in combination with a lifting presser foot, whereby the sewing or braid, cord, etc., for ornamental work, in curves, figures, etc., is greatly facilitated, substantially as described and specified.

50,158.—Cider Mill.—Charles Pool and Moses Eddy, Blissfield, Mich.:
I claim the perforated cylinder, G, encompassed by the screen, b, in connection with the endless conveying band, E, the pressure band, H, and any suitable grating or crushing device, substantially as and for the purpose herein set forth.

50,159.—Harvester Rake.—John Paulson, Jr., Pitts-town, N. J.:
I claim the shaft, N, operated through the medium of the crank pulley, K, and connecting rod, L, in connection with the cam, O, lever, P, chain, Q, and pivoted socket, R, in which the rake staff, E', is fitted, all being arranged to operate substantially in the manner as and for the purpose specified.

[This invention relates to a new and improved automatic raking device for harvesters, whereby, it is believed, a simple, economical and efficient means is obtained for the purpose specified, and one which will operate perfectly when the machine is passing over undulating or uneven ground.]

50,160.—Flour Sifter.—E. L. Pratt, Boston, Mass.:
I claim, First, The combination of the clamp, a, and standard, B B', made to operate substantially as described.

Second, I claim the rocker bar, D, when pivoted to the crank shaft, C, for the purpose set forth and described.

Third, I claim the vibrating fingers, E E, when constructed to operate in the manner and for the purpose set forth.

50,161.—Steam Boiler.—T. W. Pratt, Boston, Mass.:
First, I claim the cone-shaped boiler, constructed as set forth, provided with the inclined radial flues, substantially as and for the purpose described.

Second, The conical chimney or case, in combination with the cone-shaped boiler, substantially as set forth and for the purpose described.

50,162.—Washing Machine.—T. J. Price, Macomb, Ill.:
I claim the springs, f, attached to the vibrating frame, in combination with the movable plunger, C, and the stationary board, B, all arranged and operating as and for the purpose set forth.

50,163.—Manufacture of Boots and Shoes.—Dan Read, New York City:
I claim securing soles made or formed of gutta serena, india-rubber or other vulcanizable gums, compounded and prepared for vulcanization to boots or shoes made of leather, and vulcanizing the same, in the manner and for the purposes specified.

I also claim covering the uppers of boots and shoes made of leather with the compound above referred to, and vulcanizing it on the leather, in the manner and for the purpose specified.

50,164.—Ruffling Device for Sewing Machine.—Leonard C. Riggs, Florence, Mass.:
I claim, First, A ruffler and gathering device for use on sewing machines, which is distinct from, and independent of, the feeding device, and which does not feed the material, but (which is operated

by the movement of the material in sewing, constructed and operating substantially as shown and described.

Second, I also claim, in combination with the gears, wheels, C, H and O, with the spring plates, a and d, for the purpose of ruffling and gathering cloth when being sewed, substantially as described.

50,165.—Apparatus for Finishing Hats.—John A. Roche and J. J. Stewart, Williamsburgh, N. Y.:

We claim, First, In hat-finishing machines, the combination on the same arm of an iron and a lurer, substantially as described.

Second, We also claim hanging the iron from a hollow shaft, H, substantially as described, so that the whole series of irons can be raised and lowered, by means of the crank shaft, B.

Third, We also claim applying a yielding pressure on the hub, F, so that the irons are free to move upward when passing over an uneven surface, substantially as shown.

Fourth, We also claim arranging and operating a series of hat blocks and a series of irons around a common center, substantially as shown.

Fifth, We also claim the combination, substantially as shown, of the spindles, T, one or more, with the hat blocks, L, one or more, and the pawl and ratchet, the same being constructed and operated substantially as shown.

Sixth, We also claim placing a pulley in the base of a hat block, for tightening the cord which fastens the hat on the block, substantially as shown.

Seventh, We also claim in hat blocks passing a cord through its side or sides, for the purpose of holding the hat thereon during the finishing process, substantially as described.

50,166.—Chair Bottom.—Charles Russell, Wilmington, Ohio:

I claim the additional set of rounds or slats, B, B, situated closely below, and in combination with, the ordinary upper set of rounds, A, A, substantially as and for the purpose herein specified.

50,167.—Snap Link.—C. W. Saladee, Newark, Ohio:

I claim the spring, B, or its equivalent, in combination with the open link, A, in the manner and for the purpose substantially as shown and described.

50,168.—Bed Bottom.—R. S. Sanborn, Ripon, Wis.:

I claim the combination of longitudinal and transverse wooden slats, D and G, suspended from the frame by annular rubber springs, which are attached to notched strips, E and H, substantially in the manner described.

50,169.—Alarm Coffee Boiler.—E. K. Sargeant, Boonton, N. J. Antedated Sept. 14, 1865:

I claim as my invention, and desire to secure by letters patent, the combination and arrangement in a coffee boiler of the condenser, C, with the tube, T, valve, V, and whistle, W, substantially in the manner and for the purpose herein set forth.

50,170.—Machinery for Dressing Edges of Slate Frames.—John W. Sayre and Alexander S. Schull, Martin Creek, Pa.:

I claim the frame, T, arranged to vibrate as described, and provided with a clamp, V, or its equivalent, and operated in connection with the rotating cutter, J, for the purpose of rounding the corners of slate frames.

50,171.—Fire Shrinking Machine.—Melchior Scott, Fairfield, Iowa.

First, I claim the caps, C, C, dogs, 22, and the cranks, 11, constructed and arranged as described.

Second, The rods, p, p, eveners, O, and clevis, R, in combination with the lever, P, for operating the clamping device, as described.

50,172.—Fruit Jar.—Allen Sherwood, Auburn, N. Y.:

I claim removing preserved fruit from a can, jar, bottle, or other article in which it may have been placed, by means of a secondary receiver or vessel, properly secured thereon, and from which the air is exhausted, substantially in the manner described and for the purpose specified.

50,173.—Dividers.—S. Addison Shurtleff, Taunton, Mass.:

I claim the centering leg, D, arranged in combination with the main legs, B, B', substantially as and for the purpose described.

Also passing the centering leg through the head of the dividers, substantially as and for the purpose specified.

[This invention consists in combining with the ordinary legs of a pair of dividers a centering leg, which passes down through the head of the dividers, and is adjustable in a nut suspended by suitable links or toggle arms from the ordinary legs, in such a manner that said centering leg can be adjusted up and down, according to the position of the main legs, and that by the centering leg the distance measured off by the main legs can be divided off in two equal parts without loss of time.]

50,174.—Steam Generator.—George Sill, Wilkins, Pa.:

I claim the application of an additional boiler or water space, in combination with the smoke chamber and with the hermetically closed fire-place of a steam generator, constructed and operating substantially as and for the purpose set forth.

[The object of this invention is to employ the heat which gradually escapes from a steam boiler uselessly into the smoke stack, for the purpose of raising the temperature of a mass of water, and eventually to generate steam.]

50,175.—Clamping Device.—Edward Simmons, South Providence, R. I.:

I claim the employment or use of wooden, gutta percha, leather or strips of other material, inserted in, or applied to, a clamp of a boot-crimping machine, substantially in the manner as and for the purpose herein set forth.

50,176.—Vent for Barrels.—Thomas Simmons, Chicago, Ill.:

I claim, First, The combination and arrangement of the cylinder, A, the piston, C, cushion, c, spring, H, and their slots, a, substantially as specified and shown.

Second, I claim, in combination with the above-mentioned parts, the employment of the tapering hollow screw, N, as and for the purposes set forth.

50,177.—Method of Preparing Mastic Roofing.—Robert Skinner, George Duncan and Cesare Merighi, San Francisco, Cal. Antedated Sept. 22, 1865:

We claim the described combination of coal tar in combination with brimstone, mixed together in the manner and about in the proportion described, and applied to the canvas and roof, substantially as and for the purpose set forth.

50,178.—Planing Machine.—H. B. Smith, Lowell, Mass.:

I claim the use of the horizontal universal jointed shaft, r, in connection with the feed rollers of planing machines, etc., arranged substantially in the manner described and for the purpose specified.

[This invention consists in connecting and arranging the upper and lower feed rollers of the planing machines in such a manner that they can be properly adjusted with regard to each other at pleasure, thus increasing or decreasing the opening or space between them, according to the thickness of the board or plank to be planed, without disconnecting or disarranging their connection with the driving power employed.]

50,179.—Bee Hive.—George Spinney, Saugus, Mass.:

I claim, First, Arranging the two boxes of a double-box bee hive, in such a manner that a dead air space shall be left between the two and surrounding the inner box at all its sides and bottom, substantially as and for the purposes described.

Second, In combination with the swinging frame, C, the board, P, to be applied for winter use, or in transporting the hive, substantially as herein described. I claim the ventilating cover, H, when constructed with air passages, R and S, and double inner and outer protecting screens, as herein described.

50,180.—Soap Composition.—E. Sprague, Schenectady, N. Y.:

I claim a soap composed of the within-described ingredients, mixed together substantially in the manner and about in the proportion set forth.

50,181.—Fruit Jar.—John J. Squire, New London, Conn.:

I claim closing the end hole, D, and supply hole, E, of the cover of a jar by means of cap F, made substantially as described.

I also claim holding the covers of jars in place by means of elastic bands or straps, or their equivalents, applied substantially as shown and described.

[This invention consists in an improvement in fruit jars, whereby, among other new features, the cover is held down upon the body of the jar with an elastic pressure by means of a strap of rubber or other yielding material or device.]

50,182.—Meridian Finders.—William Stackpole, Brooklyn, N. Y.:

I claim a meridian finder, in combination with a transit or similar surveying instrument, said finder consisting of a reflector mounted on an axis at right angles to the line of collimation of the telescope, and having a movement around a center concentric with said line of collimation, substantially as described.

50,183.—Oil Ejecting Cup.—Henry E. Stager, Milwaukee, Wis.:

I claim the adjustable valve, E, in combination with the thread on the rod, D, and the conical spout, C, to regulate the aperture.

50,184.—Cement.—John Stansfield, Brooklyn, N. Y.:

I claim the cement composition herein described.

[This invention relates to the production of a cement to be used for the splicing of machine belts and other similar purposes where the article is subjected to any severe strain.]

50,185.—Die for Making Buttons.—Albert C. Sweetland, North Attleboro, Mass.:

I claim the combination of a counter punch, b, and the discharging passage, c, thereof, with the dies, A, B, and each of the main punches, a, thereof, the whole being arranged substantially as and to operate as specified.

I also claim the arrangement of the groove frame, V, e, with the upper of the two dies, A, B, and their punches, a, a, the whole being as explained.

50,186.—Artificial Denture.—S. C. Taylor, Monroe, Mich.:

I claim the rim, a, projecting from the inside or back part of the teeth, as shown.

Second, The holes, b and f, in the rim, a, and the outer edge of the gum, B, substantially as and for the purpose set forth.

Third, The combination of the vertical pins, e, and dovetailed cavities, c, in the rim, a, as and for the purposes set forth.

50,187.—Casting Grooved Rolls in Metal Molds.—Robert C. Totten, Pittsburgh, Pa.:

I claim casting chilled rolls with grooves, by means of a metallic mold or chill furnished with suitable projections in its inner surface, substantially in the manner hereinbefore described.

The combination with a chill or metallic mold for casting rolls of the rings, a, b and c, divided into two or more parts, and attached to the inner surface of the chill by means of screws or other equivalent device, for the purpose of casting grooved chilled rolls, substantially in the manner hereinbefore described.

50,188.—Machine for Making Knitting Needle.—C. P. S. Wardwell, Lake Village, N. H.:

First, I claim the arrangement and combination of the horizontally reciprocating table, M, the vertically-reciprocating frame, N, and the revolving mill or mills, T, respectively performing the several functions, and in relation to one another, substantially as and for the purposes herein specified.

Second, I also claim the auxiliary cam wheel or projection, E, or the main cam, G, in combination with the additional lever, k, pivoted to the cam lever, g, and to the connecting rod, J, so as to produce increased leverage, substantially as and for the purpose set forth.

Third, I also claim the perforated shear projections, 88, on the movable jaws or dies, P, P, by which the wires are guided and held in place, as well as cut off, in connection with the stationary dies, o, o, as herein specified.

Fourth, I also claim the notched springs, K, K, in combination with the shear projections of the movable dies or jaws, P, P, for clamping the wires and drawing them forward with the table, M, substantially as herein set forth.

Fifth, I also claim spotting the needles, and holding them in the same position and by the same means as when spotted, till all the operations upon them are completed, substantially as herein specified.

Sixth, I also claim the mechanism, or the equivalent thereof, substantially as described, whereby the needles are spotted and then continually held, in like manner and by the same means, till all the operations of the machine upon the needles are completed.

Seventh, I claim so spotting the needles as to leave the rear ends thereof round or of the full size, when arranged in combination with the wire behind, so that the latter shall strike the needles and expel them from the machine, substantially as herein set forth.

Eighth, I also claim expelling the milled needles from, and feeding the forward wires upon, the table, M, by the return motion of said table, the wires remaining stationary for the purpose.

Ninth, I also claim the levers, p, p, for operating the movable jaws or dies, P, P, arranged and operating substantially as described.

Tenth, I also claim the wedges, Q, Q, on the frame, N, traveling with the table, M, in combination with the levers, p, p, as set forth.

Eleventh, I also claim the bed pieces, V, V, arranged substantially as and for the purposes herein specified.

Twelfth, I also claim guiding the milling of the boards through patterns, X, X, actuated by the movements of the table, M, so as to raise or lower the mill or cutter shaft, as required, substantially as specified.

50,189.—Thill Coupling.—H. K. Waterhouse, Factory Point, Vt.:

I claim the spring catch, composed of a spring, C, provided with a beveled projection, b, and applied to the coupling pin, B, in connection with the recess, e, in the ear, A, substantially as and for the purpose herein set forth.

50,190.—Coupling for Shafts of Boring Tools.—James Watson, Philadelphia, Pa.:

First, I claim the construction of a coupling joint by means of collars, F, formed in the solid metal near to the end of the pieces of cylindrical bodies to be joined, the shell, C, C, in two or more parts, with its external conical form, and the sleeve, D, with its external conical form, coupling the above parts as described.

Second, The thread, g, with the nut, E, in combination with the sleeve, D, in this manner, for the purposes described.

Third, The formation of a taper thread on the shell, C, C, and within the sleeve, D, in the manner and for the purpose described.

50,191.—Harvesting Machine.—John Werner, Jr., Prairie du Lac, Wis.:

First, I claim the shaft, M, provided at one end with an arm, B, attached to the axle of a grain wheel, S, and provided at its opposite end with an arm, N, connected by a rod, O, with a lever, P, on the main frame, A, which lever is connected by a rod, I, with an arm, A, at the rear of the draft pole, B, substantially as and for the purpose set forth.

Second, The securing of the wheel, D, to its shaft, C, by means of the screw, d, and jam nuts, e, e, substantially as and for the purpose specified.

[This invention relates to a new and improved raking attachment for automatically clearing or raking the cut grain from the platform. It also relates to a new and improved means for adjusting the sickle to any desired weight; and, further, to a means employed for admitting of the speed of the sickle being varied as may be required.]

50,192.—Lantern.—Wm. Westlake, Chicago, Ill.:

First, I claim the band, d, in combination with the band, b, for the purposes set forth.

Second, The band, l, in combination with the band or upright portion of the bottom, e, for keeping the bottom of the globe in place, as herein described.

Third, The means described for securing the lower ends of the upright bars to the lower bar of the guard.

50,193.—Curtain Clasp.—Jos. G. Whitlier and Thos. M. Powell, Attica, Ind.:

We claim a device for holding up window curtains, constructed substantially as shown and described.

[The object of this invention is to provide a device for holding up window curtains, by using which all kinds of rollers

and the various means of operating them, may be dispensed with, and the invention consists in the construction of a neat and ornamental device for clamping the curtain and confining the roll after the curtain has been rolled up to the desired height.]

50,194.—Packing Tubes of Oil Wells.—R. A. Wilder, Crossona, Pa.:

I claim, in combination with the flexible bag, B, the pipes, C and E, with the valves, I and G, and wire rods, J and H, for the purposes specified.

50,195.—Buckle Fastening.—Wm. Willey, Jr., Kokoma, Ind.:

I claim a buckle, which is constructed of two parts, B and C, the part, B, having elevations, a, on it, on the part, C, being provided with pivoted loop, b, and lugs, d, d, for retaining the part, B, in place, substantially as described.

50,196.—Skate Sharpener.—F. R. Willis, Waltham, Mass.:

I claim a file for sharpening skate irons, having either adjustable or fixed guides, substantially as herein described and for the purpose specified.

I also claim the combination of the file and burnisher, as herein described.

50,197.—Apple Cutter and Corer.—John Wroten, Salisbury, Md.:

I claim the combination of the sector cutter, E, the tubular shank, C, moving in a vertical sleeve, and lever, D, operating within the frame, A, as and for the purpose described.

[The object of this invention is to provide a cheap and efficient device for cutting and coring apples preparatory to drying the same, for producing the article known in the market as dried apples. This invention consists in the use of a circular cutter, divided into sections, which, when forced through the apples placed underneath, will divide or cut the same in pieces of a suitable size for drying. The said cutter has a hollow shaft, and its lower end sharpened which, when pressed down, will take out the core of the apple at the same time that the apple is sliced or divided by the cutter, and discharge the core out of its top end.]

50,198.—Ice Crusher.—Wm. W. Armington (assignor to Geo. E. Mitchell), Lowell, Mass.:

I claim the combination of the crusher, B, the pivoted box, A, the shaft, D, lever, E, and spring, H, operating substantially as and for the purpose specified.

50,199.—Fruit Masher or Lemon Squeezer.—Wm. W. Armington (assignor to Geo. E. Mitchell), Lowell, Mass.:

I claim the platform, A, the stand, B, with its arms, D and E, the lever, C, the horn, I, the yoke, X, the roller, c, the spindle, K, the mash, L, the spring, R, brace, H, the whole arranged to operate substantially as herein set forth and shown, for the purpose specified.

50,200.—Device for Swaging Chain Links.—Virgil Draper (assignor to Oscar M. Draper), North Attleboro, Mass.:

I claim the combination or mechanism, substantially as described, for the purpose set forth, the same consisting of the bed disk, the compressors, the punch and the ring holder and former, the whole being arranged as specified.

50,201.—Seeding Machine.—B. F. Field (assignor to himself and E. T. Bond), Sheboygan Falls, Wis.:

First, I claim adjusting the runners, t, so as to press upon the heel or point, as desired, substantially in the manner as described.

Second, I claim the stirrup, L, for the purpose of attaching and adjusting the covering roller, K, substantially as set forth.

Third, In combination with the seed roller, B, the slide, C, for the purpose of preventing an overflow of seed, substantially as set forth.

Fourth, In combination with the seed roller, the spring, D, for the purpose of preventing an overflow of seed, substantially as set forth.

Fifth, The oblique seed cells, U, U, substantially as and for the purpose set forth.

50,202.—Combined Potato Planter, Seeder and Cultivator.—B. F. Field (assignor to himself and E. T. Bond), Sheboygan Falls, Wis.:

First, I claim the combination and arrangement of the feed wheel, I, shoot, K, and cultivator teeth, E, E, E, substantially as shown and described, and for the purpose set forth.

Second, The combination and arrangement in a seeding machine of the pulleys, B and F, and the set screw, H, for the purpose of regulating the tension of the belt, substantially as set forth.

Third, I claim the compound drag bar, formed of the two parts, d, d, Fig. 5, connected by the slotted plate, M, substantially as and for the purpose set forth.

Fourth, I claim the stop, H, arranged and operated as described, and for the purpose set forth.

50,203.—Manufacture of Sheet Iron.—John and Thomas Grey (assignor to themselves and John D. and Wm. Grey), Pittsburgh, Pa.:

We claim the mode of finishing sheet iron by the process hereinbefore described, consisting of passing it repeatedly through the finishing rolls without removing the scale or oxide when the iron has been previously heated to the ordinary high heat for rolling, and allowed to cool after each heat below the point of a cherry red before passing it through the finishing rolls, for the purpose hereinbefore described.

50,204.—Machine for Making Paper Cap Tubes for Spinning Machines.—Wm. J. Gums (assignor to A. Burgess & Co.), Providence, R. I.:

First, I claim the combination of the rotating and sliding mandrel with the pressure roller, substantially as described, for rolling up and discharging the tubes, as set forth.

Second, The combination of the rotating and sliding mandrel and pressure roller, with the reciprocating motion of the brush, or equivalent therefor, substantially as described, for discharging the paper tubes when completed.

Third, The combination of the rotating mandrel and pressure roller, to roll up the paper with the rotating brush, substantially as described, whereby the end of the paper when introduced is caused to lap around on the mandrel, as set forth.

Fourth, The reciprocating nippers, in combination with the rotating mandrel, substantially as described, and for the purpose of properly presenting the paper to the mandrel, as set forth.

Fifth, The combination of the shears, or the equivalent thereof, substantially as described, to cut off the length of paper required for each tube, with the feeding mechanism for moving the sheet of paper, and the mandrel for winding up the paper, as set forth.

Sixth, The combination of the rollers for feeding the paper and applying paste thereto, the vibrating roller for distributing the paste on the face of the paper, and the mandrel for forming the paper tubes, substantially as described.

Seventh, The combination of the rollers for feeding and applying paste to the paper, the roller for distributing the paste, the shears for cutting off the length of paper required for each roll, the reciprocating nippers, and the mandrel for winding up the paper, or the equivalents of all or any of them, as described.

50,205.—Injector for Steam Boilers.—Sidney Maltby and Charles Osborn, Dayton, Ohio, assignors to themselves and William H. Clark, Cincinnati, Ohio:

First, We claim the valve, E, the nozzle, G, the packing ring, F, the nozzle, H, the cap, D, and cylinder, S, constructed and arranged substantially as described and for the purposes set forth.

Second, We claim the arrangement of the nozzle, L, the waste cock, 3, the flange, V, the lock nut, W, and the cylinder, S, substantially as described.

Third, We claim the supplementary valve, x, attached to a check valve, substantially as described, and for the purposes set forth.

Fourth, We claim the arrangement of the hollow vessel, K, the check valve, 5, or its equivalent, and the vent cock, 4, for the purposes specified.

Fifth, We claim the arrangement of the hollow vessel, B, the pipe, A, and stop cocks, 1 and 2, for the purposes specified.

Sixth, We claim the adjusting index, in combination with the steam injector, for the purposes set forth.

Seventh, We claim the float, 12, in combination with the valves of the injector, for the purposes specified.

Eight. We claim the arrangement of the water jackets, T and U, substantially as described, and for the purposes set forth.

Ninth. We claim a water jacket, when applied to a steam injector, substantially as and for the purpose described.

50,206.—Harvesting Machine.—Griffith Murphy (assignor to himself and Wm. D. Slack), Lewisburg, Pa.:

I claim, in combination with the axle of the machine, the main frame, composed of the two sections, and united or connected therewith, substantially as and for the purpose described.

And I also claim, in combination with the axle and the two sectional frames connected therewith, as herein represented, the arrangement of the driving gear, as herein described and set forth.

50,207.—Washing Machine.—C. C. Phelps (assignor to George G. Campbell), Janesville, Wis.:

I claim the combination of the oscillating presser or rubber, C C, when constructed with vertical curved bars, F, and horizontal ones, I, and the corrugated piece E, with the corrugated bottom piece, E, and parallel side bars, F, the whole constructed and operating substantially as described, and for the purpose set forth.

50,208.—Steam Pressure Gage.—Christian C. Schmidt (assignor to himself and Brothers), New York City:

I claim the continuous endless oblong spring, for the purposes hereinbefore set forth.

I also claim the construction of the spring, thicker at its shank or point of connection with the hollow joint than throughout its length, whereby to give more support to the spring, for the purposes hereinbefore set forth.

I also claim the hollow endless spring, hereinbefore described, in combination with the quadrant-shaped racks and indicator, for the purpose of registering the pressure of steam in steam generators, substantially as hereinbefore set forth.

50,209.—Carriage Spring.—Alexander Selkirk (assignor to Eliza J. Selkirk), Albany, N. Y.:

I claim the levers, D and E, formed as described, and fitted with india-rubber springs, S and T, in combination with the elliptic springs, C1 and C2, substantially as set forth in the above specification.

50,210.—Horse Hay Fork.—S. H. Wheeler, Dowagiac, Mich., assignor to himself, Abner G. Townsend, James Stillwell, R. Heddon, Evan P. Townsend, Chauncey T. Lee and James Sullivan:

I claim, First, The combination of two forks, A A', provided with the suspension bales, B B', and pivot connection, C, and a tripping and retaining device, d e, substantially as described.

Second, Suspending the forks, A A', which have handles, c c', at a point above the upper extremities of said handles by means of bails which are pivoted to the two forks, and which connect these forks together, substantially as described.

Third, The yoke, f, and yoke, e, in combination with the latch, d, applied to the handle, c', of the fork, A', and adapted to receive and hold the handle of fork, A, substantially in the manner and for the purposes described.

50,211.—Carding Engine.—Evan Leigh, Manchester, Eng.:

I claim, First, The peculiar construction, shown and described, of an endless chain or flats or top cards, being self-stripping, and to which any definite angle of the periphery of the main carding cylinder, when at work, can be given.

Second, The bushed chain, by which the flats are hung or suspended in such a way that the pressure of their own weight is received by the chain bushes and the flats are allowed to swivel freely and adjust the selves to any angle to the surface of the main carding cylinder they may have been cut for.

Third, The general arrangement and combination of all the parts as herein described, and illustrated in the accompanying sheet of drawings.

50,212.—Apparatus for Freezing Liquids.—Jean Baptiste, Java Mignon and Stanislas Henri Rouart, Paris, France:

We claim, First, The general construction and arrangement or combination of apparatus having continuous action.

Second, The general construction and arrangement or combination of apparatus having intermittent action.

Third, The particular construction and arrangement of the pumps, stop cocks, distributor and safety valve, all as herein shown and described.

50,213.—Seed Planter.—John Miller, Russellville, Ky.:

I claim, First, Surrounding the openings in the grain trough with bristles, arranged and operating substantially in the manner set forth.

Second, The combination of the feed roller with the feed tubes and bristled opening, for the purpose of sowing broadcast or in drills, substantially as described.

Third, The combination of the harrow, plow, seed tubes, covering bars and smoothing roller with the feed roller and bristled seed trough, arranged and operating substantially in the manner and for the purpose described.

REISSUES.

2,074.—Fire-place.—Calvin A. Littlefield and David Boyle, Covington, Ky., assignees of Calvin A. Littlefield. Patented Sept. 11, 1860:

We claim, First, The provision or attachment to an open fire-place or grate of the bonnet, D, constructed and applied to catch the smoke and form a ledge or shelf over the fire, substantially as set forth.

Second, The arrangement of the bonnet, D, hollow crown, E, partition, c, tube, H, flues, B B', apertures, K F G, and doors, f and k, constructed, combined and operating in the manner and for the purposes set forth.

2,075.—Tea and Coffee Pot.—Edward B. Manning, Cornwall, Conn. Patented June 3, 1862. Reissued June 27, 1865:

I claim the herein-described tea or coffee pot, in which the bottom and lower portion of the body is constructed of hard metal, as iron, united to a britannia or other metal body in the manner described, when the said hard metal bottom and body are formed in the manner described, and united to the upper portion of the body a sufficient distance from the bottom to protect the joint and upper portion of the body from the effects of heat, as and for the purpose specified.

2,076.—Cook Stove and Range.—Josiah M. Reed, Boston, Mass. Patented Nov. 8, 1859:

I claim the application to a cooking stove, range, etc., of an auxiliary heating space or flue, substantially in manner and to operate as hereinbefore described.

2,077.—Head or Screw for Picture Frames.—Joseph B. Sargent, New Britain, Conn. Patented Aug. 21, 1860:

I claim a picture nail or screw, provided with an ornamental head made in parts, connected together substantially as described.

2,078.—Grate for Furnaces.—Andrew Winterburn, Albany, N. Y. Patented Nov. 3, 1863:

I claim a grate, having in its bed a revolving axis, with its appurtenances so contrived that, by its revolution, the contents of the grate shall be agitated, in combination with an extended bed, so contrived and arranged that it can make a partial or entire revolution around its own axis, by which means the contents of the grate can be discharged into the ash pit, substantially as and for the purpose described.

I also claim the axis, E, and disks, H, in combination with the revolving frame, B, constructed and operating substantially as and for the purpose described.

Back Numbers and Volumes of the "Scientific American."

VOLUMES IV., VII., XI. AND XII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, \$3 00 per volume, by mail, \$3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VIII., IX., and X., are out of print and cannot be supplied.



PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for new inventions in the United States and in all foreign countries during the past seventeen years. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after eighteen years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON

[See Judge Holt's letter on another page.]

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of \$5 accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, etc., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO. corner of Seventh and Broadway streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1881, are now in full force and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is \$10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

FOREIGN PATENTS.

Messrs. MUNN & CO. are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Beaux-Arts, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Pamphlets of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO.'S

Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO. are at all times ready to make examinations as to titles, ownership, or assignment of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO. at the Scientific American Patent Agency, No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft or Postal Order on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is \$15. Other changes in the fees are also made as follows:—

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 Re-issue.....	\$20
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

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO., No. 37 Park Row, New York.



W. C., of Mich.—The most suitable vessels for storing vinegar are wooden casks. If vinegar were put into a cistern covered with carbonate of lime, it would be decomposed, the lime combining with the vinegar to form acetate of lime, which would be dissolved—thus destroying the cistern and spoiling the vinegar. Plaster of paris—the sulphate of lime—would not be decomposed by vinegar, but it would need to be very pure indeed not to injure the vinegar.

J. Y. K., of Pa.—The experimental overshot wheel tried by a committee of the Franklin Institute some years ago, in Philadelphia, yielded about 70 per cent. of the whole power of the water. At the more recent trial, at the Fairmount Water Works the turbine of J. W. Stevenson, of No. 200 Broadway, New York yielded about 88 per cent. beside the friction, which was estimated at 3 per cent. This was the best result obtained.

A. J. H., of Mass.—If people generally knew what a frightful train of painful and dangerous diseases result from poisoning by lead, they would be far more careful than they are to exclude that metal from their stomachs. If the paint has been taken from your tub by the salt-water bath for your cucumbers we advise you to throw the pickles away.

A. F. and R. N. G., of Ill.—We believe that attempts have been made to drive machinery by spiral and other wheels connected with boats anchored in running streams, but the wheels turned so slowly that very little power was obtained. We have no data for computing the power to be got in this way.

F. S., of Ill.—The expansion of iron has been used as a means of employing the mechanical force of heat, but the scope of its expansion is so small that, practically, it cannot compete with steam or air for most purposes.

H. W. R., of Mass.—If iron in the process of zincing is heated too hot the zinc is very apt to penetrate the iron, forming an amalgam, and making the metal brittle.

H. D., of N. Y.—We have already published the statement that starch sugar has been used in Europe to adulterate cane sugar.

C. P., of Cal., asks the following:—A invents something; B has money; A has none; B pays all the expenses for getting the invention patented. In making out the papers, B signs them the same as A, takes the oath as inventor, the same as A, but has had nothing in the least to do with the inventing. The patent issues to B and A. In your opinion the patent should, of course, have been assigned to B, but, as the case now stands, are there any evil consequences to follow for B? Can anything be done to him; if so, what? Ans.—If it could be shown that B purposely made oath that he was joint inventor, well knowing that it was a falsehood, then he is liable to the penalties for perjury. A joint patent issued to two persons as inventors, when, in fact, only one of them was inventor, is invalid and worthless.

J. H. D., of Mass.—It is susceptible of mathematical demonstration that a balloon could not be propelled by an engine which it would support in the air, more than five miles per hour. The idea of a copper balloon is preposterous; it would be too heavy.

A. P. W., of Wis.—When the carbon is all burned out of cast iron in the Bessemer process, and the metal is brought to the state of pure wrought iron in a molten condition, melted cast iron may be added to it in order to introduce the desired quantity of carbon. It is not probable that you could get the requisite heat to fuse pure wrought iron in a cupola furnace.

P. W., of Ill.—The fire surface of a boiler is the fire-box, tube sheet and tubes in a locomotive boiler. In a cylinder boiler the bottom; in fact any part on which the heat acts directly.

C. F. S., of N. J.—There have been several improvements in the manufacture of screws patented since the date you name. If you have a new plan it would be well to send us a sketch. We can then tell you whether it is probably patentable.

J. H. C., of Pa.—We are sorry to inform you that your article was not preserved. Communications not inserted are necessarily destroyed, unless the owners express a wish to have them returned. We cannot inform you how high the goods were raised by hydraulic lift; probably the height of common warehouses.

H. L. A., of Ill.—We have had the subject of hot-air engines pretty well discussed of late. Roper's engine or furnace is fired as any ordinary one is, but the door is air-tight, and the charge of fuel is put in as quickly as possible.

R. B. H., of Conn.—The best and least expensive method of finding the pressure in your small steam boiler, is to apply a thermometer—or, more properly, insert one. The temperature will thus be indicated, and from that the pressure. Thus, if the thermometer reads 235° of heat, there are five pounds per square inch in your boiler. Thermometers for this purpose can be had of S. C. White, Dental Repository, N. Y.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1833, to accompany the claim, on receipt of \$2. 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 always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our receipt of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

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TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

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The hall will be open for the reception of goods on Monday, the 25th of September.

Goods for Competition and Premium must be deposited before Thursday Night, the 28th of September.

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OFFICE DEPOT COMMISSARY,

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LOT No. 1.—Consisting of ten hundred and sixty seven (1,067) barrels of Rectified Whisky, originally inspected in April, May and June, 1864, and January, 1865, containing about forty-two thousand three hundred and forty five (42,345) gallons. Proposals for ten (10) barrels and upward of this lot will be received.

LOT No. 2.—Consisting of four hundred and sixty (460) barrels of Pure Copper-distilled and Superior Bourbon Whisky, originally inspected in February, 1865, containing about eighteen thousand four hundred and ninety-eight (18,498) gallons. Proposals for five (5) barrels and upward of this lot will be received.

LOT No. 3.—Consisting of one hundred and twenty (120) barrels of Pure Rye Whisky, originally inspected in February, 1865, containing about four thousand eight hundred (4,800) gallons. Proposals for three (3) barrels and upward of this lot will be received.

LOT No. 4.—Consisting of sixty-three (63) barrels Pure Old Rye Whisky, originally inspected in February, 1865, containing about two thousand five hundred and twenty (2,520) gallons. Proposals for two (2) barrels and upward of this lot will be received.

LOT No. 5.—Consisting of five (5) barrels Pure Old Bourbon Whisky, originally inspected June, 1864, containing about one hundred and sixty-three (163) gallons. Proposals for one (1) barrel and upward of this lot will be received.

The whisky was originally selected with great care, and is all pure and of prime quality. The Rectified was designed for issue to the troops in the field, and the Bourbon and Rye for sales to officers, and are equal if not superior to any whisky now in the market; has all been regaged within the present month, and is in excellent order, packages being of the best quality.

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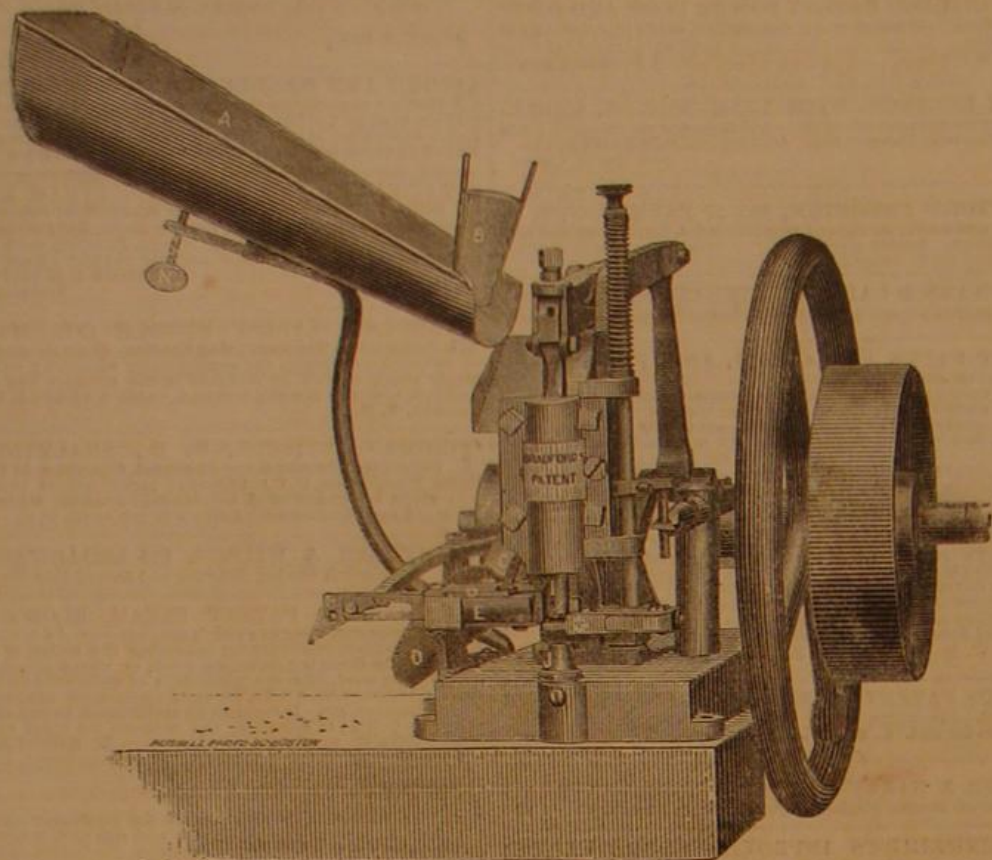
Improved Tack-leathering Machine.

It is well known to all housekeepers that a leather washer on the head of a tack not only holds a carpet down better, but it also prevents it from being torn by the head of the tack sinking into the fabric. This machine is intended to fasten leather to tacks, not for domestic use particularly, but for manufacturers who supply the market with such goods.

The inventors of this machine say that there are hundreds of tons of leatherned tacks consumed annually in this country.

fore, a dry and bitter morsel in the mouth—bitter as the apples of the Dead Sea, which turn to ashes (we are credibly informed) in the mouth of the eater.

This is a most convenient and useful thing to have in the house, for it can be applied not only to crush beefsteaks, but to break ice, to press fruit for jelly, or to crack loaf sugar. By suspending sad irons from the end of the lever, corned beef can be pressed in shape. To do this it would be necessary to make the fulcrum end of the lever adjustable. When steaks are to be crushed they are simply laid on the board



BRADFORD'S TACK-LEATHERING MACHINE

Any person of ordinary intelligence, who can run a sewing machine, can operate the machine readily and profitably; its size and general character being similar to that of the common sewing machine. An ordinary operator is able to leather from 150 to 170 tacks per minute, or 90 to 100,000 tacks in a day, with each machine; and what is of most importance to tack manufacturers, it will successfully leather tacks any quality of finish, while other machines require the best finished tacks for leathering. The action of the machine is such that only one tack can be taken up at a time, and no jammed or imperfect tack can pass it at all; while the motion of the grip and punch is so adjusted that every tack is leatherned uniformly through the center; thus avoiding all crooked or broken tacks, as well as the forcing of two or three tacks through one piece of leather; and furnishing in bulk only perfect work. The simplicity in the construction of this machine is such as to render it rarely liable to get out of order; which fact is claimed to be greatly in its favor. This machine is on exhibition at the Fairs in this city and Boston.

Further information will be furnished, on application to the sole proprietors, Barry, Bradford & Co., No. 4 Brattle Square, Boston, Mass.

PUTNAM'S BEEFSTEAK BREAKER.

This is a machine designed to make porter-house steaks out of rump steak; or, in other words, to convert bullock beef into delicious tenderloins—to make the skinny, sinewy slice, sold by butchers not envious of fame, equal to that richly-mottled cut which graces the table of Dives.

This is no mean achievement. Language is too poor to convey an idea of the anguish which fills the soul of him who would dine when he sees a slab cut from one of Pharaoh's lean kine stretched before him. But once place any apology for a beefsteak in this apparatus, bear down on it, put the iron teeth well into its sinews, and lo! its spirit is subdued, its resistance is overcome, and the hungry man can fall to with what zest he possesses. Ordinary beefsteak pounders mash the meat into a viscous pomace. They make disgusting shreds of it; they tear it to tatters, and the juice flies to all corners of the room. None of it remains in the beef, which is, there-

and the lever brought down against them. There are two links on the back end which catch over the edge of the table and hold the board down so that it cannot tip. The crusher, B, slides on the lever so as to be used at any point. This machine is entirely noiseless in its action, which is quite a recommendation in its favor.



This invention was patented through the Scientific American Patent Agency on Dec. 27, 1864, by G. W. Putnam; for further information address him at Peterboro', N. Y. Windle & Co., No. 56 Maiden Lane, New York, sell the article.

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Make a substantial model, not over one foot in size. When finished put your name upon it, then pack it carefully in a box, upon which mark our address; prepay charges, and forward it by express. Send full description of your invention, either in box with model, or by mail; and at the same time forward \$16, first patent fee and stamp taxes. As soon as practicable after the model and funds reach us, we proceed to prepare the drawings, petition, oath and specification, and forward the latter for signature and oath.

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Vol. XIII--No. 16.
(NEW SERIES.)

NEW YORK, OCTOBER 14, 1865.

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Improved Head-rest.

Riding upon the rail is very fatiguing, especially if one has to take a long journey. After a few miles the scenery, what one can see of it, becomes monotonous, and fences merging into white lines, trees bending and whisking their branches in the wind, houses, cattle, men, and the thousand-and-one objects—animate and inanimate—make one giddy and fain to seek refuge in closing the eyes. As cars are ordinarily built the seats are too low behind to afford any support to the head, and after vainly leaning back or frantically bolting forward, the weary traveler, is obliged to relinquish the idea of getting even "forty winks," and is compelled to grin and bear the jolting and concussion as well as he can.

That is ordinarily; now he may provide himself against the evils and annoyances above mentioned by the use of the head-rest shown in this engraving. A distinguished individual of literary tastes and luxurious habits is represented enjoying both with great satisfaction.

The object is to provide the railroad traveler with an easy and ready mode of procuring rest or sleep while riding in railway cars, either day or night. With some propriety it might be called a portable pocket berth, as it is susceptible of being carried about the person or within any common traveling satchel or bag, and may be attached to, or detached from, the back of any ordinary car seat, and raised

or depressed to any desired position for the head in a moment of time. With it one may pass a day's or a week's ride in any railway car without experiencing any thing like the usual fatigue.

The rest is externally light, weighing but a few ounces, is made of the finest spring steel highly polished, and is upholstered in a handsome manner in conformity with first-class cars.

When it is considered that one will last a life time, and that the ordinary fatigue from riding in railroad cars is reduced to comfort and pleasure by their use, the portable rest will be esteemed and approved of by the public generally.

This invention was patented on July 4, 1865, by W. R. Phelps, through the Scientific American Patent Agency; for further information address him at No. 34 Barclay street, New York.

Savings Banks in England.

Charles Ryland & Son's Iron Trade Circular (London) says:—

"It is indeed a noticeable fact that the amount deposited and invested in savings banks and friendly societies, now reaches ninety-three millions and upward of a tenth, an amount equal to about one-eighth of the national debt. As this sum is invariably invested in consols, and is steadily on the increase, it is not difficult to estimate the effect it must have in steadying the price of the funds, and replac-

ing, by a Government enforced investment, the withdrawals made by independent holders, who retire their money from securities paying so small an interest, to others which they regard as equally secure, while they give a larger return.

Large Profits of the London Underground Railroads.

The last number of the *London Engineer* makes the following statements in regard to the Metropolitan Railway:—

7 per cent per annum. The revenue has risen from £15,000 for the half year ending December, 1863, to £41,000 for the half year ending June, 1865. The traffic per mile presents an extraordinary contrast with that of most other railway companies. The Metropolitan receipts per mile per week are as high as £703. The nearest approach to this is by some of the lines which have Metropolitan and suburban traffic, but all of these fall far short of it. The Black-wall line reaches about £394 per mile per week, and the North London £373, whereas the great com-

panies having London termini, and other large companies in other parts of the country, have traffics which only yield receipts ranging from £60 to £160 per mile per week. In Whit week last the Metropolitan carried 370,843 passengers, and in one day alone—the Monday of that week—it carried 83,440 and, as a result of the perfect system of signaling adopted on that line, without loss of life or casualty to a single passenger. The trains are now very frequent, but it is expected that when the system is completed, they will be run each way at intervals of two minutes, which may be done with perfect safety, inasmuch as no train is allowed to pass from one station to another until the signal has been received that the line is clear between the stations. The Metropolitan forms an important part of what is popularly known as the 'inner circle,' which gives

access by railway to all directions in general, and leads to no place in particular. This 'circle,' belt, or link, is far from being a true circle. On the map it has somewhat of the appearance of the trunk and head of a 'porker,' or a hippopotamus with an unduly elongated snout."

HENRY BESSEMER ON HIS PROCESS OF MAKING STEEL.

At the recent meeting of the British Association, at Cheltenham, Eng., Mr. Henry Bessemer read a long paper on the manufacture of steel by his process of blowing air through molten cast iron to burn out the carbon—a process which has been repeatedly illustrated and described in the *SCIENTIFIC AMERICAN*, and which has been recently introduced into this country by Messrs. Winslow, Griswold & Holley, of Troy, N. Y. It will be remembered that Mr. Mushet claimed to be the discoverer of that modification in the Bessemer process which made it a practical industry—the introduction of manganese. On this point Mr. Bessemer makes the following statement:—

THE AUTHOR OF THE MANGANESE IMPROVEMENT.

In the old Sheffield process the original quality of the Swedish charcoal iron employed governs the quality of the cast steel made; consequently, £36 per ton is freely given for the high class Danamora iron, while other brands of Swedish charcoal iron may be



PHELPS'S TRAVELERS' HEAD-REST.

"Among our railway systems the Metropolitan is *sui generis*. It is unique in its mode of construction, in the district it serves, and in its working. At the top of the list in mileage traffic receipts, and, we may almost add, in the value of its shares. It is peculiar, inasmuch as the whole of the line is constructed in or under the metropolis, many portions of it passing under densely-populated districts and busy thoroughfares. The number of passengers it conveys is perfectly enormous. In the last half year the persons carried on the Metropolitan were 7,462,823, that is, two-and-a-half times the population of London. The mere increase in the number of passengers conveyed in the last, as compared with the preceding, half year, was equal to the united population of a score of the next largest cities and towns in England, including Manchester, Liverpool, Birmingham, Newcastle, etc.

"The third-class passengers, in the number stated, were 5,110,823, or nearly 69 per cent of the whole. The total capital of the company in ordinary and preference shares and debentures, amounts to £2,800,000, but will amount, it is expected, to £5,400,000, when the whole system is completed. As to the soundness of the scheme and its profitable character, it may be mentioned that in the first year of its existence the shares were at 50 per cent discount, whereas they have been sold at upward of 40 per cent premium. The dividend for the last half year was at the rate of

bought for £15. In either case these are expensive raw materials for the cast-steel maker.

"In 1839 the trade of Sheffield received an enormous impulse from the invention of Josiah Marshall Heath, who patented in this country the employment of metallic manganese, or, as he called it, 'carburet of manganese.' The addition of a small quantity of this metal, say from one-half to one per cent, rendered the inferior coke-making irons of this country available for making cast steel; it removed from these inferior qualities of iron their red-shortness, and conferred on the cast steel so made the property of welding and working soundly under the hammer. This invention was of great importance to the town of Sheffield, where its value was at once appreciated. Mr. Heath, supposing himself secure in his patent told his licensees that if they put oxide of manganese and coal tar or other carbonaceous matter into their crucibles along with the blister steel, that it would do as well, and be much cheaper than the carburet of manganese he was selling them; in effect it was the same thing, for before the steel was melted the carbon present reduced the oxide of manganese to the metallic state, so that his patent carburet of manganese was formed in the crucible in readiness to unite with the steel as soon as it became perfectly fused. But the law decided that this was not Heath's patent, and so the good people of Sheffield, after many years of litigation, were allowed to use it without any remuneration to the inventor.

"Manganese has now been used for many years in every cast-steel works in Europe. It matters not how cast steel is made, since manganese added to it necessarily produces the same beneficial changes; no one better appreciated this fact than the unfortunate Mr. Heath, as evidenced by his patent of 1839, in which he declares that his invention consists in 'the use of carburet of manganese in any process whereby iron is converted into cast steel.' Had Heath seen in his own day the Bessemer process in operation, he could not have said more; he well knew the effect produced by manganese on steel, and, therefore, claimed its employment in any process whereby iron is converted into cast steel.

"At the suggestion of the author a work for the production of manganese alloys was erected by Mr. Henderson, at Glasgow, who now makes a very pure alloy of iron and manganese, containing from twenty-five to thirty per cent of the latter metal, and possessing many advantages over spiegeleisen, which it will doubtless replace. Two bright rods of $1\frac{1}{8}$ inches in diameter will be found on the table, they were folded up cold under the hammer. This extremely tough metal is made by using Mr. Henderson's alloy in lieu of spiegeleisen, which is incapable of making steel of such a quality.

"A Prussian gentleman, M. Preiger, has been also successful in manufacturing a new alloy, which he calls ferro-manganese, consisting of sixty to eighty per cent of metallic manganese. It is extremely useful in making malleable iron by the Bessemer process, in which spiegeleisen cannot be employed on account of the large proportion of carbon it contains."

We make also the following extracts from his paper:—

USE OF BESSEMER STEEL IN SHIP BUILDING.

"The Bessemer cast steel made for ships' plates by the several eminent firms now engaged in that manufacture is of an extremely tough and ductile quality, while it possesses a degree of strength about double that of the inferior kind of iron plates usually employed in ship building, hence it is found that a much less weight of material may be employed, and at the same time a greater degree of strength may be given to all parts subjected to heavy strains.

"Most prominent among the builders of steel ships is the firm of Jones, Quiggin & Co., of Liverpool, who have now constructed no less than 31,510 tons of shipping, wholly or partially built of steel. Of these, thirty-eight vessels are propelled by steam with an aggregate of 5,910 horse-power, besides this the principal masts and spars of eighteen sailing ships have been made by them wholly of steel.

"Vessels of a large size, constructed to class Aa twelve years at Lloyd's, weigh, when built of iron, about 12 cwt. per ton measurement; whereas similar vessels built of steel weigh only about 7 cwt. per ton measurement; thus an iron ship to take first class at Lloyd's for 1,000 tons measurement, would weigh 250

tuns more than a steel one of the same class. Such a vessel could, therefore, take 250 tons, or 25 per cent more freight at the same cost, or could avail herself of the difference of immersion to leave or enter port when the tide would not permit an iron vessel to do so. As a steamer she would carry 250 tons more of coal, and thus be enabled to lengthen her voyage or take her coal for the return trip. The two steam paddle-wheel steamers launched at Liverpool by Messrs. Jones & Co., on the 13th ult., for Dublin and Liverpool service, will draw from 3 to 4 feet less water than iron steamers built on the same lines, and being thus enabled to leave port at all states of the tide, will not require a tidal train in connection with them. If the employment of steel for the construction of merchant vessels is found to be so important, how much more so is it for ships of war. Some of the larger class of armor-plated vessels require 6,000 tons of iron for their construction, and an addition of 1,800 tons in the shape of $4\frac{1}{2}$ -inch armor plates. Now, if the frames and inner skin of such a vessel were constructed of steel it would be much stronger even if reduced to 4,000 tons in weight; this would admit of 9-inch armor plates being used in lieu of $4\frac{1}{2}$ inch, and would still leave the vessel 200 tons lighter than the present ones, and hence, as the resistance of the armor to impact is as the square of the thickness of the plate, we should have a vessel capable of resisting four times the force of those at present constructed, while it would be 200 tons less in weight."

FOR PROJECTILES.

"The application of steel for projectiles has now become a necessity since the introduction of armor plates. We have before us a 110-pound shot, that has passed with very slight injury through a 5-inch armor plate, and also some specimens of bent angle iron, made of Bessemer iron, and rolled at the Millwall Iron-works in London, and from the same works a portion of one of Hughes's patent hollow steel beams for supporting the armor plating in course of construction for the forts at Cronstadt; both are interesting examples of what the rolling mills of the present day can effect, and of the facility with which cast malleable iron and cast steel admit of being worked into the most difficult forms."

FOR AXLES AND TIRES.

"There is no department in engineering in which the peculiar toughness of steel and its strength and power of resisting wear and abrasion are of such vital importance as in its application to railway purposes. This fact had long since impressed itself strongly on the mind of Mr. Ramsbottom, of the London and Northwestern Railway, who commenced experiments with this material in 1861, carefully, though trustingly, he tried it step by step, not even at first venturing to employ it for passenger trains, but as proofs of its safety and economy crowded upon him, he carefully applied it to the most important parts of passenger engines, and even to the manufacture of the formidable engine cranks (at that time intrusted only to the most eminent iron-making firms in the kingdom), these iron cranks are now being replaced by steel ones forged from a single mass. One of these steel cranks, manufactured at the new steel works at Crewe, has been obligingly lent by Mr. Ramsbottom as an illustration of the use of steel for this purpose; that gentleman has also taken out of use a plain steel axle that has run a distance of 112,516 miles, and now exhibits very slight signs of wear.

"The tires of wheels, on which so much of the public safety depends, were then tried, but the exact amount of difference between the endurance of wrought iron and Bessemer steel for this purpose is not yet ascertained, as none of these steel tires are yet worn out; but enough has been shown to prove the advantage of entirely replacing iron by steel for this purpose.

"In order to show how a steel tire will resist the most violent attempts to produce fracture, an example is given of a steel tire manufactured by Messrs. Bessemer & Co., of Sheffield; it was placed on edge under a six-ton steam hammer, and subjected to a series of powerful blows until it assumed its present form, that of a figure of eight, a degree of violence immensely more than it could ever be subjected to in practice. These tires are made without weld or joint, by forging them from a square ingot partly under the approved plan invented by Mr. Ramsbottom, and partly by an

improved mode of flanging and rolling, invented by Mr. Allen, of the Bessemer Steel Works, Sheffield.

"So important were found to be the advantages of employing cast steel as a substitute for wrought iron at the works of the London and Northwestern Railway Company, that the directors, acting under the advice of their able engineer, determined on building large steel works at Crewe, which is now in active and successful operation. In the design and arrangement of their plant for working up the steel several important improvements have been introduced by Mr. Ramsbottom, among others his duplex hammer, which strikes a bloom on both sides of the ingot at once, in a horizontal direction, and thus renders unnecessary the enormous foundations required for ordinary hammers. Here, also, he has put up his improved rolling mill for rolling blooms of large size, the enormous machine being reversed with the greatest rapidity and ease by the attendant, without any shock or concussion whatever."

FOR RAILROAD RAILS.

"While matters were thus steadily progressing in the engine department of the company, the engineer of the permanent way, Mr. Woodhouse, took in hand a thorough investigation of a no less important problem, viz., the substitution of cast steel for wrought-iron railway bars. For this purpose some 500 tons of rails were made, and put down at various stations where the traffic was considerable, so as to arrive, at the earliest period, at a true comparison of the respective endurance of wrought iron and cast-steel rails. It will be unnecessary here to enter into the numerous details of the extensive series of experiments systematically carried out by Mr. Woodhouse; the trials made at Camden will suffice to show the extraordinary endurance of steel rails. It is supposed that there is not one spot on any railway in Europe where the amount of traffic equals that at the Chalk-farm bridge at Camden Town. At this spot there is a narrow throat in the line, from which converges the whole system of rails employed at the London termini of this great railway. Here all passengers, goods, and coal traffic have to pass; here, also, the making up of trains and shunting of carriages is continually going on. At this particular spot two steel rails were fixed on May 2, 1862, on the side of the line, and two new iron rails were on the same day placed precisely opposite to them, so that no engine or carriage could pass over the iron rails without passing over the steel ones also. When the iron rails became too much worn to be any longer safe for the passage of trains, they were turned the other way upward, and when the second side of the iron rails was worn as far as the safety of the traffic would allow, the worn-out rail was replaced by a new iron one—the same process being repeated as often as was found necessary. Thus we find, at the date of the last report on March 1, 1865, that seven rails had been entirely worn out on both faces. Since then another rail has been worn out up to July, making sixteen faces worn out, the seventeenth face being in use on August 22d, when the steel rail that had been placed opposite to them was taken up in the presence of the writer, and, by the kind permission of Mr. Woodhouse, now lies on the table before the meeting. The first face of the rail only has been used, and this is now become much thinner than it was originally, but, in the opinion of the plate layers is still capable of wearing out another half-dozen faces. Taking its resisting powers at three more faces only, it will show an endurance of twenty to one in favor of steel.

"Mr. Woodhouse has ascertained, by careful and continued testing for twenty-four hours at a time, that, an average of 8,082 engine tenders or carriages pass over the steel rails every twenty four hours, equal to 16,164 wheels every day for 1,207 days, making a total of 9,754,974 wheels passed over the rail. Subject to this excessive wear the rail seems to have been reduced $7\frac{1}{2}$ lbs. per yard, hence, for every grain in weight of steel lost by abrasion, no less than 371 wheels had to pass over it. Another steel rail, put down also in May, 1862, at a place much less subject to wear, has had four faces of iron rails worn out opposite to it, and still appears as if very little used; this rail is also placed on the table. An iron rail, wears out by the giving way at various parts of the imperfectly welded mass, and not by the gradual loss of particles of metal, as in the case of the steel rail,

which no amount of wear and tear seems capable of disjoining. It must be borne in mind that this enormous endurance of cast steel is not owing to its hardness or brittleness, as some have supposed, for, in fact, Bessemer steel possesses an extreme degree of toughness. There is before the meeting an example of this fact: one of the same quality of steel rails having been attached at one end of the main driving shaft of a steam engine so as to twist it while cold into a long spiral, measuring 9 feet in length at top and bottom, and only 6 feet if measured along the center of the web. A single glance at this spiral rail will, it is presumed, dispel any idea of brittleness that may have been entertained."

EXTENT OF THE MANUFACTURE.

"In conclusion, it may be remarked that cast steel is now being used as a substitute for iron to a great and rapidly increasing extent.

"The jury reports of the International Exhibition of 1851 show that the entire production of steel of all kinds in Sheffield was, at that period, 35,000 tons annually, of which about 18,000 tons were cast steel, equal to 346 tons per week; the few other small cast steel works in the country would probably bring up this quantity to 400 tons per week as the entire production of cast steel in Great Britain. The jury report also states that an ingot of steel, called the 'monster ingot,' weighing 24 cwt., was exhibited by Messrs. Turton, and was supposed to be the largest mass of steel ever manufactured in England. Since that date a great change has been made, for the largest Bessemer apparatus at present erected in Sheffield, at the works of Messrs John Brown & Co., is capable of producing with ease every four hours a mass of cast steel weighing 24 tons, being twenty times larger than the 'monster ingot' of 1851.

"There are now seventeen extensive Bessemer steel works in Great Britain. At the works of the Barrow Steel Company 1,200 tons per week of finished steel can easily be turned out, and when their new converting house, containing twelve more five-ton converters, is completed, these magnificent works will be capable of producing weekly from 2,000 to 2,400 tons of cast steel. There are at present erected and in course of erection in England no less than sixty converting vessels, each capable of producing from three to ten tons at a single charge. When in regular operation these vessels are capable of producing fully 6,000 tons of steel weekly, or equal to fifteen times the entire production of cast steel in Great Britain before the introduction of the Bessemer process. The average selling price of this steel is at least £20 per ton below the average price at which cast steel was sold at the period mentioned. With the present means of production, therefore, a saving of no less than £6,240,000 per annum may be effected in Great Britain alone even in this infant state of the Bessemer steel manufacture."

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Reversing Gear for Steam Engines.—The object of this invention is to change the motion of the slide valve at the end of each stroke of the piston by the action of parts which are arranged in the interior of the cylinder and operated by the piston or parts attached to the same. This object is effected by connecting the slide valve to a rod which connects two pistons working in cylinders that are formed by the ends of the valve chest, and the outer ends of which connect by suitable channels with chambers which are situated in the cylinder heads and communicate with the cylinder through openings that are closed by spring valves. Whenever the piston approaches one of the ends of its stroke it strikes the stem of one of the spring valves, and by opening it allows the steam contained in the end of the supplementary cylinder to escape, and thereby the equilibrium at both ends of the small pistons connecting with the slide valve is disturbed, and the slide valve is changed automatically. Small channels passing through said pistons allow the steam to pass into the supplementary cylinders, but these channels are so small in proportion to the channels leading from the supplementary cylinders to the chambers in the cyl.

inder heads, that if one of the spring valves is opened, the steam from the supplementary cylinder escapes much quicker than it can be replenished through the small channel, and thus the equilibrium is disturbed and the slide valve changed as above stated. A. S. Cameron, corner of Second avenue and Twenty-second street, New York, is the inventor.

Device for Extracting Stumps and Elevating and Conveying Heavy Bodies.—This invention relates to the application of hydraulic pressure to a carriage for elevating heavy bodies, extracting stumps, raising stones, etc., and conveying them, when elevated and retained in a suspended state, to the place designed for them. The invention consists in the employment or use of an hydraulic apparatus similar to that used in the hydraulic press, placed upon a strongly-built carriage, and arranged with a water tank, and having the axles of the carriage provided with screw jacks—all arranged in such a manner that the desired work may be performed with but little labor, and with great facility. E. C. Haserick, Lake Village, N. H., is the inventor.

Drill Coupling.—This invention consists in a new method of making joints or couplings by which drill ing tools are fastened on their rods and the sections of the rods coupled to each other, whereby the joint is made with facility and without injury to the screw thread or to the joint itself. One of the most serious difficulties now experienced in drilling an oil well is from the constant tendency in the couplings of the drill rod to become unscrewed; and, since there are four or more in every set of tools, the hindrances from this cause are frequent. Another difficulty arises from the breaking off of the male screw at its shoulder, caused by the excessive wrenching to which it is subjected when the joint is put together. Another difficulty is the stripping of the threads of the screw, by reason of the violent jar when the drill gives its stroke. The present manner of "wrenching on" the joints or couplings of drill rods and their tools is about as follows:—Two iron wrenches, several feet long, are used, the lower one resting against the ground or some fixed body, and the upper one being turned as tight as possible by hand, when two men, with a wooden lever about six or eight feet long, surge with all their might against the wrench. This throws an immense strain upon the threads, creating new bearings and angles, and causing them to become stripped and broken. This invention is meant to preserve the joints and couplings aforesaid, and to provide a more certain connection, and one which costs less labor to make secure. Job B. Stockton, Oil City, Pa., is the inventor.

Button-hole Sewing Machine.—This invention relates to a button-hole sewing machine which imitates, as near as possible, the hand stitch generally employed in making button-holes. One needle is employed which passes down alternately through the cloth near the edge of the button-hole, and then through the hole itself. Two threads are employed, one of which is carried by the eye-pointed needle and the other by a circular shuttle or bobbin situated in the interior of an oscillating hook. The gimp which is used to strengthen the edge of the button-hole, is carried by a bobbin which lies in the cavity of a revolving hook. The oscillating hook which carries the lower thread serves to take up the loops of the needle thread, as the same drops from the revolving hook and passes the same over the bobbin carrying the lower thread, which, passing through said loops in a direction opposite to the gimp, causes them to twist and to produce a stitch similar to that employed in making button holes by hand. The position of the cloth on the cloth plate is governed by a feeder which has a triple motion, viz., a vertical motion in the direction transversely to the cloth plate, or in the direction in which the cloth is fed while sewing; a similar motion in a direction at right angles to the latter motion, and a rotating motion. The first motion serves to feed the cloth in the ordinary manner; the second imparts to the cloth a lateral motion, causing the needle to pass down through the hole instead of through the cloth, and the third or revolving motion is employed to govern the motion of the cloth in sewing round the eye of the button hole. While sewing the straight edges of the button-hole the circular motion of the feeder is thrown out of gear. The various motions of the feeder are adjustable so that they can be accommodated to button-holes of different

sizes. If desired, the sewing machine can also be employed for ordinary or plain sewing. E. O. Otis, of No. 238 Hudson street, New York, is the inventor.

Spinning Jack.—This invention relates to an apparatus the object of which is to put friction upon the driving pulley of the jack by sliding the belt partially upon it from the driver pulley and thereby to assist the spinner in winding the yarn upon the bobbins. This apparatus consists of a bell-crank cam lever, one arm of which is hinged to a longitudinally sliding rod which is subjected to the action of a spring, and the motion of which is governed by a regulating screw, in combination with the belt shifter and with a catch and rod acting on said catch, when the faller or coping wire is applied in such a manner that, whenever the spinner applies the faller to the threads, the catch is sprung, and by the action of the spring rod the belt is shifted from the loose or the fast pulley, more or less, according to the position of the regulating screw; and when the carriage is pushed home it strikes the bell-crank cam lever and carries the spring rod back, thereby shifting the belt back upon the loose pulley and allowing the catch to drop behind the spring rod, ready for the next succeeding motion of the carriage. Ezra Dews, South Britain, Conn., is the inventor.

Self-acting Brake for Horse-powers.—This invention consists in having the bearings of the driving shaft of a horse power arranged in such a manner that they will slide in a direction transversely with the shaft, and having springs, or their equivalents, connected with said bearings in such a manner that they will have a tendency to press the band wheel, which is the driving shaft, in contact with the break when the band is off from said wheel—the band, when on the wheel, keeping, by its tension, the wheel free from the brake, so that at any time when the band is cast off from the wheel the spring will throw the wheel in contact with the brake. William F. Rundell, Genoa, N. Y., is the inventor.

Apparatus for Drying Straw Boards.—This invention has for its object to dry straw boards and other articles of similar character. Straw boards have hitherto been dried by passing them in their green state around heated cylinders by means of strong canvas bands, which are made partly to encompass the cylinders. This invention consists in the use of stationary steam chests, against whose surfaces the articles to be dried are held by means of hinged pressers, consisting of frames whose bodies are composed of cloth or other suitable material, which shall be of an open texture, to admit the passage of vapor through it. William H. Severson, Cohoes, N. Y., is the inventor.

Fire-arm.—This invention consists in forming the breech-piece or cylinder of a fire-arm in two parts or sections, so arranged as to be opened or removed from each other for the insertion of metallic cartridges therein, or the removal of the waste cases therefrom; and when a revolving breech cylinder is used, so constructed and connected as to revolve together and as one piece—the metallic cartridges, when inserted within the chamber or chambers of the breech, extending across from one section to the other, with their fulminating rims in and between the contiguous ends of the same, and the striking hammer of the fire-arm being properly constructed and arranged to discharge the cartridges, as in ordinary fire-arms. Silas Crispin, No. 45 Worth street, New York City, is the inventor.

WORTH IMITATING.—The New Bedford and Taunton Railroad has an arrangement for preventing brakemen being knocked off the tops of the cars by bridges while riding backward. About thirty rods distant from every bridge crossing is a bar or joist twenty feet above the track, from which a number of laths or similar small strips of wood are suspended by short cords, hanging within three or four feet of the car roofs. Persons standing on the cars cannot pass these sticks without striking some of them, and their attention is thus called to the fact that they are rapidly approaching a bridge.

ONE good Havana cigar is found by Dr. Richardson to yield, when its smoke is condensed, a sufficient amount of poisonous matter to induce active convulsions in a rabbit, and six pipes of common shag tobacco will yield sufficient poison to destroy a rabbit in three minutes.

THE FAIR OF THE AMERICAN INSTITUTE.

We continue our notices of the Fair in this issue. It will remain open for some days longer, until Oct. 19th. We have already given the principal novelties attention, and devoted a large portion of our space to the interests of the exhibitors, and have not intentionally overlooked any object of general interest.

HARD-RUBBER COLLARS.

Steel collars have been in vogue for some time, and are much liked by some. Of late, hard-rubber manufacturers have introduced a new style of goods for mourning use, consisting of ties, collars and cuffs, made of hard rubber. They look like silk in finish, and are, of course, capable of great variety in ornamentation.

BREAD AND MEAT CUTTER.

This machine was invented in response to a call for such a one published in our correspondence. It is a very substantial affair, and is quite the same in construction as a circular saw without teeth. The knife is circular and is driven by a belt and treadle, and there is a sliding table which can be gaged to cut to any desired thickness. John Burgum, Concord, N. H.

AMERICAN NEEDLE COTTON GIN.

This is a new kind of cotton gin, wherein the cotton is cleaned by a series of needles on endless belts, instead of by saws, as usual. H. V. Scattergood, Albany, N. Y.

BUTTON-HOLE MACHINES.

The button-hole machines seem to have reached great perfection. The Union Button-hole Machine Co., of Boston, Mass., exhibit one of their machines in operation doing perfect work. In this machine the needle skips from side to side of the braid around the button-hole, at every stitch, and works around it at the ends with great accuracy and elegance of execution. It makes fifty button-holes an hour.

Messrs. Wheeler & Wilson exhibit one of their well-known button-hole machines also; it is well worth looking at.

SHINGLE-CUTTING MACHINE.

A few years ago machines were introduced for making shingles very rapidly by paring them from a block of wood, the block having previously been subjected to the action of hot steam for four or five hours. The shingles which were cut by this process, on exposure to the sun, developed fine cracks or splits, and, in consequence, they went generally out of use. Mr. John D. Chism, of No. 684 Sixth avenue, New York, has on exhibition at the Fair a machine which he claims overcomes the difficulty. He argues that the cracking of pared shingles was the result of a wobbling motion of the cutting blade, owing to the frame of the machine being made of wood, and contends that, by making the frame of his machine of iron, he gets a perfectly steady motion to his knife, and produces a perfect shingle. His machine has also a novel and very positive feed motion for the block.

A COMPACT STEAM ENGINE.

Mr. George B. Brayton, of No. 84 Washington street, Boston, exhibits a steam engine of six horsepower, which is one of the most compact machines, including engine and boiler, of any that we have ever seen of this power. The engine is an oscillator, taking and discharging steam at the trunnions, the novelty being in the boiler. A rectangular cast-iron chest has the fire in its lower part. Directly over the fire are a series of one inch and a half wrought-iron tubes, slightly inclined, with their lower ends closed by screw plugs, and their opposite ends opening into a series of cast-iron chambers, which extend longitudinally across the chest above the pipes. These chambers are divided by cross webs, cast with them, into cells four inches wide and thirteen inches deep, the openings from one cell to another being only one inch and a half in diameter. The object of this arrangement is to so obstruct the communication between the several parts of the boiler, that, in case of a rupture, no large quantity of the hot water could be so suddenly thrown into the air as to cause a violent explosion. The manifest objection to cast iron for boilers is, that the requisite thickness of the walls obstructs the transmission of heat from the fire to the water. The exhibitors of this engine claim, however, to get a horse-power by the expenditure of two

and a half pounds of coal per hour—a very good result for so small an engine.

HASH MACHINE.

Hash is a standing joke with a certain class in the community who are always ready to make fun of any thing. Nevertheless, hash is not to be despised when you know what it is composed of, and who has made it. It is quite tedious to chop up a quantity of meat, and therefore machines have been provided to do it by power. All that is necessary is to put the meat in a case containing a number of revolving knives; then turn a handle and the hash is made. All the meat is minced before it issues from the further end, where there is a spout to allow it to discharge. These machines are easily worked and cleaned. Miles Manufacturing Co., No. 59 Lewis street, New York.

TRUE'S POTATO PLANTER.

This machine is on exhibition at the Fair, and is highly approved of by those who have used it; it will do the work of ten men, and as perfectly as it can be done by hand. The inventor has been many years engaged upon it.

SALES OF PATENTS.

We noticed in our last week's issue, that a number of patents had recently been sold for quite large sums. The clergyman alluded to who had been offered \$50,000 for his United States patent, informs us that he has since consummated a sale of it for \$200,000. The invention is on a valve for a steam engine, and is illustrated in No. 7, present volume, SCIENTIFIC AMERICAN.

One half of the patent on a tobacco pipe granted to Edwin Hoyt, on the 26th ult., has been sold, we are informed, for \$2,500.

The inventor of a very novel music stand, for which a patent was recently solicited through this office, and allowed, but which is not yet issued, says he has been offered \$3,000 for his invention, but refused it, for the reason that he had orders for all he can make during the next twelve months.

And we know of a still larger number of patentees less fortunate in finding purchasers, but abounding in faith that their inventions will be appreciated some time, when a fortune will crown their patient waiting.

We would not encourage all inventors to expect that they may realize a fortune without further effort than obtaining their patents; but we believe, where the invention is a good one, and the patent is properly secured, and where the same, or even less, energy is expended in making sales that the owner would exert at his trade, he would usually realize far better pecuniary results.

THE COOPER UNION NIGHT SCHOOLS.

It is impossible to overestimate the benefit mechanics, clerks, and young men of all professions, have received from the Cooper Union Schools. While others, who have been fortunate enough in early years to procure a liberal education, are toiling up the steep of fame, hard after them comes the artisan and the sturdy workers, determined to dispute the possession of wealth and renown; for both of these distinctions are possible with the possession of an education. It will be seen from the programme published below that, by the munificence of Mr. Cooper, a splendid course of lectures can be heard at the Institute without money and without price. These lectures are in connection with the schools, where competent teachers are employed to instruct persons in all branches of education. The programme of the second week's lectures before the classes, by Prof. Chas. S. Stone, is:—Monday, Oct. 16, Natural Philosophy—Motion and its Laws; Tuesday, Oct. 17, Elementary Chemistry—Chemical Affinity and the Laws of Combination; Wednesday, Oct. 18, Analytical Chemistry—The Alkaline Group; Thursday, Oct. 19, Elementary Chemistry—The Chemical Nomenclature and Symbols; Friday, Oct. 20, Natural Philosophy—Gravity and its Laws.

The Lectures are changed through the winter, and are open to the public, but visitors are not admitted after a quarter before eight o'clock.

A FIELD of wheat buried under an avalanche for twenty-five years proceeded on its growth, etc., as soon as the snow had melted.

FOREIGN SUMMARY.

A visit to James Watt's workshop is thus graphically described by an Edinburgh gentleman attending the British Association:—We were admitted into his workroom—a garret at the top of the house. It appears he had a scolding wife, who didn't like the messes and noises he made, so he was sent to the attic. This room is exactly as Watt left it. The very ashes are still in the grate; his little lathe has a bit of unfinished work in it; tools lie about; books and drawings are in old drawers, and strewn here and there. It is a miserable place. Only four of us could get in it at one time. In fact, the daughter of the house who went with us had to tuck herself up into all manner of shapes to prevent her crinoline sweeping all the letters into the corners. The house is a very good one, and Watt was rich when he died there; but it's clear his wife kept him and his little workroom in the background. This room has only been recently opened. By the will of Watt's son it was ordered to be left forever as the old man left it when he last went out at its door. It was not looked into for more than thirty years.

SEVERAL inventions have lately been patented for the prevention of accidents in coal and other mines, but perhaps the most simple and complete apparatus is that of Messrs. Denton and Whittaker, which consists in the application to the cages of strong iron springs, which catch the woodwork on every stoppage of the cages, and effectually prevent them from slipping. In case of an accident such as that which occurred at Wigan last week by the breakage of the rope, this apparatus would at once have stopped the cage, and prevented the great loss of life which took place. The invention also provides against accidents from overwinding, a slipcatch giving way when the cage has reached the required height. The patent has been successfully tried on the Ardsley colliery of Messrs. Firth, Donisthorpe & Co.

THE Paris correspondent of the *Chemical News* states that an important experiment has been made by M. Duchemin during a holiday at the seaside. He made a small cork buoy, and fixed to it a disk of charcoal containing a small plate of zinc. He then threw the buoy into the sea, and connected it with copper wires to an electric alarm on the shore. The alarm instantly began to ring, and has gone on ringing ever since, and, it is added, that sparks may be drawn between the two ends of the wires. Thus the ocean seems to be a powerful and inexhaustible source of electricity, and the small experiment of M. Duchemin may lead to most important results.

THE SIXTH SENSE.—Dr. Hughes Bennett, Professor in Edinburgh University, lately read a paper before the British Association of Science, wherein he announced that the tendency of modern physiology was to ascribe to man a sixth sense. If there be placed before a man two small tubes, the one of lead and the other of wood, both gilded over so as to look exactly alike, and both of the same temperature, not one of the five senses could tell the man which is lead and which is wood. He could tell this only by lifting them, and this sense of weight was likely to be recognized as a sixth sense.

THE Rev. W. R. Dawes concludes that the ruddy tint of the planet Mars does not arise from any peculiarity of the color of its atmosphere, as the redness is most apparent in the center where the atmosphere is thinnest, and it is suggested that it arises from the color of the soil.

SAYS Mencius:—"If I am treated rudely, let me examine into the cause, and if I cannot discover any sort of impropriety in my own conduct, I may disregard the rudeness, and consider him who displays it as no better than a brute, and why should the conduct of a brute disturb me?"

IN the year 1325 a vessel is recorded to have brought corn from France to Newcastle and to have returned laden with coal.

TO CARRY on the coasting trade in coals to London, 10,000 tons of gravel are weekly supplied in the Thames for return ballast.

ONE-THIRD of the coal used in France is imported from England, Belgium and Prussia.

POTATOES grow at Quito at an elevation of 10,000 feet above the sea, but olives not above 1,250 feet.

A RADICAL CHANGE IN SUGAR MAKING.

MESSRS. EDITORS:—Suffer me to lead your attention to the inclosed extracts from *Les Mondes*, of Paris, and the *Diario de la Marina*, of Havana, convinced that their perusal will prove interesting, not only to yourselves but also to the enlightened readers of your ably-conducted journal. Mr. Reynoso's discovery has caused a great sensation in this country.

JORGE CRAVE.

Concepcion, August 29, 1865.

The extract from *Les Mondes* we translate, as follows:—

"LAST SESSION OF THE IMPERIAL AND CENTRAL SOCIETY OF AGRICULTURE.—M. Payen, in consequence of the intimate relations of agriculture with the manufacture of sugar, believed it a duty to call, in a special manner, the attention of the Society to the happy thought of M. Alvaro Reynoso, of Havana, a very distinguished pupil of our national schools, of substituting the action of cold for that of heat in the concentration of sugar sirups—either those of the cane or those of the beet.

"At the present time machines for making ice have become very common and very economical. By the combustion of one pound of coal, twelve pounds of water are frozen; while, with the same pound, only six pounds of water, in the average, can be evaporated. The advantage, then, in favor of congelation, is nearly one-half. It has, furthermore, been applied with success to the concentration of sea water, to extract from it the salts of soda, potassa and magnesia which it contains; to the concentration of mineral waters to reduce them to the smallest volume possible without depriving them of their virtue; and even to the purification of sea water in freeing it from all its saline principles and making it potable. The waters of the sea desalted, the salts extracted from sea water, mineral waters concentrated, are far from having the commercial value of sugar, and of being able to bear the cost of a treatment equally expensive.

"The moment, then, was come to think of treating sugar juice by artificial cooling, in place of submitting it to heat which decomposes it, or augments considerably the proportion of uncrystallizable sugar. M. Payen had seen the results of the first experiments made on a small scale by M. Alvaro Reynoso; he was able to state that the sirups marking five to six degrees on the hydrometer of Beaume were converted by congelation, aided by movement, or by a turn of the hand analogous to that employed in obtaining sorbetices known under the name of *granit*, into a sirup of twenty-five degrees, and water nearly pure from the melting of the ice after the sugar had been separated by the centrifugal machine, or the press.

"The able Havana chemist, who has made a name in the Spanish colonies by the publication of two highly esteemed works—"Progressive Studies on Divers Scientific Matters, Agricultural and Industrial," "Essay on the Culture of the Sugar Cane"—completes at this moment his practical researches on the best mode of the application of cold. At the same time he is preparing some experiments on a large scale. M. Payen undertakes to follow them closely with his illustrious associates of the Academy of Sciences—MM. Dumas, Pelouze and Peligot, and to present, in relation to them, a detailed report to the Society of Agriculture.

"M. Chevreul, in the name of the assembly over which he presides, thanks M. Alvaro Reynoso, for the communication made through the medium so honorable of M. the Perpetual Secretary, and accepts the promise which has just been made in his name."

[As there is a loss of at least 18 per cent in removing the water of cane juice by evaporation, owing to the conversion of a portion of the sugar into grape sugar by heat, if the separation could be effected without the employment of heat, the yield of sugar would be considerably increased. The freezing of water is an act of crystallization, and crystallization is a separating process. If all the water could be removed from cane juice by this process, or sufficient to induce the sugar to granulate, and if the process were a cheap one, it would indeed work a revolution in sugar making; but if the concentration is only to 25°, requiring evaporation for its completion, it is difficult to imagine that it can be economical. The novelty of the suggestion, however, and the high position of M. Payen, who introduces it, warrant us in laying it before our readers.—Eds. Sci. Am.]

NOTES ON THE NEW SLOOPS OF WAR.

[For the Scientific American.]

The contracts for the construction of the machinery for these vessels were issued in the year 1863, the price agreed upon being \$400,000 for each pair of engines, with boilers, etc., complete. The hulls are being constructed at the national navy yards throughout the country, none being built by private contract. These steamers are rated at "second-class sloops" in the "Navy Register," and will average 225 ft. between perpendiculars; have a breadth of beam of 41 feet, and a burden of 2,000 tons; they will have two decks, viz., the spar and main decks—the whole of the machinery being below the latter, and, consequently, below the water line. The propelling force will consist of a pair of back-action condensing engines, having cylinders of a diameter of 60 inches, with a stroke of piston of 36 inches. They were designed by the Chief of the Bureau of Steam Engineering, and are creditable specimens of their class. Steam is supplied by four of "Martin's" upright tubular boilers, and two superheating boilers of one furnace each. Total number of furnaces, 30, each one 3 feet by 6 feet 6 inches; total grate surface, 585 square feet; total heating surface, 16,000 square feet. In reviewing the general design and the elaboration of the details of these engines, it is manifest that they are much less open to criticism than were the earlier attempts of the Bureau of Steam Engineering in designing the machinery for its war vessels. The gunboats built in 1861 and 1862, having engines of 30 by 18-inch cylinders, proved so entirely deficient in speed that new boilers, having increased grate and heating surface, in addition to a superheating apparatus, are being built by them, and for the use of these it is hoped a better rate of speed may be obtained; but there are so many defects in the engines as at present arranged that the performances can never be entirely satisfactory. The sloops of war, having engines of 42 inches cylinder and 30 inches stroke of piston, built soon after the gunboats, although an improvement on the last-named vessels, are yet defective in design and detail. In the engines for the vessels which are the subjects of these notes, the slide valves and their working gear have received some valuable modifications. The valves have been made "double ported," thereby giving a quicker opening, and reducing the size and throw of the eccentrics. Steel rollers have been introduced for carrying the weight of, and pressure on, the valves, and a large proportion of the surfaces of the valves has been balanced by "Waddell's" patent balance plate. By means of this arrangement that portion of the inside surface of the valve within the edges of the "balance plate" is open to the same pressure of steam as the back, and is, therefore, "balanced." This plan of relieving the pressure on large slide valves has, for some years, been in successful operation on the Royal Mail steamer *Persia*, of the Cunard line, as well as in the navy. It might be supposed that the use of rollers under the face of a slide valve would not be admissible. The inventor of this arrangement designs that the rollers should barely touch when first fitted in, but, as the face of the valve and its seat wears down, the rollers receive a considerable proportion of the unbalanced pressure on the valve, substituting a rolling for a sliding motion. Rollers under the lower edge of the valve are in daily use in the navy, and give entire satisfaction. The reversing gear for these engines is, in some of its details, light and ill-proportioned for the duty it has to perform. The counter-balance introduced will balance the weight of the links only, leaving the power to move the valve (which, in reversing, with the eccentrics in certain positions, will be moved several inches) and the friction of the various journals to be overcome by a small hand wheel on the engine platform, operating through the agency of a worm and wheel. Much difficulty must be experienced in reversing the engines promptly, as it will require for that purpose more operators at the wheel than can reasonably be expected to be in the engine room at any one time. A very good arrangement—one that has been in use in naval steamers, and is in general use on large screw steamers of the merchant marine—is the combination of a steam cylinder with the reversing shaft and arms, for the purpose of raising or lowering the links. Such an apparatus has, for some reason, been

omitted in the design of these engines, although its use would certainly facilitate the maneuvering of the engines. It would be noticed by even a casual observer that the main cross-head slides of these engines have unusually large surfaces. So much trouble has been experienced on board of naval steamers, both screw and paddle wheel, from an insufficiency of surface in this very important part, that the value of this increase will be appreciated. As friction is independent of surface at ordinary speeds, the dimensions so often given to main slides could, where practicable, be increased with great advantage, and with this modification one source of delay to the vessel and annoyance to her engineers would be removed. The air and circulating pumps are entirely separate, and each is double-acting. This is manifestly an advantage, as the former plan of combining the two pumps in one, causing one end of the pump to use fresh water and the other end salt, was productive of much trouble, causing both a loss of fresh water and the introduction of salt water in the hot well. The suction valves are unnecessarily large, and the space between the piston at the end of its stroke and the valves is so great (more than the capacity of the pump) that much trouble may be apprehended from the uncertain action of the valves, caused by the vapor inclosed within this space. It is asserted that the momentum which the water acquires in descending from the condenser of the pump will insure a prompt movement in the valves; but this cannot be relied upon when at sea, and it is more advisable to bring the valves as close to the end of the pump barrel as possible. The pump barrels are lined with brass, and the weight of the pistons is borne as usual by lignum-vitæ rings, which are to be recommended for that purpose. A manifest improvement has been made in the reduction of the capacity of the surface condenser to that actually required (about one-third of the heating surface of the boilers), and in passing the refrigerating water but once through the tubes. In some of the gunboats before referred to, the condensers contained twice the number of tubes required; and the refrigerating water, by being twice passed through them, became, some time before it was discharged, so heated as to be of little avail in condensing the steam. The great pressure brought upon the pumps in forcing the refrigerating water to change in direction so often, caused their pistons to leak badly, their valves to pound and wear out very rapidly, and in some instances bursting the bonnets of either the condenser or pumps. The tubes in the condensers for the vessels which are the subject of these notes, lie in the direction of the length of the ship—the exhaust steam entering the condenser by two nozzles in front, and being distributed around and among the tubes by a channel way having a narrow opening extending the whole length of the condenser. By this arrangement the whole of the tubes are made available, which was not the case in the condensers of the gunboats, where there is a difference of many degrees in different parts of the condenser.

The working parts of these engines are very massive, and their dimensions might be reduced with advantage. The metal of the cylinders, channel plate, etc., is also much heavier than is found in ordinary practice.

The boiler power in these ships is ample, and by means of the superheating apparatus attached, a considerable economy of fuel may be expected, besides a more satisfactory action in the engines. There are no blowers supplied, in which omission the good judgment and the experience of the designer may be seen, as it is well known that the duty of a Martin boiler cannot be greatly augmented by the use of a blower, owing to the contracted calorimeter, while the consumption of coal under those circumstances is greatly increased. A steam jet has, however, been applied in each steam chimney, a moderate use of which jet is often found advisable, as it is the speediest way of bringing the fires, when small, to a full action.

The screw propeller for these vessels is of brass, and has four blades, each 27 inches wide, with a pitch at the forward edge of 26 feet, expanding at the after edge to 30 feet. The mean pitch of 28 feet will require the engines to perform 50 revolutions per minute, in order that the vessel may have—in ordinary weather—a speed of 14 miles per hour. This

will allow of a slip of 16 per cent, which is considered ample for vessels having the lines, etc., of those under remark.

The engines, owing to their strength of detail, will be capable of working much beyond the speed mentioned with safety, should the boiler power be sufficient to allow of it. It should not be expected that a man-of-war, which is necessarily of a fuller model than a clipper-built merchant steamer, and which, in addition to its large crew, with their provisions, etc., for many months, is obliged to carry a heavy battery, with ammunition, etc., can be propelled with the same economy of fuel as its rival in the merchant marine. But it cannot be denied that the sloops-of-war, which are the subject of these notes, will, when completed, compare favorably with any vessels of their class in the world.

ENGINEER.

September 25, 1865.

[These engines are not of the class usually known as "back acting." They are direct acting horizontal engines, precisely similar to those used in factories every day.—Eds.]



Steam in Long Pipes.

MESSRS. EDITORS:—In your paper of July 29th, in answer to a question from Mr. John C. Gardiner, in regard to length of steam pipes, you stated the case of the Gould and Curry Mine. Having been at that time the chief engineer and projector of the works in question, I will give you some facts.

The mine was worked through three tunnels—upper, middle and lower—with a respective difference in their levels of about 225 feet each. In consequence of a very heavy winter and the softening of the hanging wall of the mine, it became evident that the mine would cave or fall in; therefore it became necessary to project some other works which would secure the yield of the mine at a lower depth, outside or below the "cave." There was no shaft from the surface, so that there had to be put up temporary works in some secure part of the mine until a shaft could be put down from the surface. I then carefully considered the troubles arising from putting a boiler in the mine; and, on the other hand, the ease with which a steam pipe could be carried there from a boiler on the surface. In fact I had no other recourse as, if I put a boiler in the mine, I would have to use part of the old workings for a smoke-stack, but as that was going to "cave," I would then have had no smoke-stack at all, so I resolved to carry the steam 1,300 feet, which was the shortest available distance to the surface. I had no data to work on other than the knowledge that, in some coal mines in the north of England, they have carried steam six or seven hundred feet for accessory work, from lower levels than the main pumping level. It was "Hobson's choice" with me; but I was fully aware that I staked my reputation in the experiment.

The boiler was of the common Mississippi style—two flues of 42 inches diameter 26 feet long, and two flues 14 inches diameter, having also steam and mud drums. The steam was taken from the steam drum and passed through a superheater under the boiler—the same firing answering for both—and thence through a 4 inch gas pipe down an air shaft to the lower tunnel, where I had fixed an expansion joint and also an accumulator; this was a small boiler, 30 inches diameter and 5 feet long—its object being to catch water in case the boiler should foam, or to drain the pipe beyond. As the pipe raised gradually from this accumulator to the engine, with the grade of the tunnel, it was in just the right place. The length of the steam pipe in the air shaft was 201 feet. From the accumulator the pipe ran alongside of the tunnel, to a branch tunnel, to the engine room—600 feet long—in the branch tunnel—500 feet long—and up a slight incline to engine room, 40 feet more—making, in all, a steam pipe of 1,341 feet in length. In the engine room was placed another accumulator, the same as the one at the bottom of the air shaft, but set on its end—the steam going in at its middle and out to the engine at the top. The object of this one was to catch whatever water might be carried

with the steam, also scale from the iron pipes, and to form a kind of reservoir for steam; as the engine had a variable cut-off on, it acted as such to a considerable extent. On each of the accumulators, was placed one of Farman's steam and water traps, also a gage to note pressure.

The engine was made at the Vulcan Iron Works in San Francisco, and was a horizontal cylinder of 14 inches bore, 30 inches stroke, and was used cutting off at half stroke. It hoisted a bucket for sinking purposes, holding one ton of rock, in one shaft 200 feet deep; in another shaft a cage, with car and load weighing 3,000 pounds. The speed of hoist was 400 feet per minute; it also worked a pump of 8-inch bore, 4-feet stroke, with its machinery in the third shaft. The amount of water was not much—about half the capacity of pump, as the pump was going sucking about half the time. The trips of hoisting were made about every ten minutes, respectively—sometimes both were hoisting together. The hoisting apparatus was of the friction variety—the same as generally used in these mines; in all I think the engine had to do about 35 horse-power of work.

The steam pipe was 4-inch gas pipe screwed together with flanges at intervals of 100 feet. For convenience of repairs, in every 400 feet there was an expansion joint. The pipe was anchored to the side of the tunnel in the middle of that distance, so that it expanded both ways from that point. The casing of the pipe was of wood, made of two by 12-inch plank—making a box of eight inches square inside, in the center of which rested the pipe on saddle pieces, the balance of space being filled with common wood ashes. The expansion of the pipe was very nearly two inches per 100 feet, from 60° to temperature of the steam at 80 pounds pressure. [325°, Eds., Sci. Am.] The difference in pressure at the boiler from that at the engine, could not be detected; I changed the gages (Ashcroft's) from the boiler to the engine, but no difference could be found. I even made two gages of gas pipe, half-inch, of common siphon shape, and filled them with mercury. I made them long enough to suit our working pressure, and still no difference in pressure between boiler and engine. I also made experiments without the superheater, and found no difference in pressures. The only loss was an increase in the amount of water trapped off from the pipes. The loss would then be one cubic foot per hour trapped off; with the superheater the loss was one third of a cubic foot per hour. The amounts trapped off were accurately kept; these figures are the average, and not the result of any one hour, although it never varied much from what is given. When the flow of steam through the pipes was rapid it was less; when slow, greater.

The fuel was common pine wood, using from three and a half to four cords per twenty-four hours—which will compare with any engine having short steam pipe and doing the same amount of work with the same kind of fuel. The engine ran in the mine over one gear, during which time I made numerous experiments with it. It is now out of the mine, as they have no use for it in there. It was a complete success, as it did more than was ever expected of it, and enabled the company to declare dividends during the "caved" condition of their mine.

In conclusion, I would state that, as far as my experiments went, I see no end to the distance to which steam can be carried—it being merely regulated, more by the amount of condensation than by difference of pressure. I would not hesitate to carry it one mile, if I could cover the pipe well—that being the great point to be looked after.

ROBT. G. CARLYLE.

Virginia, Nev. Ter., Sept. 1, 1865.

Galvanizing Cast Iron.

MEMSRS. EDITORS:—At some time during the past year I have read a series of interesting articles upon galvanizing iron, in your paper, but I have not seen any method or process which will apply to common cast iron. I find no difficulty with wrought or malleable iron, but the process which succeeds with these fails with common cast iron—the zinc or tin will not adhere. I have used first a bath of dilute sulphuric acid, after cleaning a bath of muriate of zinc, then immersed in the tin or zinc. This process fails, as above stated. Knowing you to be interested in all that pertains to the arts, I take the liberty to inquire

what is the common process in use, or best process for galvanizing cast iron.

E. D.

South Dedham, Mass, Sept. 18, 1865.

[We have made repeated efforts to obtain this information, but without success; and we print the inquiry in hopes that some of our correspondents may be able to send the directions required.—Eds.]

Wire Bolting Cloth.

MESSRS. EDITORS:—For the information of G. W. Waskey and others, I place at your disposal my experience in the use of wire cloth instead of silk for bolting. In 1860 I purchased one of D. C. Anderson's atmospheric wire bolts, and put it in operation immediately, and have been using it constantly up to the present time. Its dimensions are as follows:—Length of cylinder, 6 feet; diameter, 20 inches; one-third is covered with No. 64; one-third, No. 74, and the remaining one third with coarser iron wire. Bolting chest and frame for gearing, all occupy a space 9 feet long, 3 feet wide, and 6 feet high. I bolt 10 to 15 bushels per hour, make a No. 1 article of flour, clean the bran, middlings and shorts in good order, use no cooler or conveyer, and give every man his own grain to within one peck—something that cannot be done where it has to pass through 30 or 40 feet of reel and over the same amount of conveyer. Wire, as a material for separating flour from bran is not known or not appreciated, or I think it would supersede silk cloth altogether. I have been in the milling business for twenty years, and have found nothing to answer the purpose for bolting so well for the same amount of money as the bolt described above.

I first used Nos. 74 and 84, and found them too fine for all kinds of grain; 60 and 70 are fine enough for any cloth for ordinary business.

B. A. HAYCOCK.

Richland, Iowa, Sept. 3, 1865.

Suggestion for a Cast-iron Statue.

MESSRS. EDITORS:—Do you know of any iron foundery where they make a casting to resemble a soldier standing "In place, Rest!" that is, the butt of the gun on the ground, one foot on the alignment, and the hands folded in front? I think such a design would be very appropriate for the top of a soldier's monument. There are founderies which cast figures to resemble animals, and I should think such a design would pay for the trouble.

A. R. B.

Cherry Valley, N. Y., Sept. 28, 1865.

Shooting a Candle Through a Board.

MESSRS. EDITORS:—It is a well-known fact that a candle can be shot through a board; now if the board could be impelled against the candle with a velocity equal to that of the candle when shot from a gun, so that the relations of the two should be the same as in the first instance, at the moment of contact, what would be the result?

J. W. P.

New York, Oct. 2, 1865.

[Doubtless the candle would be smashed.—Eds.]

The Definition of Work.

MESSRS. EDITORS:—Mr. Nystrom seems extremely anxious to convince some one of the correctness of his peculiar definition of the mechanical term "Work." After an unsuccessful attempt against the savans of the country in the *Journal of the Franklin Institute*, he now tries, through the columns of the *SCIENTIFIC AMERICAN*, to urge his confusing ideas upon your readers. Permit me to offer a correction to any who have taken Mr. Nystrom's dose. As the definition is one in mechanical science, we will ask it of men of universally acknowledged preeminence in the scientific world. Prof. W. J. M. Rankine, probably, now stands first in his specialty—mechanical science. In his work on "Prime Movers" I find that "the action of a machine is measured, or expressed, as a definite quantity, by multiplying the motion which it produces into the resistance—or force directly opposed to that motion—which it overcomes; the product resulting from this multiplication being called 'work.'"

The high scientific attainments of Dr. J. R. Mayer have won for him the respect and admiration of the first scientific men of our age, and his wonderful success in ascertaining the mechanical equivalent of heat by mathematical investigation has won for him a place in history by the side of Newton and La

Place. We certainly cannot ask instruction of more reliable authority.

In his "Celestial Mechanics," in the chapter on the "Sources of Heat," he says:—"The mathematical expression for work done—that is to say, a measure of this work—is obtained by multiplying the height expressed in feet or other units by the number of pounds lifted to this height."

No time is mentioned, nor is it ever in speaking of the measure of work. Work cannot be done without occupying time, but the measure of work is as independent of time as is the equally indispensable length of shaft through which that work may have been done. When time is introduced, the expression becomes one of power.

The performance of Cornish, or pumping engines generally, is measured in units of work performed by a unit of coal. The unit of work is the foot-pound—that of coal, the bushel of 112 pounds. We say that the Cornish engine of East London has performed work amounting to more than a hundred millions of foot-pounds with a bushel of coals, saying nothing of the time occupied in doing that work, or the power exerted by the engine. Work is, therefore, measured independently of time, say the best authorities and common usage.

R. K. T.

Providence, R. I., Sept. 10, 1865.

[The relation of ideas to sounds is arbitrary. The sense in which any word is to be employed is that in which it is generally used by the community speaking the language; and this is to be determined by the recognized authorities. The authorities for the meaning of technical terms are the masters of the science or art to which the terms belong. With this citation of Rankine and Mayer, in addition to Morin, we rest the discussion. It is a small and simple matter, and we have given up to it quite enough of our space.—Eds.]

Dipping a Razor in Hot Water.

MESSRS. EDITORS:—Having seen in your valuable paper the question asked, "Why does a razor cut better for being dipped in hot water?" I venture upon what seems to me to be a reasonable explanation.

That wonderful little instrument, the microscope, reveals to us the fact that the edges of all tools, instead of being perfectly smooth, are really toothed like a saw. Now, when the razor is dipped in hot water, it causes these little teeth to expand, thereby rendering the distance between them smaller, and, consequently, giving the razor a smoother edge.

At first thought it might seem that the teeth would expand the same distance in every direction, thereby leaving the edge in exactly the same condition as it was before its "hot-water bath." But when we consider that the base of the tooth is thicker than the edge, the explanation is clear; for the former will expand in a greater degree than the latter, thus making the distance between the teeth small; or, in short, making a finer saw. We all know that the finer the work to be done, the finer must be the saw employed; hence, when we wish to saw off our whiskers (how few are conscious of doing such an act), we resort to the last means of sharpening the instrument—dipping it in hot water.

Is not this explanation the most reasonable that can be given?

P. DuBois.

Philadelphia, Sept. 23, 1865.

[On placing a well-strapped razor under one of Smith & Beck's microscopes, with a lens of four-tenths focus, we find the edge—not indeed formed of fine teeth—but irregularly notched, and perhaps sufficiently so for our correspondent's explanation. In this case, as in all others, the first step should be to ascertain, by honest, careful and repeated comparison, whether there is any foundation in fact for the prevalent opinion. Does a razor cut any better for being dipped in hot water?—Eds.]

Eyesight.

MESSRS. EDITORS:—In your issue of 30th ult., a correspondent, "C.," advises people to rub their eyes in the manner stated, to prevent flattening of the eyeball. He says "the pupil becomes flattened," by which he betrays a want of correct knowledge on the subject. Like recommendations from unscientific men have been published frequently for many years past, and based upon an alleged habit of

John Quincy Adams—that of rubbing his eyes from without, inwardly, while washing. If the eyeball flattens with age, it occurs from a lessening of its contained fluids, or from other structural changes, which pressing of the ball with the finger has no tendency whatever to relieve. Eyes may be permanently injured by the practice, as all the delicate portions of the organ are strained and violently distorted each time. To preserve the sight, carefully avoid straining the eyes, use bright, steady lights, with good green shades over them, and, when necessary, use glasses of low-magnifying power.

R. F. S.

The Vortex Question.

MESSRS. EDITORS:—Can you tell me the cause of the little whirlpool often noticed above an orifice from which water is escaping? Also, whether the commonly received idea, that the direction in which it turns is dependent on the rotation of the earth, is correct? I have made several observations on them, and find that, although they may be made to turn in either direction, if undisturbed they usually turn in the opposite direction from the hands of a watch, thus agreeing with theory. Still, I cannot understand how the rotary motion is kept up, even if it is once imparted to the water.

E. C. P.

Boston, Oct., 1865.

A Novel Joint Stock Company.

An English journal contains the announcement of a new "dodge" in the organization of a joint stock company. It appears that a number of gentlemen who are interested in the elevation of the working classes have commenced a company, called "The Clayton Forge Company," for the manufacture of boiler plates and bar iron, on the principle of dividing profits with the workmen and the customers. The scheme, shortly described, is as follows:—All profits up to 10 per cent will belong to the shareholders; all above 10 per cent, after providing for repairs and renewals of plant, is to be divided into three equal portions, the first of which will belong to the shareholders, the second to the workmen, and the third to the customers. The subdivisions among the workmen are to be in accordance with the wages earned by each, and the subdivisions among the customers according to their purchases. Thus the scheme says to the shareholders, "We hope to pay you something more than 10 per cent for your investments;" to the workmen it says, "You shall no longer have reason to complain that your employers get an undue share of the profits, for if they earn more than 10 per cent, you shall share it;" and to the customers it says, "Our best exertions shall be at your service, and you shall not pay too much for your iron, for if we earn more than 10 per cent, you shall have a share of the excess as extra discount." Messrs. Briggs, the colliery proprietors of Normanston, have already tried the division of profits among the workmen with good effect, and there is every reason to believe that the principle will spread not only in that but in other employments. The division among the customers is a new idea, and is of course intended to secure orders in all states of trade, and we hope and believe will be found to answer the purposes of the promoters.

It will be observed that 10 per cent clear first goes to the concern. Then, and not till then, a fund is struck off for renewals and repairs—which would amount, at least, to 5 per cent, which ought to be charged before profits are estimated. Then a third of the subsequent profits each—first, to shareholders; second, to workmen; third, to customers; but to what do these divisions of profit really amount? extra wages and extra discount—that is, a higher rate of wages and lower rate of prices to insure workmen and customers. If not these, the scheme is fallacious—but if these, why not carry on the business plainly and directly upon that system without the mystification of shares to retain workmen or customers?

The Great Mont Cenis Tunnel.

I am in a position to send you some recent special information with respect to this important work. On the Italian side, the average daily advance was 6 feet 6 inches in the first half of 1863; and in the second half of that year 4 feet 7 inches. In the first quarter of 1864, the average daily advance was 4 feet 6

inches; in the second quarter, 5 feet 2 inches; in the third quarter, 6 feet 4 inches; in the fourth quarter, 6 feet 7 inches; in the first quarter of 1865, 7 feet, and in the second quarter, 6 feet, 10½ inches. In 1863 the average daily advance at the French side was 3 feet 10½ inches; in the first quarter of 1864, 4 feet 0½ inch; in the second quarter, 3 feet 9 inches; in the third quarter, 4 feet 5 inches; in the fourth quarter, 4 feet 9 inches; in the first quarter of 1865, 5 feet 6 inches; and in the second quarter, 7 feet 1 inch. At the close of June a total distance of 16,012 feet had been pierced, and by January, 1870, the whole tunnel is expected—if no unforeseen difficulties arise—to be carried out.—Correspondent of the London Engineer.

A Poisonous Tomato Worm.

The Port Byron (N. Y.) Times says that several persons near Auburn have recently been fatally stung by a large worm that infested tomato vines, death ensuing within a few hours. A lady in Port Byron discovered one of these monsters on her tomato vines one day last week, and narrowly escaped being stung. The worm is described as about three inches long, of a green color, and armed with claws and nippers, with a black horn protruding in front some three-fourths of an inch long. A writer in the Rochester Express states that a few days since he took one of these worms from his tomato vines, and confined it about a week in a glass jar, awaiting its change into the chrysalis state. Upon being released it burrowed its way into the ground nearly a foot, or as far as the thread by which it was held would permit. Under the impression that it might resurrect itself another season in the milder form, and become the parent of a numerous and destructive progeny, it was killed.

Early Radishes.

A writer in Gallucci's Messenger states that radishes may be grown in a very few days by the following method:—

Let some good radish seed soak in water for twenty-four hours, then put them in a bag and expose it to the sun. In the course of the day germination will commence. The seed must then be sown in a well manured hot bed, and watered from time to time with lukewarm water. By this treatment they will, in a very short time, acquire a sufficient bulk, and be good to eat. If it be required to get good radishes in winter during the severe cold, an old cask should be sawed in two, and one half of it filled with good earth. The radish seed beginning to shoot as before, must be sown in it, and the other half of the barrel put on the top of the full one, and then placed in the cellar. For watering, lukewarm water should be used as before. In the course of a few days the radishes will be fit to eat.

SPECIAL NOTICES.

William Alford and John D. Spear, Philadelphia, Pa., have petitioned for the extension of a patent granted to them on the 18th day of May, 1852, for an improvement in iron safes.

Parties wishing to oppose the above extension must appear and show cause on the 30th day of April next, at 12 o'clock, M., when the petition will be heard.

Rebecca C. Wheeler, administratrix of the estate of Thomas B. Wheeler, deceased, of Albany, N. Y., has petitioned for the extension of a patent granted to him on the 16th day of December, 1851, for an improvement in grain sieves.

Parties wishing to oppose the above extension must appear and show cause on the 27th day of November next, at 12 o'clock, M., when the petition will be heard.

A small lead shot weighing .072 gramme was found to cause 192 times its own volume of air to penetrate beneath the surface of water by being thrown into it from a height of 1½ feet at an angle of 60 degrees.

The refuse of horn used in the manufacture of combs is used in the manufacture of prussiate of potash, and from the waste in this process is obtained the delicate pineapple flavor used by confectioners.

A solar eclipse will take place on Thursday, the 19th inst. Prepare your smoked glass.

Improved Hilling Plow.

Those persons who have, early or late in life, been obliged to bend their backs over a hoe, know what fatiguing work it is, and how it tires every muscle in the body. Those who are not obliged to do it themselves, but have to pay others for it, know what an expensive and unsatisfactory piece of business is sometimes made of it. The ends of the rows, where the eye of the farmer naturally falls, are fair to view, but in the middle the slothful laborer has made a beggarly account of his time. The plow here illustrated is designed to expedite the labor and make it more thorough. The patentees say of it:—

"Being practical farmers ourselves, we think all will agree with us in saying that improvement in double mold-board plows has been very much needed. In this plow, which we have spared neither time, labor nor expense to perfect, and which is adapted to every kind of soil in which cast-iron plows are used, we have succeeded beyond our most ardent expectations. It will run as deep as may be desired without any extra exertion in holding; it holds easy and runs steady, and is not liable to clog; it will work different widths of rows by using it either with or without the long or short wings, A and B, thus making a large or small hill, as may be desired. It will allow a portion of the loose soil, and also lumps and stone, instead of being thrown upon the plants, to fall in the center of the furrow, leaving the ground perfectly loose and mellow between the rows, which is very necessary to allow the fibrous roots of plants, and especially of corn, to penetrate from one row to the other; and, also, very important in a drouth, as it allows the moisture to be absorbed more readily during the night. By using the plow with the center piece in it will prevent any soil from falling in the center of the furrow, and leaves the bottom clean and smooth, very suitable for ridging, surface draining, or for nursery purposes.

"In sections of country where quack grass is to be overcome, the guard colter, D, is used. The center piece, the wings and guard colter are held firmly in their places by means of wooden wedges behind. The wings are taken off, as required, and the others substituted, the lines, *a*, showing the place where they fit.

"By using this plow in the cultivation of the potato, hand-hoeing can be entirely dispensed with; this is no experiment, but an established method, which has been very successfully pursued by farmers, who prefer this way of working their potatoes to any other, believing that a better crop can thus be realized, and with less labor than by other management.

"After the ground is plowed and thoroughly harrowed, let the furrows be made deep and at equal distances apart; when the potatoes first make their appearance, or when they are one or two inches high, use this plow, arranged wide enough, and, if necessary, with the center piece or guard colter in, to bury the potatoes entirely under by passing once between the rows; then, with the harrow, drag over the same way (no danger of injuring the potatoes), which will leave the ground freshly plowed and harrowed. Very soon the potatoes will again make their appearance, free from grass, and with as much ground on the hill as is necessary, after which they may be cross-plowed with this plow as often as desirable.

"For a great variety of work, and thoroughness in it, we assert this plow stands pre-eminent. It has been awarded the highest premium at every county fair at which it has been exhibited, and elicited the highest encomiums from the farmers present."

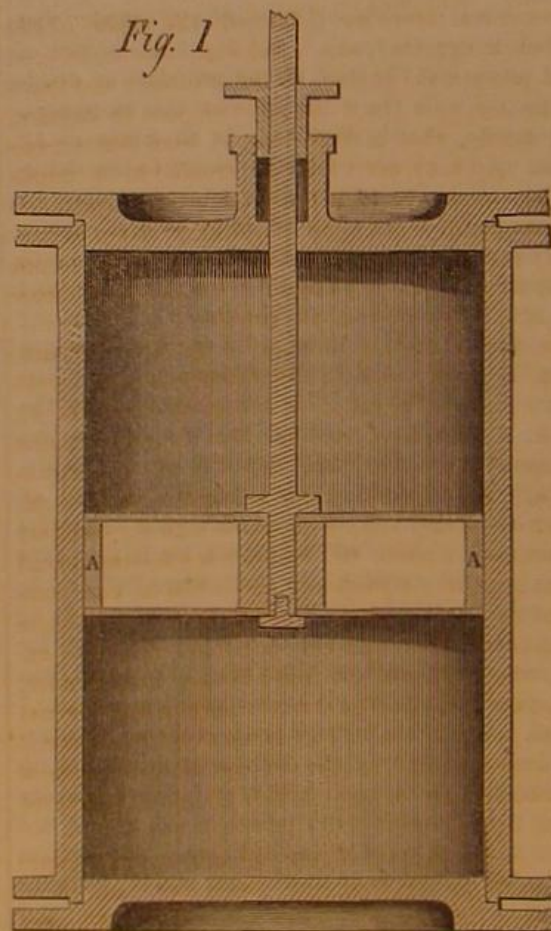
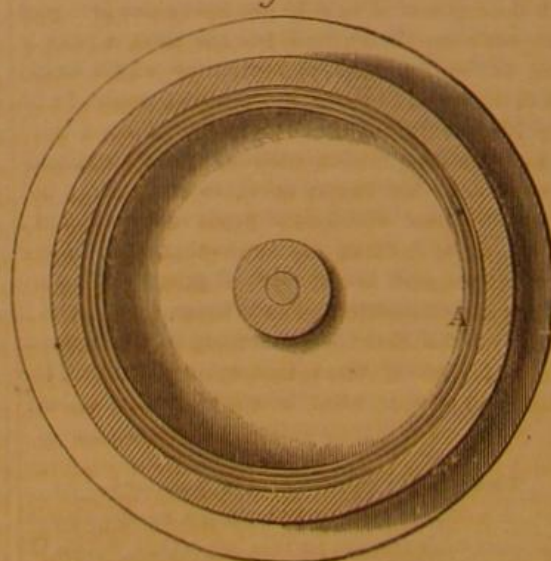
It was patented by Messrs. A. C. & R. L. Betts, of Troy, N. Y., May 17, 1864, to whom all communications in regard to town, county or state rights should be addressed.

KENDALL'S PISTON PACKING.

The engraving represents a plan for packing pistons to render them steam or water-tight. Instead of the usual metallic rings, the inventor provides a brass spring coiled in continuous circles and inserts

**BETTS'S HILLING PLOW.**

it between the heads or flanges of the piston, as clearly shown in the engraving. It is claimed that this method of packing a steam piston is cheaper,

**Fig. 2**

more expeditious and less liable to get out of order than that generally used, and that it requires no attention after it is put in until it is worn out.

The invention was patented through the Scientific

American Patent Agency on July 11, 1865, by Edwin Kendall, of New Lebanon, N. Y. For further information address him at that place. It is on exhibition at the Fair of the American Institute.

Rifle Trial.

A very interesting trial of rifled arms for one of our colonial governments took place at the Rifle Range, Woolwich Arsenal, on the 7th September, in the presence of Major Pasley, R. E., the Military Commissioner for the colony, and other officers. The rifles, which were selected by chance out of 1,000 arms, were in pattern precisely similar to that known as the "oval-bore sapper rifle," except that the mountings are of iron instead of brass, and the caliber of the minor axis is .565 to suit the .550 ammunition; ratio of spiral, one turn in 36 in. The range chosen was 1,000 yards. Each rifle

was fitted into the machine rest and fired without altering the elevation or direction of the rest. Diagrams of twenty shots with each rifle were taken. These diagrams, which we have inspected, are really so extraordinary that we have great pleasure in giving to them the publicity they deserve. The rifles were "Lancasters," oval-bore, the bore being .565, quantity of powder $2\frac{1}{2}$ drams, R. F. G. The bullets were .55 boxwood plug, and the lubrication wax. The cartridges were rolled one cut outside, and the rifles were fired from a fixed rest. The hits made were 20, the misses 0, with each rifle; total, 100 rounds, the range being 1,000 yards. The deviations were as follows:—No. 1 rifle, mean absolute deviation 30.35 inches; No. 2 rifle, 28.35 inches; No. 3 rifle, 33.15 inches; No. 4 rifle, 26 inches, and No. 5 rifle gave a mean absolute deviation of 30.5 inches.—*London Mechanics' Magazine.*

NEW BOOKS AND PUBLICATIONS.

THE CADET ENGINEER.—This is an unpretending volume of 165 pages, treating of simple matters in engineering likely to be useful to neophytes or young engineers. It is illustrated with drawings of different details of marine engines and one or two examples of boilers. If we were to criticise any portion of this work it would be that which speaks of boilers. Generally speaking young engineers know (or think they do, which is perhaps the same thing) all about engines, while the boilers are something to put coal in. Of the benefit to be derived from the proper proportions; of the faults to be avoided in design; of the amount of fire surface per inch of cylinder and foot of stroke, much may be said, and we should have been glad to have seen some discussion of these things. It is well to make the calculations examples in simple arithmetic, for it renders the book more useful to those who have never pursued the higher branches of mathematics. Published by J. B. Lippincott, Philadelphia, Pa.

RAYS OF SUNLIGHT FROM SOUTH AMERICA.—This is a volume of 70 large photographs, representing places of resort, sites, public buildings, monuments, tombs, etc., in the city of Lima, with a number of panoramic views of the guano fields in the Chincha Islands. The book forms a magnificent collection of South American views never before published. Philip & Solomons, publishers, Washington, D. C. Baragwanath & Van Wicker, agents, No. 200 Broadway (up stairs), New York.

ELECTRICITY is distributed on the surface only of bodies; the conducting power of a wire or ribbon, however, is not in proportion to its surface but to its size—to the area of its cross section.

Don't stand near a rope under heavy strain; a man was recently killed in Connecticut by the breaking of a steamboat's hawser—the loose end flying over and striking him with great violence.

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

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

Contents:

(Illustrations are indicated by an asterisk.)

Phelps's Travelers' Head-rest	239	Dipping a Razor in Hot Water	245
Savings Banks in England	239	Eyesight	245
Large Profits of the London Underground Railroads	239	The Vortex Question	245
Henry Bessemer on his Process of Making Steel	239	A Novel Joint Stock Company	245
Recent American Patents	241	The Great Mont Cenis Tunnel	245
The Fair of the American Institute	241	A Poisonous Tomato Worm	245
Sales of Patents	242	Early Radishes	245
The Cooper Union Night Schools	242	Betts's Hilling Plow	246
Foreign Summary	242	Kendall's Piston Packing	246
A Radical Change in Sugar Making	243	Rifle Trial	246
Notes on the New Sloops of War	243	New Books and Publications	246
Steam in Long Pipes	244	Trifles	247
Wire Bolting Cloth	244	The Winooski and Algonquin Trial	247
Suggestion for a Cast-iron Statue	244	The United States and the French "Exposition Universal" of 1867	247
The Definition of Work	244	Patent Claims	248, 249, 250, 251
		Notes and Queries	252
		Blackwood's Hydraulic Jack	254
		Thomas's Hay and Grain Rack	254

TRIFLES.

There is an entertaining work, with which we have all been familiar in our younger days, wherein a certain tutor expatiates to his pupils on the value of eyes. "Eyes and No Eyes," the story is called, and it is in the volume "Sandford and Merton." The substance of the matter is that one youth (No Eyes) goes gaping about the world, and sees nothing but that which he stumbles over, while the other (Eyes), finds something novel, something pleasing and useful, on every hand.

The world of mechanics, of science, of art, is full of trifles, or matters that seem to be, yet few take note of them. Wise above many is he who does.

We read, in a recent exchange, that "Towers's patent pin is being manufactured in large quantities, and is highly popular." "What is a patent pin?" asks No Eyes; "a pin is a pin, if it has a point, but what is there patentable about that? By the law, a thing that has been in common use for years cannot be protected!" That is true; but, as it happens, Mr. Towers did not patent the pin.

What then? Two little nicks in it, near the point. "And what's the use of two little nicks near the point, I should like to know?" pursues No Eyes.

Simply to prevent it from being drawn out by accident, so that it holds better, does its work more efficiently—in a word, is improved a hundred fold; and Mr. Towers will very likely reap a handsome reward for his idea. Thus "No Eyes" is silenced, and walks away with his hand on his beard and new ideas in his head. He begins to think that, if there is commercial value in two nicks near a pin's point, there must be other wrinkles worth discovering, and he is the man to find them.

Most frequently we are called upon to notice the organization of new companies to work patents on what are sometimes called trifles. They are trifles, but they exercise a most important influence on the world's comfort and economy; otherwise capitalists would not touch them.

It was a small thing to put a copper tip on a shoe; a small thing to put a crease in a bobbin to hold the first end of the yarn; a little matter to make an indentation in the rim of a tobacco box, to serve as a catch; yet each and all of these trifles, we are told, return their lucky owners handsome revenues. In making cut nails, a great difficulty has been to feed the sheet to the shears properly, so as to cut the metal without waste, and many complicated devices have been invented for the purpose. Recently, some wide-awake person discovered that, by cutting the nails with a punch, and skipping one at every stroke, the sheet might be fed straight through, saving an

immense amount of labor; this has been lately patented.

All these inventions are simply the practical illustration of the moral conveyed in the story mentioned at the head of this article. It is "Eyes and No Eyes" over again. Men without means go through the world crying out against their fellows for being rich when they are poor, and declaring that wealth is unequally divided, when some comrade equally poor in point of worldly goods, but with intelligence, energy, perseverance and determination to succeed, puts forth his hand and seizes a prize.

In this country there are abundant sources of wealth for those who wish it, but without eyes how can we see—without the will to succeed how can we hope to?

Some men, having burned their fingers with a patent, shake their heads sagaciously; they wag their beards, saying, "Catch me in that business again!" This is as if a shipwrecked sailor should forswear the main because of misfortune. Perpetual-motion people, water wheels that pump their own water, windmills that manufacture their own wind—because these are worthless so are all and sundry machines akin to them; but good inventions, which serve some purpose, even if it be only to cut a slice of bread straight, are saleable and valuable. "He who runs may read," says the proverb; but he who keeps his eyes open will see many things.

THE "WINOOSKI" AND "ALGONQUIN" TRIAL.

In our last issue we published the report of the "civilian experts" who conducted the unfinished trial between the engines of the *Winooski* and those of the *Algonquin*, and we now propose to inquire, very briefly, what may be learned from that experiment. An impression has been created in the minds of the community that the trial was to determine the comparative economy of working steam expansively and following full stroke; but the trial was not made for this purpose, nor did it incidentally throw any light whatever upon the problem.

Mr. Forbes made a proposal to the Navy Department to supply one of the Government gunboats with engines of peculiar construction, designed by Mr. E. N. Dickerson, and he offered, if this engine developed less power than those in the other gunboats, or developed its power at less economy of coal, to remove it and supply its place with an ordinary Government engine. Mr. Forbes's engine was placed in the gunboat *Algonquin*, and when it was completed the Department assigned the gunboat *Winooski* for comparison, and the questions which the experts who conducted the trial had to determine were, the power developed by the two engines and the cost of this power in coal. The measure of the power it was agreed should be the number of revolutions of the wheels, they being precisely alike and immersed to the same extent.

The problems seem simple enough, but they were not settled by the trial, and would not have been settled if the trial had been completed. All that would have been settled, was the power of the two engines and its cost under the exact conditions in which the engines were run during this trial. The *Algonquin's* engine, with a grate surface in the boiler of only 142 square feet, and cutting off at about one-ninth of the stroke, developed almost as much power as the *Winooski's* engine with 200 feet of grate surface and following four-tenths of the stroke; and this result was due simply to the fact that the *Algonquin's* engine was using steam at 70 pounds pressure, while the steam in the *Winooski's* boiler was at a pressure of only 17 pounds. But suppose that these conditions had been reversed; or suppose that the steam in the *Winooski's* boilers had been raised to 50 pounds pressure, or to 30 pounds, or even to 20 pounds, what would have been the result? No man can tell by any process whatever, except that of trying the experiment. Again, suppose that the steam in the *Algonquin's* engine, instead of being cut off at one-ninth of the stroke, had been cut off at two-ninths, or three-ninths, or four-ninths, what effect would have been produced on the amount of power and its relative cost? A dozen trials might be made with these two engines, and the results reversed at each trial by some change in the conditions of one or both of the engines.

If the attempt is made to draw from this trial any lessons in regard to the comparative economy of high and low measures of expansion, the absence of equality in the conditions is still more fatal. In an experiment for such a purpose a difference of a single pound to the inch in the pressure of the steam would wholly destroy the value of the results; but in this trial the mean pressure in one boiler was 16.8 pounds and in the other 70.79 pounds.

If the two parties to the contract are willing to accept the conditions under which the engines were run as sufficient to settle the questions, then the trial has accomplished the purpose for which it was undertaken, but it is idle to study the results of running two engines under such very different circumstances for any light on the science or art of steam engineering.

THE UNITED STATES AND THE FRENCH "EXPOSITION UNIVERSAL" OF 1867.

The principal motive which induces manufacturers to incur the large expense of transporting their articles to popular fairs and exhibitions, is, that the qualities of their wares may be more widely known, and thus a larger sale may be obtained. The fairs are great advertising agencies, and to this fact they owe their success. The trade between this country and Europe consists mainly in the export of cotton, tobacco, grain, petroleum, provisions, and other raw materials, and the import of innumerable manufactured articles in return. Our manufactures are almost exclusively for the domestic market, or for export to South America and the Indies. Consequently, European manufacturers, who are eagerly competing for our market, have an interest in presenting their wares at our exhibitions, while most of our manufacturers have no interest in sending their products for exhibition at European fairs. In consequence of this controlling element, the United States have made a sorry appearance at the international exhibitions of London and Paris. The English or French manufacturer of cassimere, or calico, or porcelain, may obtain an advantage over his competitors by sending samples of his goods to the exhibitions, but no individual grower of wheat, or cotton, or tobacco, is likely to have the demand for his products increased by displaying samples at these fairs. Our manufacturers of clocks, of porcelain teeth, and of a few other articles, find a demand for their wares in France, and they will probably send specimens of their work to the exhibition, but the great mass of our manufacturers and producers have no inducement to incur this expense.

We are indebted to the Hon. William H. Seward, Secretary of State of the United States, for a pamphlet containing a map of the "Exposition Universal for 1867," with the official correspondence in relation to it. From this it appears that the exhibition is to open on the 1st of April, 1867, and to close on the 31st of October, of the same year; all applications for admission, with a description of the articles to be exhibited, must be presented before the 31st of October, 1865; the expense of packing and transporting the articles must be borne by the exhibitors; if on the receipt of any article the exhibitor, or his agent, is not on hand to take charge of it, the carrier will be required to take it away immediately; goods will be admitted into the exhibition from January 15, 1867, to March 10, 1867, inclusive; the removal of all goods, after the close of the exhibition, must be completed before the 30th of November, 1867; all communications by exhibitors from this country should be addressed to N. M. Beckwith, Esq., care United States Legation, Paris, France. The space allotted to United States exhibitors is 2,788 square meters—about equal to an area of 100 by 300 feet.

Unless the time for making application for admission is extended beyond the close of the present month, certainly no considerable number of articles can be expected from this country. The exhibition has been mentioned to a very limited extent in our papers, and probably not one in ten thousand of our people has yet heard that such a fair is to be held in the summer of 1867. It would require extensive advertising, and probably an appropriation of money by Congress for paying the freight on articles, to fill even a quarter of the space which has been assigned to this country, but if all exhibitors must make their

applications before the close of the present month, the managers may reduce the space allotted to us from 2,788 square meters to 88, as that will be amply sufficient.

Since writing the above we have received a letter from the Secretary of State, in which he informs us that Mr. Bigelow, our Minister at Paris, has been instructed to ask for an extension of time of filing the applications of exhibitors residing in the United States. If this application is successful some competent person will, doubtless, be selected to take charge of the business in this city.



ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING OCTOBER 3, 1865.

Reported Officially for the Scientific American.

32 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.

50,214.—Bit Stock.—Charles H. Amidon, Greenfield, Mass.:

I claim the combination of the movable screw socket, A, jaws, B, and sleeve, C, with a bit stock, when constructed and operating substantially as described.

50,215.—Loom.—R. W. Andrews, Staffordville, Conn.:

I claim the arrangement of one or more elastic friction pieces, or their equivalents, with the shuttle boxes of looms, in such a manner with relation to the picker staffs or picker blocks of said looms as to produce the within-described desirable results, and in substantially the manner herein set forth.

50,216.—Stove Damper.—George Asmus, Portage, Mich.:

As a new article of manufacture, I claim the hinged damper and slip weight, adjustable on the bar, C, in combination with the inclined face of the draught channel, A, of a heat generator, constructed and operating substantially as and for the purpose set forth.

Also, the curve, a, in the bar, C, in combination with the weight, D, hinged damper, B, and draught channel, A, constructed and operating substantially as and for the purpose described.

[This invention consists in the arrangement of a hinged damper and slip weight, in combination with the inclined face of the draught pole of a heat generator, in such a manner that the draught of the air rushing into the fire-place of the heat generator has a tendency to close said hinged chamber, whereas the gravity of the damper, combined with the slip weight, has a tendency to keep the same open, and that by adjusting the position of said slip weight the quantity of air admitted to the fire-place can be regulated at pleasure.]

50,217.—Cultivator.—Andrew Bouton, Napa, Cal.:

I claim the right and left cultivators, A, supported by the castor wheels, C, and adjustable wheels, B, and connected by transverse bars, G, all arranged substantially as and for the purpose herein set forth.

[This invention relates to a new and improved cultivator, designed more especially for cultivating the earth in orchards in California, where the trees branch out quite close to the ground, and preclude the plow being used near the trunks of the trees.]

50,218.—Valve Gear for Steam Engines.—Adam S. Cameron, New York City:

I claim the valve chamber, H H', and valves, I P, in the heads of the main cylinder, A, in combination with the supplementary cylinders, E E, pistons, F F, and slide valve, C, constructed and operating substantially as and for the purpose described.

50,219.—Globe Valve.—William Chesley, Cincinnati, Ohio:

I claim a globe valve, the part of whose stem below the stuffing chamber is smooth, to fit the correspondingly smooth interior of the tube, and the portion of whose stem above the stuffing chamber is partly screw threaded and partly smooth, so as to co-operate with the interiorly screw-threaded cap of the stuffing box, in the manner explained.

50,220.—Mode of Revivifying Loam Luting.—John Chilcott, Brooklyn, N. Y. Antedated Sept. 22, 1865:

I claim the revivification of spent loam luting by the addition of fresh loam, substantially as herein specified.

50,221.—Setting Steam Boilers.—John Chilcott, Brooklyn, N. Y. Antedated Sept. 18, 1865:

First, I claim the arrangement of water and steam tubes, A A1 A2 A3, partitions, E F F1 F2 F3, and flues, D D1 G G1 G2, substantially as herein specified, whereby a horizontal and vertical circulation of the gases or combustion between the tubes is provided for.

Second, Providing in the top sides an back of the outside setting of a boiler a continuous system of flues, I I1 and J J1, whereby the gaseous products of combustion are caused to circulate many times back and forth through the setting, substantially as herein specified.

50,222.—Process for Tanning.—Orson A. Coe, Charleston, Ohio:

First, I claim the first solution herein described, and composed of the ingredients described under No. 1, and employed for tanning skins with the wool, hair or fur on.

Second, The combination of the first and second solutions, made and used substantially as and for the purpose specified.

Third, The combination of the first, second and third solutions, all made and used substantially as and for the purpose specified.

[This invention relates to a process which is equally applicable to tanning light skins with wool, hair or fur on, or to tanning hides or skins for leather.]

50,223.—Saw Mill.—A. P. Conant, Smithland, Ky.:

I claim the vertical adjustable revolving head, E, provided with guide rods, F, and screw spindle, G, in combination with dogs, F, and with the head block, A, of a sawing machine, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the arrangement of two dogs, which

are adjustable according to the width or thickness of the log to be clamped between them, and which are guided by rods secured in the end of a swinging head, which can be raised or lowered on a standard rising from the head block, and which also allows of being turned in a horizontal plane in such a manner that by raising and lowering the head the position of the dogs can be readily adjusted to suit the diameters of different saws, or the size and shape of different logs or pieces to be sawed, and by turning said head the dogs can be swung back out of the way, or forward in their working position, and the operation of adjusting the log in the proper position for sawing is greatly facilitated.]

50,224.—Revolving Fire-arm.—Silas Crispin, New York City:

I claim the application to a revolver, having its barrel swinging from the frame by a hinge joint, of a transversely divided cylinder, when one section thereof is connected to the swinging barrel, and the other section to the stock or frame, each being retained by its own section of the center pin, in the manner shown and described.

50,225.—Sewine Machine for Making Ruffled Fabrics.—C. O. Crosby, New Haven, Conn.:

First, I claim the combination of the check and carrier for the second thread, substantially as and for the purpose specified.

Second, The combination of the check and carrier for the second thread with a sewing mechanism, substantially as and for the purpose set forth.

Third, The combination of the carrier for the second thread, feeding mechanism and clamp, substantially as and for the purpose described.

50,226.—Construction of Sheet-metal Boxes.—Daniel Cronk, Milwaukee, Wis.:

I claim the construction of sheet-metal boxes or cans with a seam, composed of lips or projections and notches at the ends of the plate forming the body of the box or can, and also with slots, in order to form a locked joint, substantially as shown and described.

[This invention relates to a new and improved mode of constructing sheet-metal boxes or cans, and it consists in a novel manner of forming the seam.]

50,227.—Picker for Looms.—Benjamin F. Day and Chas. H. Nelson, Biddeford, Me.:

We claim the box constructed as described and represented, having a means of attachment to the picker staff, an opening in its face to permit the nose of the shuttle to strike the contained disks, and an opening, c, at the top for the ready insertion and retraction of the cushion disks, as may be required.

[It is common to protect the picker against the blow which it receives from the nose of the shuttle by means of cushions of leather, rubber or hide, the different layers being secured to each other and to the picker staff by bolts or bands. One of the defects of these cushions is their liability to split and be torn apart by the violent blows it gives to and receives from the shuttle, making it necessary to stop the loom to replace it with a new picker, thereby incurring a loss both of time and money. This improvement consists in using a metallic box, of any suitable form, to receive the leather or other substance composing the cushion of the picker.]

50,228.—Apparatus for Tanning.—Charles R. Dean, Randolph, N. Y.:

I claim the construction of a hollow cylinder, or its equivalent, with slots, or their equivalent, and compartments, and the applications thereof, in the process of tanning, substantially as above described.

50,229.—Cultivator.—Isaac Dunham, Lanesfield, Kansas:

I claim the arrangement and combination of the several parts, substantially as described, in their relation to the frame and running gear, whereby the machine is adapted to the different kinds of work, as explained.

50,230.—Spinning Jack.—Ezra Dews, South Britain, Conn.:

I claim the longitudinally sliding rod, A, connected to the cam lever, B, in combination with the belt shifter, K, and catch, L, operated by the faller or coping wire of a spinning jack, substantially as and for the purpose set forth.

50,231.—Cook Stove.—Albert S. Dunham, Taunton, Mass.:

First, I claim the construction of the air chambers, and placing them at each side and at the top of the fire box, to draw in the pure air to be heated and conveyed into the oven or through between the plates of the oven doors, as herein described, for the purposes set forth.

Second, I claim the arrangement of the air chambers, flues and dampers, whereby the atmospheric air can be heated and circulated without becoming impregnated with the gases from the fuel, so facilitate baking in cook stoves, as herein described.

50,232.—Many-barreled Fire-arm.—William H. Elliot, Hion, N. Y.:

First, In a many-barreled arm, in which a separate firing point or pin is employed for each chamber, I claim so constructing and operating said pins in relation to the hammer that only one of them will be driving forward at a time, as herein shown.

Second, The combination of the cam and firing pins, for the purpose of throwing one or the other of said pins before the hammer, as herein set forth.

Third, The angular pin, n, in combination with the reflecting surfaces, u, for the purpose herein set forth.

50,233.—Lubricator.—J. H. Ferguson, Springfield, Mass.:

First, I claim the lateral passage, a, and its triangular groove in the valve plug, and the vertical passage, g, in the bottom of the plug, in combination with the screw thread, by means of which the plug is adjusted, substantially as above described.

Second, I also claim the finger, G, arranged with and projecting downward below the plug, D, constructed and operating substantially as above described.

[One of the objects of this invention is to apply oil to bearing surfaces continuously, and not intermittently at long intervals, according to the usual mode—experiments by Morin having demonstrated that the friction is about 25 per cent less when such surfaces are lubricated by a continuous flow than when they are lubricated from time to time, and that less oil is used, because there is less opportunity for wastefulness. Another object is to be able to adjust the lubricator and supply it while the machinery it is attached to is in motion.]

50,234.—Washing Machine.—Benj. S. Fletcher, Cornish Flat, N. H.:

I claim the movable slotted blocks, a a a, the screws, B B B, and the set screw, C, constructed, combined and arranged substantially as described, for the purposes specified.

50,235.—Fire Plug.—Jacob Fricker, Cincinnati, Ohio:

I claim as new and of my invention the reversible plug, B, provided with a waste way, C, in the described combination with the dip hole, D, and stops, G G, or devices substantially equivalent, for the purposes described.

50,236.—Wooden-soled Boot and Shoe.—James Fulton, Zanesville, Ohio:

First, I claim an improvement in the manufacture of boots and shoes having a double sole, that is to say, an inner and an outer wooden sole, by combining the wooden sole with a double flexible shank joined to the outer and inner parts of the wooden sole at one end, and at the other to the outer and inner parts of the heel, or as the manufacturer may prefer, having the inner thickness of the shank extended so far back as to make an inner heel or heel-piece, admitting the edge of the upper of the boot or shoe to be fastened between the inner and outer soles, and between the inner and outer shank and the inner and outer heel or heel-piece, substantially as herein before described.

Second, The combination of the flexible shank with the double wooden soles, substantially as herein described.

[This invention consists in the combination of a double wooden sole—that is to say, an inner and outer wooden sole—with a double flexible shank joined to the inner and outer parts of the sole at one end, and at the other end to the outer heel and the inner heel or heel-piece, or having the inner thickness of the shank extended so far back as to make an inner heel or heel-piece, and having the upper of the boot or shoe fastened between the inner and outer sole, between the inner and outer thickness of the shank, and between the outer heel and inner heel or heel-piece.]

50,237.—Composition for Removing Incrustation from Boilers.—John G. Gansz and Jacob J. Savo, St. Louis, Mo.:

We claim a chemical compound for removing incrustation on boilers, which compound is composed of the ingredients mentioned in the foregoing specification, united and mixed together in the proportions specified, or their equivalents.

50,238.—Rendering Casks Oil-proof.—Smith Gardner, New York City. Antedated Sept. 23, 1865:

I claim rendering casks impervious to spirits of turpentine, petroleum, and like substances, by impregnating them with sulphate of iron and muriate of lime, as aforesaid, and for the purposes herein set forth.

50,239.—Combined Shutter Hinge and Fastening.—Wessell S. Gerard, Newburgh, N. Y.:

I claim the catch or fastening, B, when fitted within a socket, d, and applied to a shutter hinge, substantially in the manner herein shown and described.

[This invention consists in combining a fastening with a shutter hinge in such a manner that the shutter when thrown open will be secured in an open state, and the fastening be capable of being readily adjusted so as to release the shutter and admit of its being closed.]

50,240.—Bobbin Holder for Spinning.—John Goulding, Worcester, Mass.:

I claim the device herein described for holding bobbins upon spindles, the same consisting of two or more centrally bulging springs, secured, as described and shown, into a seat or base fitting the spindle.

50,241.—Bobbin Holder for Spinning.—John Goulding, Worcester, Mass.:

I claim the combination with the spindle, A, of the bobbin holder, C, when constructed with a long tube or spring, c, which serves as the only support to the bobbin holder, as set forth.

50,242.—Pantaloons.—B. J. Greely, New York City:

I claim forming the fronts and also the backs of pantaloons with lapels, as shown and holding them in place by means of elastic straps, substantially as shown.

[This invention in pantaloons is applicable also to drawers for men, women and children, and it consists in a novel way of uniting them at the place of the seam or opening in front, whereby buttons and hooks and eyes are dispensed with, the front part of the body being made with an inner and outer lapel, the outer one of which folds over the inner one, both being drawn out to and kept in their proper positions by means of elastic straps made fast to the band at opposite sides, the strap which holds the inside lapel being attached to the inside of the band, and the other strap to the outside.]

50,243.—Railroad Rail.—Alexander Hamill, Sr., and Robert J. B. Hamill, Baltimore, Md.:

I claim the arrangement and combination of the tenons, B, and keys, A, with the rails, as herein described, for the purpose of fastening the rails, more permanently and securely to the cross-ties, and dispensing with the use of spikes.

50,244.—Device for Extracting Stumps.—E. C. Hase-rick, Lake Village, N. H.:

I claim the application to a carriage or mounted truck of a hydraulic apparatus, constructed and arranged as described, with a water tank and a lifting frame, or its equivalent, for the purpose of raising heavy bodies, extracting stumps, etc., and transporting the same when desired, substantially as set forth.

I further claim the screw jacks, D, when arranged and applied to the axles, in the manner substantially as and for the purpose herein set forth.

50,245.—Script Printing Type.—H. J. Hewitt, Brooklyn, N. Y.:

I claim reducing or forming the body of script printing type so as to make the extending letters with a kern to project over the body of the type and between the extended letters of the lines next above and below, substantially as and for the purpose described.

50,246.—Corn Planter.—A. F. Hines, Washington, D. C.:

I claim the slide valve, q, rod, i, spring, x, in combination with valve, m, plates, N and O, spout or seed duct, S, groove, y, and frames, H, in valve, m.

I also claim rubber or spring, a, rod, F, in combination with lever, E, and the inner ring of wheels, C, provided with pins, d d d, to operate on the lever.

I also claim the arrangement of two or more shelves in hopper, said shelves slanting upward that the corn or other seed in hopper, at the least motion of the machine, will fall off into the bottom of the hopper, the whole constructed and operated in the manner and for the purposes herein set forth.

50,247.—Roller-crushing Machine.—Alonzo Hitchcock, New York City. Antedated Sept. 23, 1865:

I claim the construction of the rollers in reversible half lengths or sections, substantially in the manner described.

50,248.—Brakes for Carts.—Henry Holcroft and C. S. Smith, Media, Pa.:

First, We claim a new, and desire to secure by Letters Patent, the liberation of the cart body from the thills or shafts, by the same arrangement and at the same time the brakes are put into action, as above described, or an equivalent arrangement of the same.

Second, We claim the pieces, B B, supported by the shaft, f, and chains, o, as and for the above-described purpose.

50,249.—Caster for Furniture.—P. B. Holmes, New York City:

I claim the combination with the roller horn of a caster of the plate, e, with its hollow shaft or bushing, f, as a center or bearing, for the horn to turn upon, substantially as herein described and for the purpose specified.

[This invention has for its object the formation and construction of a caster, to be used for furniture more especially, in such a manner that the strength of the legs will not, in the least degree, be weakened thereby, while, at the same time, they can be securely fastened with the horn of the caster, free to swing, the advantages of which are obvious.]

50,250.—Apparatus for Carbureting Air.—J. H. Irwin, Chicago, Ill.:

I claim the application of heated air to a carbureting apparatus, when arranged within an inclosing case, substantially as and for the purposes specified and shown.

50,251.—Apparatus for Carbureting Air.—J. H. Irwin, Chicago, Ill.:

I claim, First, In combination with a carbureting apparatus, arranged with respect to the burners which it supplies with gas, substantially as herein described, any mechanical device so arranged as to force a current of air into said carbureter, substantially in the manner set forth.

Second, A carbureting apparatus and a mechanical device for forcing a current of air into the same, when so constructed and combined that the carbureting apparatus will generate gas and supply the burners when the mechanical device is not in operation.

50,252.—Last.—George Marshall, Brooklyn, N. Y.:

I claim a cast-iron last made with a sole, A, socket, B, and strengthened rib, C, substantially as herein described.

50,253.—Button-hole Sewing Machine.—D. W. G. Humphrey, Chelsea, Mass.:

First, The mode of clamping and holding back the needle thread that the needle may draw the loop tight which was formed at the previous operation, in combination with the double-acting cam, which makes the duration of the grooving operation different when the needle descends through the cloth than when it descends in the slit, or by the edge of the button hole, substantially as and for the purpose specified.

Second, I also claim holding the clamp down to the face of the table by a button, or the equivalent thereof, which, at the same time, acts as a guide for the motions of the clamp, substantially as described.

Third, I also claim making the curved part of the slot in the table in which the pin of the clamp works, eccentric to the button, which acts as a guide to the motions of the clamp, substantially as described, to admit of the required lateral motion to work the eyelets in button holes, as described.

Fourth, Making the pin of the clamp, by which the required motions are communicated to the clamp, so that it can slide up and down therein, in combination with the button that holds the clamp down to the table, substantially as described, so that the clamp can be removed from the table by drawing the pin up out of the groove in the feeding ring, and out of the slot in the table, as described.

Fifth, I also claim the springs for spreading the cloth, in combination with the clamp, substantially as described.

Sixth, I also claim, in combination with the feeding mechanism and the clamp, the stop lever for supporting the feed motion when the button hole is finished, as described.

50,254.—Portable Scales.—H. Maranville, Akron, Ohio:

First, I claim the standards, B' and C, pivoted or hinged to the rule, in combination with the spring books, b b', as and for the purpose set forth.

Second, I claim the lips, c' c', plate, D, openings, c c', in combination with the scale beam, A', pendulum, E, and standard, B', as and for the purpose set forth.

Third, I claim the springs, f, platform, F, catch, J, pendulum, E, and plate, D, constructed and arranged as and for the purpose set forth.

50,255.—Soda-water Apparatus.—John Matthews, Jr., New York City:

I claim, First, The soda-water cooler, consisting of one or more open-bottomed and close-topped vessels, B B, fitted and secured in a frame, C D E, within the cooling chamber, and having inlet and outlet pipes, J K, applied and arranged for the circulation of the soda water through them, substantially as he is described.

Second, The arrangement of the sirup-cooling chamber, g, soda-water cooling chambers, c, ice chambers, f, and communications, y and v, within the case or box, A, of the draft apparatus, substantially as and for the purpose herein specified.

Third, The tumblers, h, arranged within the box or case, A, of the draft apparatus, below the cooling chamber, g, which contain the sirup vessels, substantially as and for the purpose herein set forth.

Fourth, The sirup vessels, F, having their outlets at the bottom, in communication with openings in the bottom of their containing chamber, substantially as herein specified, whereby their removal is facilitated.

50,256.—Milk Pan.—F. J. May, New York City:

I claim the two pans, A, B, fitted one within the other, and the inner pan provided with a perforated bottom or strainer, b, all arranged substantially as and for the purpose set forth.

[This invention consists in the employment or use of two pans, placed one within the other, and the inner pan provided with a perforated bottom, to serve as a strainer. The inner pan contains the liquid, and when the latter is required for use the inner pan is lifted or raised from the outer one, the liquid passing through the strainer or perforated bottom of the inner pan, and remaining in the center one; thus, by simply raising the inner pan out from the center one the skimming is accomplished. The invention is more especially designed for milk pans, to obviate the necessity of skimming the cream from the surface of milk, which is now performed by means of a spoon, an operation consuming considerable time in large dairies, and attended with more or less waste.]

50,257.—Cultivator.—Robert McCorkle, Philadelphia, Pa.:

I claim, First, The metal pieces, F, provided with the horizontal flange, a, recessed to receive and hold the bolt, c, and having the lugs or projections, b, for the purpose of attaching the drag bars, D, to the slotted bar, A, and adjusting the same therein, as set forth.

Second, The plates, G and H, constructed and arranged to operate in combination with the drag bars, D, as and for the purposes set forth.

Third, The plate, I, in combination with the elbow levers, L, and plates, G, for the purpose of moving the plows, I I, as herein described.

Fourth, The rubber disk or its equivalent, in combination with the standard, n, and head, K, of the drag bar, when constructed and arranged to operate as and for the purpose set forth.

50,258.—Grate for Stoves.—Wm. McIlvain, Philadelphia, Pa.:

I claim, First, Adjusting the grates, D, at different altitudes in the fire chamber, by means of the bars, B, with the vertical projections, a, substantially as described and for the purpose specified.

Second, Constructing the front bars of the grates, D, with the lips, d, and the grooves, e, substantially in the manner and for the purpose set forth.

50,259.—Roller and Harrow Combined.—William R. Mears, Grafton, Ill.:

I claim, First, The combination and arrangement of the levers, m m', connecting bars, l l', and stay bars, k k', with the harrow bars, D D, and frame, A, of my improved machine, all substantially in the manner and for the purpose herein described.

Second, I also claim the arrangement and combination with each other and with the frame, A, of the sectional rollers, C C, and harrows, D D, to constitute a combined roller and harrow, substantially as herein described.

50,260.—Combined Latch and Bolt.—Morris J. Meyer, Washington, D. C.:

I claim, First, The bolt, B, with the additional bevel, P, on the projection, c, and the rotating cylinder, C, when arranged within a casing constructed and operating substantially as herein specified.

Second, In combination with the above, and with the tube, A, and spiral spring, E, I claim the inclines, b b', when constructed and operating substantially as and for the purposes herein set forth.

50,261.—Umbrella Holder.—J. A. Minor, Middletown, Conn.:

I claim the combination of the adjustable sleeve, f, and swinging frame or plate, h, constructed and arranged together upon a common rod or staff, substantially as herein described and for the purpose specified.

I also claim, in combination with the above, the use of a supplementary sleeve, g, for the purpose set forth.

[This invention relates to certain new and useful improvements in holders for umbrellas, especially adapted for carriages and vehicles of all kinds, either for protection from storms or from the rays of the sun, and consists in an arrangement of devices whereby the position of the umbrella can be adjusted at pleasure, to suit the requirements of each case, and, as may be necessary to obtain the most protection from a storm or the sun's ray.]

50,262.—Hammer.—Chas. Monson, New Haven, Conn.:

I claim, First, The application of a spring or springs, or their equivalent, to hammers and other similarly used instruments, constructed substantially as and for the purpose herein set forth.

Second, Connecting hammers and similarly used instruments to the handle or shaft thereof, substantially in the manner herein set forth, and either with or without the use of a spring, as described, or the equivalent thereof.

50,263.—Blasting Plug.—Charles Monson, New Haven, Conn.:

I claim the combination of the plug, A, and bar or bars, B, constructed and united together by a joint or its equivalent, substantially as and so as to operate in the manner and for the purpose herein set forth.

50,264.—Row Lock.—Peter W. Neefus, New York City:

I claim the construction of the base plate, B, with its slots, b b', and socket and chamber for the reception of the shank of A, and the lugs, a a', and a' a', constructed and combined substantially as and for the purpose specified.

50,265.—Blower for Steam Generators.—David M. Nichols, New York City:

I claim the combination of a chimney with a gridiron steam blower, constructed substantially as above set forth.

I also claim the gridiron steam blower composed of a series of straight perforated pipes extending crosswise to a distributing pipe, by which the perforated pipes are supplied with steam, substantially as set forth.

50,266.—Boiler for Treating Straw.—T. A. Nixon, Philadelphia, Pa.:

I claim, First, The combination with a horizontal revolving boiler of tubes, c c, through which the products of combustion are caused to pass, and which maintain the contents of the boiler in constant agitation, for the purpose specified.

Second, The revolving boiler, A, with its tubes, c c, in combination with the fireplace, C, and its roof, f, the whole being arranged substantially as and for the purpose herein set forth.

50,267.—Granary.—B. M. Nyce, Cleveland, Ohio:

I claim so constructing and arranging granaries and other buildings for similar purposes, whereby they are adapted to the employment or utilizing of waste bittern from salt works, within airtight walls, substantially as described.

50,268.—Cooking Stoves.—Clinton J. Paine, Painesville, Ohio:

First, I claim the special use of the direct heating and directly continuous flue, C C C constructed as shown in Fig. 3, so that the same is double radiating, or so that radiation of heat into the oven space or spaces is obtained from both its sides or surfaces, the same being constructed with angular or other turns, so as to form within its interior space a rectangular or other shaped chamber, constituting the oven proper, and located within the oven space of the stoves, in the manner shown and for the purposes set forth.

Second, The divided inlet and exit openings, Q Q and Q' Q', in the plate, B, in combination with the said flue, C, as described, and for the purpose set forth.

Third, The special construction and use of the fire draught device, V, as described, and for the purposes set forth.

Fourth, Adapting the heat absorbing and heat retaining principle of galvanized sheet iron for forming the outside plates of my stove, by filling skeleton cast iron frames therewith, and using them as walls interspersed between the interior space thereof and the outer air, for the purpose of preventing the escape of the heated air therefrom, as herein explained.

Fifth, Constructing the stove in the manner described, and in combination with the said galvanized sheet iron surfaces, so that the spaces, H I J K, and D I D J D K are made available for the retention of hot air to act in conjunction with the heat of the direct flue, C, as explained, and for the purposes set forth.

Sixth, The aperture, G, in combination with the foregoing hot air spaces, for the purposes set forth.

Seventh, The gas burner, K, constructed with the depressions, as described, and in combination with the aperture, J, of the oven, chamber, L, M, and aperture, L, and operating as and for the purpose set forth.

Eighth, The removable reflector, A', constructed as described, located and used in the manner and for the purpose set forth.

Ninth, The use of the circular gratings, T and T', when yoked or coupled with the bar, V, as and for the purpose described.

50,269.—Horse Rakes.—Geo. Palmer, Littlestown, Pa.:

First, I claim the sharp cutting sickle edge rake teeth, the same being constructed, arranged and operated in the manner as and for the purposes herein specified.

Second, I claim the application of vulcanized india-rubber tube for the support of the driver's seat in combination with the mode of adjusting the same, as herein described.

50,270.—Dust Pan and Brush.—Chas. H. Parker and Gridley Burnham, Waltham, Mass.:

We claim attaching to the back side, top or bottom of a dust pan a suitable receptacle for holding a dust brush intended for use in connection with a dust pan, substantially as herein shown and described.

[This invention relates to a further improvement in a combined dust pan and dust brush patented to the same parties on July 4, 1895.]

50,271.—Marking Attachment for Sewing Machines.—Stephen Perrett, Yonkers, N. Y.:

I claim the above described a pendage to the sewing machine, having the parts arranged and constructed and the marking presser actuated directly from the rocker shaft, substantially as set forth.

50,272.—Machine for Bending Seythe Snaths.—Alfred S. Philbrook, Claremont, N. H.:

I claim the use of the form, D, of the exact size and shape desired for the snath, with its rings, l l l and its combination and arrangement with relation to the cross pieces, B' B', and the beam, E, substantially as described and for the purposes set forth.

50,273.—Knob Latch.—Hiram, Richmond and Alfred Claude, West Meriden, Conn.:

We claim the pin or rollers attached to either side of the rod which connects the handles in combination with two inclines in the slotted shank of the bolt, one on either side of said connecting rod, substantially as and for the purpose set forth.

[This invention relates to a latch which opens by pulling or pushing the handle instead of turning the same, as usual the bolt being pressed forward by a spring not provided with an inclined plane, so that rollers or pins projecting from the sides of the connecting rod of the handle, when being pressed against said inclined plane, will force the bolt back against the action of the spring.]

50,274.—Grinding Mills.—James C. Roberts, Adams-town, Md.:

First, I claim the vibrating paw frame or its equivalent operated from the driving power of the mill, in combination with the interposed gearing and adjustable suspension rod for raising or lowering the bridge piece.

Second, I claim the weighted scale beam, or its equivalent, from which the bridge piece is suspended and whose oscillations on either side of the given point of adjustment actuate the mechanism for raising and lowering the bridge piece.

Third, In this connection, and automatically operated, I claim the rods, G and I, and wheel nut, H, forming a suspension rod, adjustable as to length, for the support of the movable end of the bridge piece.

50,275.—Instrument for Finding the Centers of Circles.—E. P. Rogers, Corning, N. Y.:

I claim the construction of an instrument, substantially as described, so that two jaws, as at C C Fig. 3, with corresponding outline, turning upon a center pin, c, may be simultaneously adjusted, so as to touch convenient points in any circles, while the line of the inner edge of the tongue, a, shall be the radius of such circle.

50,277.—Still for Distilling Petroleum.—John Rogers, New York City:

I claim the within described process of distilling petroleum or other hydro-carbon liquids by passing the crude oil through heated pipes, or their equivalents in the interior of the still, for the purpose of freeing the same from their most volatile constituents, substantially as herein set forth.

[This invention consists in the application of a series of pipes, arranged in the interior of an ordinary still or retort, one pipe leading to the supply tank containing the crude oil, and other pipes being placed into the still near its exterior, and just below its center, in combination with suitable escape pipes, in such a manner that the crude oil on being let into the still has to pass through the heated pipes in the interior of the same, and during its passage through said pipes it is freed from its lightest or most volatile constituents. The operation of distilling can thus be continued without interruption, and much time and labor be saved.]

50,278.—Brake for Horse Power.—Wm. F. Rundell, Genoa, N. Y.:

I claim the placing of the driving shaft of horse-power in sliding

bearings, acted upon by springs or their equivalents, in such a manner that the band wheel on the driving shaft will, when the band is cast off from it, be thrown in contact with a brake, and the machinery at once stopped, the tension of the band, when on the wheel, keeping the latter free from the brake, substantially as set forth.

I further claim the hinged plates and spring catches, applied to the bearings of the driving shaft, in the manner substantially as and for the purpose specified.

50,278.—Pea Sheller and Cherry Stoner.—Geiston Sanford, New York City:

I claim the two adjustable rollers, A A, in combination with the feed board, D, constructed and operating in the manner and for the purpose specified.

50,279.—Stockings.—E. V. Sears, Boston, Mass.:

I claim, as a new article of manufacture, a stocking, which is provided with means for receiving the supporter, b.

50,280.—Apparatus for Drying Straw Boards.—Wm. H. Severson, Cohoes, N. Y.:

I claim, First, In dryers for treating straw boards and other articles to be dried, the use of stationary drying vessels, substantially like that shown at E, with hinged pressers, whose sides are flexible and porous, or open, substantially as above described.

Second, I also claim the hinged pressers, composed of adjustable frames, and a flexible porous sides, D, distended on said frames, constructed and operating substantially as above described.

50,281.—Mill Roller.—W. H. Seymour, Ravenna, Ohio:

I claim the herein described roller, for the purposes set forth, as a new article of manufacture.

50,282.—Locomotive Car.—Henry F. Shaw, West Roxbury, Mass.:

I claim so shaping and arranging the gear wheel, M, of the crank shaft N, and the gear wheel, L, of the truck-wheel axle, that the one may turn horizontally about the other, substantially as set forth, and for the purpose described.

50,283.—Transmitting Motion.—Henry F. Shaw, West Roxbury, Mass.:

I claim, First, Transmitting motion from shaft to shaft when at an angle with each other, by means of the slotted connecting rods, J K, and elongated cranks, d e, or their equivalents, substantially as described.

Second, Giving motion to the driving wheels of a locomotive engine, or street steam railway car, by means of the vertical crank shaft, A, provided with the elongated cranks, d and e, and the slotted connecting rods, J and K, or their equivalents, arranged and operating substantially as described.

Third, Passing the vertical driving shaft, A, through the center, on which the truck frame turns, substantially as described.

50,284.—Duplicating Deflector for Photographic Purposes.—David Shive, Philadelphia, Pa.:

I claim the deflector, A, arm, B, and clamp, C, constructed and arranged so as to operate, when applied to a camera, substantially as and for the purpose described.

50,285.—Ventilating Device for Hats.—Wm. Smith, Philadelphia, Pa.:

I claim, First, The frame, A, constructed and adapted for being secured within a hat, substantially as and for the purpose specified.

Second, The combination with the said frame of the catch, e, pin, n, and elastic bands, m, for securing the frame in its position, substantially as set forth.

50,286.—Process for Cooling Air.—D. E. Somes, Washington, D. C.:

I claim a portable air cooler, when made with tubes, or their equivalents, as described and used, for the purpose set forth.

50,287.—Coupling for Shafts of Boring Tools.—Job B. Stockton, Oil City, Penn.:

I claim, in fastening drilling tools on their rods, and in securing the couplings of drilling rods, locking the parts to each other by means of a screw inserted radially through the walls of the outer part a half of the coupling so as to intersect the place of the joint, substantially as described.

50,288.—Pill Machine.—Daniel J. Tittle, Albany, N. Y.:

First, I claim the arrangement of two pairs of grooved rollers at right angles to each other, so that the strips of pill material delivered from the first will be in position for being passed into the second pair, as set forth.

Second, I claim the mode of fitting the scrapers, m n v, each upon a cross shaft, with a spring to keep the scraper off the roller, but which will yield when the screws are applied to press the scraper to the rollers for cleaning the same as specified.

Third, I claim the bar, l, and bed, q, in combination with the rollers, i and g, and bed, r, for causing the delivery of the cylindrical strips of pill material from the rollers, f g, upon the bed, r, in the proper position for passing them to the next pair of rollers, as set forth.

Fourth, I claim an incline, z, combined with a pair of grooved rollers, and operating as specified, to give a rotary movement to the strip of pill material as it passes in between the rollers, as set forth.

Fifth, I claim the combination of the incline, w, and grating, x, with the grooved rollers, s and t, for receiving the pills as they are delivered from said rollers, and causing them to continue to revolve in the direction before acquired, while passing down the incline, w, and over the grating, x, for separating the imperfect pills, as set forth.

50,289.—Combined Shirt and Braces.—William H. Towers, New York City:

I claim a shirt provided with straps, intended to take the place of suspenders, substantially in the manner above described and for the purpose set forth.

50,290.—Curd Cutter.—Christopher Wadsworth, East Livermore, Me.:

I claim a machine for cutting curd, as herein described, both the slicers and squares in combination.

50,291.—Dental Operating Chair.—James O. Whitecomb, New York City:

I claim the base, a, stand, B, in combination with the ring, r, provided with bearings for the nut wheels, b b' b'' b''', and bevel wheels, a and c, as herein described and shown.

I claim the chambered ring, G, provided with the leather or other frictional material, in combination with the ball, A, clamp ring, d p, rod, 2, eccentric or cam, M, and lever, g, as herein described and shown.

I claim the cams, m, when attached to the rod, h, and operating on the pins or studs, f, as herein described and shown.

I claim the manner of arranging and adjusting the vertically and horizontally sliding bars, S and I, in combination with their respective grooves, guide, and clamp screws, as herein described and shown.

I claim the segment, g, when attached to the plate, d and operated by the screw, n, and milled head, B, or its equivalent, as herein described and shown.

50,292.—Sawing Machine.—Orsamus A. White and Isaac W. Bostwick, Norwalk, Ohio:

First, The combination and arrangement of lever, G, lever, B B', and pulley, e, and cord, E, operating substantially in the manner and for the purposes specified.

Second, The combination and arrangement of the guide arm, A, lever, H, pulleys, d d', and cord, F, operating substantially in the manner and for the purposes specified.

[This invention consists in combining or arranging a shaft with a horse power, and also arranging the person of the latter in such a manner that both a reciprocating and a circular saw may be driven by one and the same horse power, or either driven separately as desired.]

50,293.—Apparatus for Cooling Malt Lignors.—Francis L. Wissmann, Philadelphia, Pa.:

I claim the described improvement in apparatus for cooling malt liquors, consisting in the use of the corrugated pipes, A A, of a flattened or oval section, and otherwise arranged as and for the purpose specified.

I also claim the laterally zigzagged or undulated distributing strips, a a, whether used in connection with the described corrugated pipes or with any other form of tubes, as and for the purpose described.

50,294.—Steam-Warming Apparatus.—Chas. A. Wilson, Cincinnati, Ohio:

First, I claim the provision of the manifold, F, having the auto-

matic air vent, G g g', or its equivalent at its upper part, and the water receptacle, I, at its lower part, substantially as and for the purpose set forth.

Second, The provision in the return pipe, H, of the diaphragm, b, and valve, I, so arranged as to open and close automatically by the alternate action of the back pressure of the steam and the forward pressure of the water of condensation, the latter being completely emptied at each discharge, substantially as set forth.

Third, In the described combination, with the tank, K, pipe, L, water discharge valve, M, vent, N, and air discharge valve, P, or other equivalents, I claim the provision of the elongated float, Q, arranged and operating as set forth.

50,295.—Kettle for Evaporating Sorghum Sirup, Etc.—Elmer Woodruff, Grand Rapids, Mich.:

First, I claim a cover for kettles, having the general construction and arrangement herein described and for the purposes specified.

Second, In combination with the above, the pan having supporting legs or ridges, substantially as and for the purpose specified.

Third, Forming a door in the side of the cover of the kettle, through which the pan can be placed in or removed from the kettle, substantially as described.

[This invention consists in a novel construction of the top portion and sides of kettle covers, used for the boiling and evaporation of saccharine substances, etc., whereby all the vapors arising from the boiling liquid in the kettle, and condensed upon the interior of its cover, is conducted therefrom to the outside of the cover, while, at the same time, the free escape of such vapors as does not condense is allowed, the advantages of which are obvious to all.]

50,296.—Process for Amalgamating Gold and Silver.—John N. Wyckoff, New York City:

I claim the within-described process of separating gold and silver from the adhering impurities, by mixing the whole with a solution of chloride of sodium, confining it together with mercury within suitable containing vessels, and thereby the action of heat commingling the chloride of sodium and mercury throughout the entire body of auriferous and argentiferous substances, substantially as set forth.

50,297.—Sewing Machine.—Francis D. Ballou, Abington Mass., assignor to Alfred B. Ely, Newton, Mass.:

First, I claim automatically controlling the throw of the needle in sewing materials of varying thickness, by the presser foot, substantially in the manner and for the purpose set forth.

Second, The combination of a needle lever with a presser foot, substantially in the manner and for the purpose set forth.

50,298.—Hand Pegger.—J. H. Brown, Boston, Mass., assignor to Alfred B. Ely, Newton, Mass.:

I claim driving the peg by the reaction of a spring, compressed by the same below that makes the peg hole.

50,299.—Button-hole Sewing Machine.—Emil Cajar (assignor to himself and John H. Thieling), New York City:

First, I claim the method herein described of producing a stitch, such as shown in figures 9 and 10, composed of two threads passing through the loop of the needle thread in opposite directions, and being interlaced with said loop, by mechanism substantially such as herein set forth, or by any other equivalent means.

Second, The use of an L-shaped feeder, in combination with a sewing mechanism, composed principally of an eye-pointed needle, a revolving hook, and an oscillating foot, and otherwise constructed and operating substantially as and for the purpose described.

Third, Imparting to the feeder, M', of a sewing machine, in addition to its ordinary rising and falling motion and to its ordinary rectilinear reciprocating feed motion, an oscillating or circular motion, by means substantially such as herein described or any other equivalent means for the purpose specified.

Fourth, Imparting to the feeder, M', of a sewing machine, in addition to its ordinary rising and falling motion and to its ordinary rectilinear reciprocating feed motion, a reciprocating motion acting conjointly with and in aid of the other motions to effect both a lateral as well as a forward feed of the cloth in the formation of each single stitch, by means substantially as herein described or by any other equivalent means, for the purpose set forth.

50,300.—Folding Bedstead.—John H. Durand (assignor to himself and James Harrison), Kalamazoo, Mich.:

I claim the lazy tongs, G G, when connected to the head and foot of the bedstead and to a central post, E, substantially as and for the purpose specified.

[This invention consists in constructing a folding bedstead by arranging a system of levers, commonly called lazy tongs, underneath the bed frames, which latter is made in three parts, two of which, as well as the lazy tongs, are hinged to a central support in such manner that when the foot and head of the bedstead are shoved together the two end parts of the frame will be thrown upward, carrying with them the bed and bedclothes.]

50,301.—Holder for Fruit Jars.—Charles G. Imlay, (assignor to himself and C. C. Lathrop), Philadelphia, Pa.:

I claim the holder, A, with its feet, b, constructed and adapted for the reception of preserving jars, as described, so that the jars may be maintained free from contact with the bottom of the vessel or oven in which they are heated.

50,302.—Gas Burner and Stop Cock.—Edward Jones (assignor to himself and E. J. Davenport), Boston, Mass.:

First, I claim the combination of the gas burner and stop cock, in the manner and for the purpose set forth, substantially as described.

Second, In my combined gas burner and stop cock I claim making the disks or moving surfaces of contact, of a composition of tin and antimony, or some metal equivalent, adapted to offer greater resistance to the corrosive action of the gas than that of which the rest of the apparatus is composed.

50,303.—Box Opener.—M. D. Lawrence (assignor to himself and G. K. Fox), Springfield, Mass.:

I claim the combination of the part, A, having the projections, a, b and c, and stop pin, g, attached with the part, B, having the nail set, G, and projection, k, attached, these parts being combined and operated in the manner and for the purpose herein set forth.

50,304.—Cut-off Valve.—Wm. McClintock (assignor to himself and G. G. Lobdell), Wilmington, Del.:

I claim the arm, B, with its slots, a, and V, formed substantially as described, secured to the valve spindle, and combined with the within-described operating devices, or their equivalents, substantially as and for the purpose set forth.

50,305.—Gardening Implement.—Roger W. Porter, Nashua, N. H., and Jacob A. Spaulding, Hudson, N. H., assignor to Roger W. Porter, Nashua, N. H.:

We claim the fork, A, hoe, B, projection, E, latch, F, and pin, d, when these several parts are arranged in relation to the shank, C, as and for the purpose specified.

50,306.—Lifting Jack.—H. S. Shephardson (assignor to H. S. Shephardson & Co.), Shelbourne Falls, Mass.:

I claim, in combination with the permanent portion, B, and the movable portion, C, of the jack, the toothed arc, D, and swinging toothed arm, F, operating together for the purpose and in the manner substantially as herein described and represented.

50,307.—Water Meter.—H. S. Walcott, Boston, Mass., assignor to James D. Sumner, Lexington, Mass.:

I claim the water wheel, S, constructed as specified, when arranged in combination with its wheel box and pipes, A and B, as herein described and for the purposes set forth.

I also claim, in combination with the above, the counter, I, the indicator, K, with the case, M, when arranged as herein described and for the purposes set forth.

50,308.—Drawers.—James Ware (assignor to himself and C. Y. Ward), New York City:

I claim inserting in the bottom of a pair of drawers a gore-shaped piece of fabric, having an elastic band, inserted in the same, for the purpose herein specified, a pair of drawers thus made constituting a new article of manufacture.

[This invention consists in inserting a gore in the legs of the drawers, which is made to extend down to the bottoms thereof, and

in inserting in the bottom of said gore an elastic band for drawing or gathering up the bottom of the drawers, so as to make them fit snugly to the leg or ankle of the wearer.]

50,309.—Railroad Chair.—H. W. Warner (assignor to himself, Franklin J. Pratt and Edmund W. Russell), Greenfield, Mass.:

I claim, in combination with the beveled end rails, C C, the railroad chair, constructed with the corresponding beveled or inclined surfaces, d d, for the purpose of bridging and gradually breaking the joint between the rails, for the purpose set forth.

In combination with the back piece, B, I claim the projection, b, for the purpose of bracing and strengthening the back piece.

I claim a railroad chair constructed with the back piece, B, inclined surfaces, d, brace piece, b, and bed plate, A, substantially as described and for the purpose set forth.

50,310.—Lamp Cleaner.—Robert White, Kingston, C. W., assignor to Furnals & Clark, New York City:

I claim the combination of the thumb piece, D, tubular slide, B, and elastic ribs, b b b, the latter being formed at each end with eyes or loops by which they are hinged at their upper ends permanently to the handle, A, and at their lower ends to the slide, B, all as herein specified.

50,311.—Bobbin Holder for Spinning.—Edward Wright (assignor to John Goulding), Worcester, Mass.:

First, I claim a bobbin holder, constructed and operating as above described.

Second, Making the bobbin holder by punching out the metal to form the spring bars, a, substantially as set forth.

Third, The combination with the bobbin holder, C, of the expandable band, E, substantially as set forth.

50,312.—Handle Attachment to Small Arms.—Edward Charlesworth, London, England, assignor to Chas. P. Button, New York City:

I claim the handle or safety elevator above described, for the purposes to which it is applicable, as above set forth, in connection with a gun constructed without the ordinary stock or shoulder rest.

50,313.—Mode of Keeping Gunpowder.—James Gale, Jr., Devonshire Terrace, England. Patented in England, June 27, 1855:

I claim the combining fire-dry unexplosive powder with gunpowder, and in separating the fire-dry powder from the gunpowder when it is required for use, substantially as herein described.

50,314.—Telegraph Cable.—William Peter Piggott, London, England:

First, I claim the method of giving a static charge to a cable, and the means by which this is accomplished, as is set forth, and the manner in which I construct my generators, and which are equally capable of being used either on land or submerged in sea or other water, for telegraphs, and which may be used for other purposes.

Second, The application and use, to and in the transmission of, electric signals of statically charged cables, constructed and worked in the manner hereinbefore described.

Third, The combination in an electric cable of two wires or series of wires of opposite electrical denomination, one of such wires or series of wires being connected with earth at each end by corresponding earth plates, while the other wire or series of wires is connected to a galvanometer or receiving instrument, which is itself connected with earth by a corresponding earth plate.

Fourth, The combination in an electric cable of two or more wires or wire strands of one electrical denomination, connected through a galvanometer or receiving instrument with earth, and of a wire core or covering of opposite electrical denomination, in permanent connection with earth at each end, as hereinbefore described.

Fifth, The application of my ganglions to old or damaged cables of the ordinary construction, for the purpose of working the same by the aid of induced electricity, in the manner hereinbefore described.

50,315.—Manufacture of Artificial Stone.—Frederick Ransome, Ipswich, England. Patented in England, April 9, 1861:

I claim the manufacture of artificial stone by mixing sand, chalk or clay, with or without other matters, with a soluble silicate, which, after molding or plastering, is rendered insoluble, substantially as herein described.

50,316.—Manufacture of Artificial Stone.—Frederick Ransome, Ipswich, England. Patented in England, Feb. 24, 1864:

I claim the treatment of artificial stone, produced according to my previous patent, by employment of a solution of carbonate or bicarbonate of soda, or equivalent salt, to decompose the excess of chloride of calcium, or equivalent salt, and to produce an insoluble substance within the pores of the artificial stone, substantially as herein described.

50,317.—Fabric for Skirt Lining and Binding.—Charles Spannagel, Barmen, Prussia. Patented in England, Feb. 8, 1865:

I claim the herein-described skirt bordering and binding as a new article of manufacture, when combined together, in the manner and for the purpose substantially as set forth and specified.

50,318.—Device for Arranging Tapes, Ribbons and Threads for Use.—Marcus Brown Westhead, Manchester, Eng.:

I claim the application of an elastic slip or drag for the purposes above set forth.

[The object of this invention is to make up tapes, ribbons and other such narrow fabrics or thread in such manner that the consumer may be able to unwind or rewind them and retain the coils in a compact form.]

50,319.—Puddling Furnace.—John Williams, Montreal, C. E.:

First, I claim the novel arrangement in a puddling furnace of a blind grate with the ordinary grate, together with the combination of slide doors, trap doors, towel holes and air chambers, whereby for all the fuel consumed in the blind grate the benefit is received into the body of the furnace on the iron, with much less of the fuel passing up the chimney than in the ordinary furnaces.

Second, In the different grates I claim the introduction of the hop doors for letting the ashes, cinders, etc., fall into the external ash pit, and thus save the hauling out of ashes when the furnace is in operation, thereby effecting a saving in time.

Third, I claim the peculiar arrangement of water boshes, whereby water may be employed without the danger of explosion from the generation of steam.

[By the use of this improved puddling furnace a ton of iron can be made with one-third less fuel than by the ordinary furnaces now in use, and at the same time with about one-half of the cement or iron ore for lining the furnace, turning out also a better class of iron in less time.]

REISSUES.

2,079.—Mowing Machine.—Rufus Dutton and Richard L. Allen, New York City, assignees by mesne assignments of Rufus Dutton. Patented March 15, 1864:

First, We claim changing the cutting apparatus from front to rear and from rear to front of the wheel of the machine, by means of detaching and reversing the parts of the gear casing, C D, draught rod, C', and cross bar, A, substantially as set forth.

Second, Bending the cross bar, A, substantially as described, for the purpose of depressing the end of the casing, together with the crank shaft in rear-cutting machines, and elevating the same in front-cutting machines, substantially as set forth.

Third, The construction of the draught rod, C', with a bend or curve at one end, as described, whereby such rod is adapted, on being reversed for use, either in front or rear-cutting machines, substantially as and for the purposes set forth.

Fourth, So attaching the line of draught in harvesting machines as to counteract the tendency of the gear to rotate the frame on the axle, and also prevent the shoe rising from the ground in rear, cutting and pressing or riding upon the ground in front-cutting machines, substantially as set forth.

Fifth, In machines having two driving or supporting wheels, and also a linger, finger bar and loose pole, and in which the driver's seat is controlled by the pole or shafts, instead of being controlled by the frame of the machine, the frame of the molding being also supported directly from and by the axle, and not from the pole, attaching the draft rod or chain to the shoe, or to such part of the frame as receives an upward and downward motion from the shoe as it passes over uneven ground, the whiffletree or lever to which the forward end of the draft rod or chain is attached being so connected to or supported from the pole or shafts that it can have a forward and backward movement as the shoe rises and falls, for the purposes set forth.

2,080.—Mechanism for Sealing Boiler Tubes.—P. Eldredge Garvin, Philadelphia, Pa. Antedated March 22, 1865. Patented Aug. 8, 1865:

I claim the combination of the revolving cutter, E, the stationary guide and feeding screw rod, D, and the centering draught dog, H, as and for the purpose as herein specified and described.

2,081.—Auger.—Russell Jennings, Deep River, Conn. Patented Sept. 30, 1865:

I claim the projecting of the floor lips in advance of the cutting spur, when said cutting edges are on parallel lines not passing through the axis of the auger, and are horizontal on the cutting line, as and for the purposes substantially set forth.

2,082.—Steam Boiler.—H. C. Sergeant, Columbus, Ohio. Patented Aug. 22, 1865:

First, I claim the combination of the metal cylinder or casing around the fire surface, with the fire box and reservoir for a body of water upon the crown sheet.

Second, I also claim the combination of the fire due and casing around, when so arranged as to receive the water from the crown sheet and convey it upward in contact with the flue.

Third, I claim so arranging the casing around the fire surface of boilers as to allow the steam to come in contact with one side of the casing, while the current of water is in contact with the other side, substantially the same as specified in the foregoing specifications.

EXTENSIONS.

Steam Engine.—Frederick P. Dimpfel, Philadelphia, Pa. Patented July 1, 1851. Reissued Feb. 21, 1865.

Extended July 1, 1865:

I claim, First, The means herein described for connecting the steam piston of a steam engine with the crank thereof, said means consisting of a piston rod, fixed cross head, side bars, forked connecting rod and belts, or the equivalents thereof, the several devices being arranged and operating substantially as herein set forth, in such manner that the cross pieces of the connecting rod which are placed transversely to the crank shaft shall be on opposite sides of the axle line of said shaft, at opposite extremities of the stroke of the piston.

Second, The forming of the induction and induction chambers in cylinder heads of steam engines, and furnishing them respectively with supply and exhaust valves, substantially in the manner and for the purposes described.

Third, The forming of two steam chambers in one or both heads of a steam-engine cylinder, in combination with induction and induction steam pipes, and with puppet or other valves, in such manner as that a large portion of the steam shall be saved which is lost or wasted in the nozzles or steam ways of engines, as ordinarily constructed, substantially as described.

Fourth, The removable chambered cylinder head, in combination with the extension chambers, u u, and steam pipes, r r, connected to the latter, substantially as and for the purposes described.

Fifth, The manner substantially as described, of applying the induction and induction valves with their respective chambers to steam cylinders, for the purpose set forth.

Reaping Machine.—Wm. H. Seymour, Brockport, N. Y. Patented July 8, 1851. Reissued (A) May 31, 1864.

Extended July 3, 1865:

I claim, First, The combination in a harvesting machine of the cutting apparatus, to sever the stalks, with a reel and with a quadrant-shaped platform located in the rear of the cutting apparatus; these three members being and operating substantially as set forth.

Second, The combination in a harvesting machine of the cutting apparatus, with a quadrant-shaped platform in the rear of the cutting apparatus, a sweep-rake mechanism for operating the same, and devices for preventing the rise of the rake teeth, when operating on the grain, these five members being and operating substantially as set forth.

Reaping Machine.—Wm. H. Seymour, Brockport, N. Y. Patented July 8, 1851. Reissued (B) July 10, 1860.

Extended July 3, 1865:

I claim the combination of the arm, rod or lever, which carries a vibrating sweep rake, with a guide rod, which forms a movable fulcrum for the rake head, substantially as described, for the purpose set forth.

Reaping Machine.—Wm. H. Seymour, Brockport, N. Y. Patented July 8, 1851. Reissued July 10, 1860;

again reissued (C) May 7, 1861. Extended July 3, 1865:

I claim a quadrant-shaped platform, arranged relatively to the cutting apparatus, substantially as herein described, for the purpose set forth.

Processes of Bleaching Ivory.—Ulysses Pratt, Deep River, Conn. Patented Jan. 6, 1852. Antedated July 6, 1851. Extended July 4, 1865:

I claim the improvement in the process of bleaching ivory, as set forth in the specifications; i. e., the raising up of one edge of the piece of ivory above the plane of the frame which supports it, and sustaining it in its place, in the manner described.

Fire-proof Safe.—Lewis Lillie, Troy, N. Y. Patented July 15, 1851. Extended July 11, 1865:

I claim the combination of wrought and cast iron, the same forming a safe, in the manner and for the purpose substantially the same as described.

Securing Pinions, Etc., of Watches in Lathes.—J. M. Bottum, New York City. Patented July 15, 1851.

Reissued July 8, 1856. Extended July 12, 1865:

I claim the employment of adhesive cement for screwing staffs and pinions of watches, and like articles of small dimensions, for lathe operation, in combination with a chuck, A, having a female center, a, therein, either with or without the tube, B, or its equivalent, as described and set forth, or any device, substantially the same.

Printing Press.—George P. Gordon, Brooklyn, N. Y. Patented Aug. 5, 1851. Reissued July 31, 1860.

(No. 1,021.) Extended July 20, 1865:

First, I claim a bed vibrating to and from the impression, in combination with a rocking platen, rocking to and from the impression, for the purposes herein set forth, substantially as described.

Second, I claim rocking the inking-roller arms or frame upon a center, so that the inking rollers may pass and repass over the form of types for each and every impression, whether said rocking frame be constructed in the precise manner described, or in some equivalent way, to produce a like result.

Third, I claim the bearers, or their equivalents, in combination with the rocking inking roller arms or frame, for the purpose of passing and repassing the inking rollers over the type, or form, in a line parallel with the face of the type, when each working roller frame shall carry the inking rollers forward and backward over the type for each and every impression.

Fourth, I claim vibrating the bed from the point of its receiving the inking rollers to the point of impression, as described.

Fifth, I claim the rocking inking-roller arms or frame, in combination with a vibrating bed, substantially as herein specified.

Sixth, I claim constructing a printing press with a rocking platen, so that the pressman, while feeding and driving the press, may stand directly in front of said press for such purpose, and be enabled, without changing his position, to see the face of such rocking platen as it rocks or turns toward him for the reception of the sheet to be printed; the face of the type or form as it moves to and from the impression; the ink-distributing cylinder, or its equivalent, from its being placed at the top of the press; and the inking rollers when inking the type or form—thereby enabling said pressman to detect any imperfection in the working of these parts of the press—all substantially as herein set forth.

Printing Press.—George P. Gordon, Brooklyn, N. Y. Patented Aug. 5, 1851. Reissued July 31, 1860. (No. 1,022.) Extended July 20, 1865:

First, I claim supporting upon a center or centers a platen which shall rock or turn between the point necessary for the reception of the impression and the point necessary for the reception of the sheet to be printed, when the face of such working platen shall stand out of a horizontal position, or at an angle from a horizontal position, at the time the impression is given, substantially as herein set forth, and for the purposes described, whether the same be accomplished in the precise manner specified or in some equivalent way.

Second, I claim the friskot grippers, or their equivalents, for relieving the sheet from the type, in combination with a rocking platen.

Third, I claim giving to a rocking platen, when receiving the sheet to be printed or when receiving the impression, a period of rest during the continued motions of other parts of the press.

Process of Forming Stitches by Machinery.—Allen B. Wilson, Waterbury, Conn. Patented Aug. 12, 1851. Reissued Feb. 28, 1860. (No. 913.) Extended July 24, 1865:

I claim, First, In combination with an eye-pointed needle carrying one thread, a hook properly shaped and moved, and a bobbin supporting and giving off a lower thread, the combination as a whole being substantially such as specified, and acting to make stitches under the mode of operation, substantially as hereinbefore described.

Second, The combination of a hook so shaped and moved as to spread a loop sufficiently to surround a bobbin with a bobbin acting as specified, the combination being substantially such as recited hereinbefore, and acting so that a loop is seized, spread and released with a bobbin thread inclosed in it, and then drawn up tight by the hook.

Third, I claim a revolving hook so shaped as to operate substantially in the manner specified on loops of needle thread.

Fourth, I claim a hook so shaped and moved as to spread a loop substantially in the manner set forth, in combination with an eye-pointed needle actuated by an eccentric or equivalent motion.

Fifth, I claim feeding the material to be sewed step by step by an instrument operating and constructed substantially as described, for the purposes specified, in conjunction with a presser foot or surface governed by a yielding force, such as described.

Sixth, I claim a spring or yielding clamping surface, when combined with another surface so as to grasp cloth between them, and also with a feeding instrument which is out of contact with the cloth when it is thus clamped, the operation being such that the cloth remains clamped, substantially in the manner and for the purposes specified, while the feeding instrument is out of contact or engagement with the cloth.

Seventh, I claim arranging a hook that operates substantially in the manner specified in such relative position to a table for supporting cloth and to an eye-pointed needle that the former shall extend loops of needle thread in planes perpendicular, or nearly so, to the plane of the cloth or material to be sewed, substantially as specified.

And, Lastly, I claim a horizontal shaft arranged beneath the platform or table of the machine, by which are actuated the needle, the hook and the feeding instrument, in combination with a hook which moves in a vertical plane, or nearly so, the combination being substantially such as described.

Process of Forming Stitches by Machinery.—Allen B. Wilson, Waterbury, Conn. Patented Aug. 12, 1851. Reissued Feb. 28, 1860. (No. 914.) Extended July 24, 1865:

I claim, First, That there are certain periods in the formation of the seam, two loops of needle thread below the cloth at the same time, one being extended and the other being drawn up, substantially in the manner and for the purpose specified; and

Second, That the stitches are tightened or drawn up by the extension of the next succeeding loop, as distinguished from a drawing up of the stitch by the motion of the needle or needle bar.

Sewing Machine.—William H. Akins, Dryden, N. Y., and Jacob D. Felthousen, Michigan City, Ind. Patented Aug. 5, 1851. Reissued April 11, 1865. Extended July 29, 1865:

I claim, First, The combination of a needle bar of a sewing machine with a spring to draw up the needle after the stitch is formed, for the purpose of tightening the stitches, substantially as set forth.

Second, The combination of the stitch-forming mechanism and spool spindle with an intermittent thread-gripping mechanism located between the spool spindle and the place where the stitch is formed, substantially as set forth.

Third, The combination of the needle bar and shuttle driver of a sewing machine with mechanism for operating them in such manner that the shuttle is caused to enter between the needle and its thread while the needle is arrested, after having made a short retrograde movement.

Fourth, The combination in a sewing machine of a stitch-forming mechanism with a cylindrical rest, for the purpose of supporting articles of curved or tubular form, substantially as set forth.

Fifth, The combination of a toothed feeding instrument with reversible driving mechanism, substantially as set forth.

Sewing Machine.—Isaac M. Singer, Yonkers, N. Y. Patented August 12, 1851. Reissued Oct. 3, 1854. Extended August 7, 1865:

I claim giving to the shuttle an additional forward movement after it has been stopped to close the loop, as described, for the purpose of drawing the stitch tight, when such an additional movement is given at and in combination with the feed motion of the cloth in the reverse direction, and the final upward motion of the needle, as described, so that the two threads shall be drawn tight at the same time, as described.

I also claim controlling the thread by what I have termed the friction pad between the seam and the bobbin, or any equivalent therefor, substantially as described, and for any or all of the purposes specified.

I also claim placing the bobbin from which the needle is supplied with thread on an adjustable arm, attached to the frame, substantially as described, when this is combined with the carrying of the said thread through an eye or guide attached to and moving with the needle carrier, as described, or the equivalent thereof, whereby any desired length of thread can be given for the formation of the loop, without varying the range of motion of the needle, as described.

And I also claim, in a sewing machine, feeding the cloth or other substance to determine the space between the stitches by the friction of the surface of the periphery of the feed wheel, or any equivalent of the surface of the periphery as specified, in combination with a feeding surface, plate or pad, which grips the cloth or other substance against such feeding surface, substantially as specified and for the purpose set forth.

Machine for Numbering the Pages of Account Books.—John McAdams, Brooklyn, N. Y. Patented Aug. 12, 1851. Reissued Jan. 26, 1858. Extended Aug. 11, 1865:

I claim the mode of arranging and operating the numeral types for printing the pages of the whole book, substantially as herein described, to wit, arranging the types of the several numbers from 1 to the highest number required in a serial order, in one or more continuous lines one behind another, and bringing them up successively and separately to the point of impression, so that the type of each number is independent of all others, and used alone and but once in number is independent of all others, and all others are out of the way; and the paging of the whole book, and all others are out of the way; and in this I claim whether said types are fixed in a chain or chains, or in any other manner by which the same system of operation is obtained, and I also claim arranging two type chains or continuous lines of type parallel with each other, at a proper distance apart, and with type parallel with each other, and operating the same simultaneously, substantially as described, to print the numbers of two pages only, substantially as described, or the same side of the sheet.

And I further claim the arrangement of two pairs of type chains or continuous lines of type, substantially as described, to print the numbers of two pages on each side of a sheet while the sheet is passing once through the machine.

Nut and Washer Machine.—Robert Crichton and James Rees, Pittsburgh, Pa., Executors of Henry Carter (deceased) and James Rees. Patented Aug. 26, 1851. Reissued June 19, 1855. Extended Aug. 14, 1865.

We claim the machine, substantially as herein described, for making nuts, by cutting the blank from a heated bar of iron, punching its eye in a closed die box, pressing it into shape while in the die box and on the punch, and then discharging it, as specified.

Insulator for Lightning Rods.—George W. Otis, Lynn, Mass. Patented Aug. 26, 1851. Extended Aug. 25, 1865:

I claim the insulated support and point for lightning rods, consisting of the insulated point and opening in its shank, the insulating cylinder of glass, with its lip or flange, and the wooden collar for securing the whole to the building, all as described.

Leather-splitting Machine.—Hubbard Harris, Enfield, N. H., Administrator of Alpha Richardson (deceased). Patented Sept. 16, 1851. Extended Sept. 15, 1865:

I claim, First, Making the gage roller of a leather-splitting machine, with the sectional tubes or friction rollers to be placed on each side thereof, substantially as hereinabove set forth, and for the purpose specified.

Second, I claim combining with the ordinary cast-iron spring plate of a leather-splitting machine, a cast-steel spring plate, forming a zonally, as hereinabove set forth, and so that the front edge of the lower or cast-iron plate, may project under the edge of the knife and hold up the split as hereinabove set forth.

Mowing Machine and Harvester.—Mary Manny, Rockford, Ill., Executrix of John H. Manny (deceased). Patented Sept. 23, 1851. Reissued Jan. 2, 1855. (No. 286.) Extended Sept. 22, 1865:

I claim the combination of the bar that supports the cutter with a diagonal lever held down at its inner end, substantially as described, and resting upon the axle of the carriage, as a fulcrum, or upon some other equivalent support, that will perform the function of a fulcrum, whereby the outer end of the cutter bar is held up, substantially as herein set forth.

Arrangement of Joints for Attaching Trucks to Harvester Frames.—Mary Manny, Rockford, Ill., Executrix of John H. Manny (deceased). Patented Sept. 23, 1851. Reissued January 2, 1855. (No. 287.) Extended Sept. 22, 1865:

I claim the arrangement of a flexible joint in the line of the cutter, or thereabouts, in such manner that the machine will bend freely up and down along this line, to keep the cutter as nearly as may be at a uniform height from the surface of smooth or undulating ground.

Arrangement for Controlling Harvester Cutter.—Mary Manny, Rockford, Ill., Executrix of John H. Manny (deceased). Patented Sept. 23, 1851. Reissued Jan. 2, 1855. (No. 288.) Extended Sept. 22, 1865:

I claim controlling the flexure of the machine, hinged so that it will bend in the line of the front edge of the cutting apparatus, or thereabouts, by means of an adjustable stop and arm, or their equivalent, in such manner that the cutter will be kept at the proper elevation on smooth ground, will be free to rise and fall, to conform to a gently undulating surface, and will be restrained from descending into furrows or other sudden and narrow depressions, while it will be free to rise to any extent required, for passing over bowlders, stumps, or other like protuberances in its path, substantially as specified.

Machine for Making Nuts, Washers, Etc.—William Kenyon, Steubenville, Ohio. Patented Oct. 14, 1851. Reissued March 18, 1856. Again Reissued Feb. 15, 1859. Extended Sept. 27, 1865:

I claim, First, Making nuts for bolts by subjecting the blank of which the nut is to be formed, at a welding heat, to compression between swages or dies in a close die box or matrix, and punching the eye of the nut during the continuance of such pressure, for the purpose of welding up any imperfections in the iron, and giving a symmetrical shape and smooth finish to the nut, and of preventing any injury to the nut which it might suffer by the passage of the punch through it, if it were not thus sustained by the sides of the die box, and forcibly compressed between the dies.

Second, The use of a die box, closed at the sides, for surrounding the nut, and sustaining its sides while it is subjected to pressure, substantially in the manner hereinbefore described.

Third, The combination of the compressing dies, P and T, with the die-box, M, for the purpose of compressing the nut while it is sustained at the sides, and thus welding up any imperfections in the iron, and compacting its fiber, so as to give strength as well as exterior finish and symmetry to the nut.

Fourth, The combination of the punch, L, with the die box, M, and compressing dies, P, and T, for the purpose of compressing, confining, and restraining the opposite faces of the nut, during the passage of the nut through it; and thus preventing any injury to the nut during the process of punching; and also for the purpose of insuring the making of the bore of the nut in the proper relative position to its upper and lower surfaces.

Fifth, The combination of the die box, M, the compressing dies, T and P, and punch, L, constructed and arranged substantially as hereinbefore described, for the purpose of making hot pressed nuts at a single operation, by severing a blank from a bar of heated metal, compressing it into shape, and punching a hole or eye through it while under compression, and delivering the finished nut from the machine.

Sixth, Arranging the compressing dies, in relation to the punch, and regulating their relative motion in such manner substantially as hereinbefore described, that any excess of iron in the blank shall be forced into the path of the punch in the compressing dies, thus securing the compression of the nut without risk of damage to the machine.



PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for new inventions in the United States and in all foreign countries during the past seventeen years. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after eighteen years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers.

Yours very truly,

(See Judge Holt's letter on another page.)

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy.

Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and

submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of \$5 accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, etc., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO. corner of a and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention to the Government for a caveat is \$10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent Office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Pamphlets of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO.'S Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignment of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a Draft or Postal Order on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, etc.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that

they devote their whole time and energies to the interests of their clients.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is \$15. Other charges in the fees are also made as follows:—

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 Re-issue	\$20
On application for Extension of Patent	\$20
On granting a Disclaimer	\$10
On filing a Disclaimer	\$10
On filing application for Design (three and a half years)	\$10
On filing application for Design (seven years)	\$12
On filing application for Design (fourteen years)	\$20

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *unextended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.



T. C. D., of Mass.—Your balloon with masts and sails is quite an old idea.

W. B. H., of Ohio.—It is quite an easy matter to arrange a slide lathe to feed across the face plate. Put a small pulley on a counter shaft over head, and another on the back end of the screw that moves the tool in and out, then put on a belt and go ahead. To cut a scroll you must have some positive arrangement, as gearing belts would slip. Any mechanic can devise a plan in five minutes.

W. B. S., of Ill.—You will find an article on the pressure on a slide valve on page 151, Vol. XII., of the SCIENTIFIC AMERICAN, which will give you all the information you want.

G. L. D., of Conn.—Silver is readily soluble in nitric acid; the two substances combine, forming nitrate of silver, or lunar caustic.

F. J. S., of Tenn.—If water is heated in a close vessel above the temperature of 212°, and then allowed to escape into the atmosphere, it immediately expands into steam, increasing its volume 1,700 fold. In boiler explosions the destruction is due principally to steam thus suddenly formed.

G. E., of Ind.—The admixture of sand with fire clay tends to prevent unequal contraction and cracking under the action of heat; the proper proportions of sand vary with the purpose for which the clay is to be used. Mica is a very infusible mineral, and, in some cases, would, doubtless, be as good, or better, than pure quartz sand, but this could be ascertained only by experiment.

J. G. M., of Conn.—We have had suggestions enough in relation to the cable, unless some one can propose something manifestly of practical value.

T. W., of Pa.—You can only obtain the Patent-office Reports through your Member of Congress. The Commissioner is supplied with but few copies.

T. K., of N. Y.—The question in regard to the rotation of a carriage wheel has been so often discussed in our journal that we do not care to open the subject now. Try the experiment and you will be able to settle the question without our advice.

N. S., of N. Y.—So far as we know, all files are made by the force of a blow upon the surface of the steel. We inquired of a file maker a few days ago why files could not be made by the use of a cutting tool, as you suggest. He thought a good file could not be made in that way, but if you can succeed you will be doing something new so far as our information extends.

J. R. L., of Va.—We should be happy to tell you the value of the contents of the machine shop you are about to purchase if we had any means of knowing. Inasmuch as it is 500 miles from here, that we have never seen it, and don't know what tools there are in it, the chances are that our opinion would not profit you much.

W. H. T., of R. I.—This correspondent wishes to know the best works for a young man to read who wishes to be something more than common. As he has not informed us of the nature of his calling we cannot say. "Bourne's Catechism of the Steam Engine;" "King's Notes on the Steam Engine;" "Silliman's First Principles of Philosophy" are all good works for machinists and engineers.

W. R., of N. Y.—Rosewood is polished by varnishing it and afterward rubbing it down with pumice stone and water. The operation is repeated two or three times. Any wood can be thus polished. Carriages are so treated, and the result is like an enameled surface.

H. H., of Wis.—In regard to the question of two levers, each four feet in length; one having the fulcrum at the end, and the weight one foot from the end; and the other having the weight at the end, and the fulcrum one foot from the end—a clear way of considering the relative power is to let each lever sweep a complete circle around the fulcrum as a center. In both cases the circle described by the weight will be two feet in diameter, but that described by the opposite end of the lever will in one case be six feet in diameter, and in the other eight; and the power is in proportion to the distance passed over.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1833, to accompany the claim, on receipt of \$2. 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 always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our receipt on of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Back Numbers and Volumes of the "Scientific American."

VOLUMES IV., VII., XI. AND XII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, \$3 00 per volume, by mail, \$3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I, II, III, V, VI, VIII, IX, and X, are out of print and cannot be supplied.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

TO SOAP MANUFACTURERS.—PROF. H. DUS-SAUCÉ, Chemist, is ready to give information and advice to manufacturers, and furnish them Processes to make the following Soaps:—Castile, Olive Oil, Tallow, Oleic Acid, Family, Soft, Cocoa and Palm Oils; Transparent, Sifted, White, Colored and Perfumed Toilet Soaps, Soaps by the cold process. Recipes to prepare every kind of Lyes and purify them after having been used. He also furnishes Plans of Soap Factories and Drawings of the Principal Apparatus. He makes out on short notice Analyses of Alkalies, Lyes, Greases, Soaps Etc. Address New Lebanon, N. Y.

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
WASHINGTON, Sept. 27, 1865.

IN THE CASE OF MAJOR JOHN A. HADDOCK,
12th Regiment Veteran Reserve Corps, Acting Assistant Provost-Marshal General, Western Division of the State of New York, tried before a General Court Martial, which convened at Elmira, New York, May 22, 1865, and at Syracuse, New York, July 6, 1865, for "violation of the 99th article of war," in receiving presents and large sums of money, as bribes, from substitute brokers, to influence his official action; for "violation of the 83d article of war, and conduct unbecoming an officer and a gentleman," in writing certain communications for fraudulent purposes; also, for "fraud, malfeasance in office, abuse of official powers, complicity with bounty brokers in the Western Division of the State of New York, accepting presents and bribes, proposing to accept presents and bribes, agreeing to accept presents and bribes, being interested pecuniarily in recruiting and filling quotas in the Western Division of the State of New York," the Court sentenced him "to be cashiered and utterly disabled to have or hold any office or employment in the service of the United States, and to be imprisoned at such place as the proper authorities may designate until the said fine be paid—the period of said imprisonment not, however, to exceed five years; and in conformity with the 85th article of war, the Court adjudge in and to the said sentence, that the crime, name and place of abode of the said John A. Haddock, to wit: the Town of Watertown, in the State of New York, and punishment of the said delinquent, be published in the newspapers of the State of New York, from which particular State the said offender came, and where he usually resides," which sentence was duly approved and ordered to be executed.

E. D. TOWNSEND,
Assistant Adjutant-General.

BUSINESS OFFERS ARE SOLICITED BY A YOUNG
American Engineer, who has had a thorough Scientific and Mechanical Education. Has had several years experience in the practical designing of steam machinery, at the two leading machine shops of this city (references from which will be shown), and is now employed as Inspector of Steam Machinery being constructed for the Government. Can command some capital, and wishes to devote his whole time and attention to business, with a few to partnership. Address
H. W. BARLOW
New York City P. O.

PORTABLE STEAM ENGINES.—THESE WORKS
have lately increased their facilities for the manufacture of their so popular engines. Prices reduced to a peace standard. Fourteen feet and more of heating surface given to the nominal horsepower. Delivery to the Oil Regions by part navigation much prompter and cheaper than from more eastern points per railroad. Stationary and Propeller Engines with Boilers of the best design made to order. The Stationary Engines have Variable Cut-off worked by Governor. Send for circular before buying.

F. W. M. RAEDER,
Ames Iron Works, Oswego, N. Y.

PLATINUM CRUCIBLES AND DISHES.—FOR SALE
by H. M. RAYNOR, Importer of Platina, No. 748 Broadway, N. Y. Platinum Scrap and Ore purchased.

WANTED.—A SITUATION AS MECHANICAL
DRAUGHTSMAN. Good references. Address
WM. B. BROOKS,
Northbridge, Mass.

WHAT MATHEMATICIANS HAVE PRONOUNCED
mathematically impossible I have demonstrated to be mathematically certain. Price 15 cents by mail. WM. ISAACS LOOMIS, Martindale Depot, Col. Co., N. Y.

AGENTS WANTED.—LIVE AGENTS WANTED
everywhere. If you want employment and a good chance to make money, send your address and receive my circular free by mail.
BENJAMIN W. HITCHCOCK
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PATENT RIGHT FOR SALE.—A NEW AND NOVEL
TOY, denominated "The Mystic String." For particulars address
H. C. KEITCHAM,
Box 674, Newark, N. J.

MANUFACTURERS OF SHINGLE SAWING MA-
CHINES may find a purchaser by addressing
J. F. ROSE, Duncannon, Perry Co., Pa.

PLAIN AND ORNAMENTAL CASTINGS AND MA-
CHINERY made to order at No. 100 First street, Williamsburgh, near South Seventh-street Ferry.

AGENCY WANTED.—FOR THE MANUFACTURE OR
sale of some First-class Article in the Railroad trade by a man of large experience in the business, and having capital.
Principals only will please address
Box 1,877 N. Y. P. O.

DENTIST WANTED.—TO AN ACTIVE YOUNG
MAN of good character, who can dispose of \$500 or more cash, is offered a situation or partnership in an agreeable lucrative mercantile business. Write real name and address to
E. FRANK, of H. Siebold & Co.,
No. 67 William street, New York.

DOUBLE-SCALE SELF-REGISTERING CALIPERS
—Morse's Patent—outside and inside combined. Pocket size, 2-inch 32d divisions. Sent free by mail. Agents wanted. WM. A. MORSE & CO., No. 333 Walnut street, Philadelphia, Pa. 16 2°

KEEP BOILERS CLEAN BY USING WINANS' ANTI-
INCORUSTATION POWDER—10 years in successful operation. Saves many times its cost in fuel. H. N. WINANS, New York. 16 2°

M. B. ILEY & CO., PROVISION BROKERS, NO.
40 West Fourth street, Cincinnati. Orders for Provisions, Lard, Tallow, Grease, Oils, etc., carefully and promptly filled.
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CHEAP IRON!—WE OWN IN WILLS VALLEY, 18
miles S. W. from Chattanooga, Tenn., a property possessing extraordinary facilities for the manufacture of iron, viz., immense quantities of finest Ores, Timber and mineral Coal, all very easy of access; one superior new Blast Furnace, within a few days' work of completion, immediately upon the railroad, engine sufficient for two; 40,000 bushels Charcoal in house; 4,000 cords Wood, cut; 30 Cabbins built, and many minor preparations; excellent Farming Lands, sufficient to sustain operations and stock; climate and health unsurpassed. We desire to interest one or more practical manufacturers of iron, who will invest thirty or forty thousand dollars and take charge of the business, and with such a one we will recommend, we will make a very liberal arrangement. Address us, care of Crutchfield, King & Co., Chattanooga, Tenn.
16 2° M. B. McMAHAN & CO.

SOLID EMERY WHEELS, SILICATE OF VULCAN-
ITE of every size, promptly made or shipped from stock. Emery by the ton or keg, warranted pure. NEW YORK EMERY WHEEL CO., No. 94 Beekman street, New York. 16 4°

TO MANUFACTURERS.—A FORMER GRADUATE
from the Lawrence Scientific School of Harvard College is desirous of obtaining a situation as Chemist in some manufactory or dyeing establishment. Address J. K. SANDS, Boston, Mass. 16 2°

FOR SALE.—THREE PLANERS.—ONE OF THEM IS
a Baker's Iron Frame Planer and Molder, planes 7 inches, price \$60; one is a Faye's, with three molding heads and cutters, planes 5 inches, price \$35; and one is a Faye's new, planes 8 inches wide, with three heads. Inquire of MORGAN BIRD, Plainfield, N. J.

METALLIC PATTERN LETTERS.—TO FOUNDRY-
MEN, Machinists and Inventors.—Metallic Letters to put on Patterns, Etc.; a beautiful and superior article. Dealers supplied at a liberal discount. Send for sample letter and price list. Address H. W. KNIGHT & BRO., Seneca Falls, N. Y. 15 4°

WIGHT'S PATENT FLOOR CLAMP.—MANUFAC-
TURED and for sale by ROWE & RICHARDSON, Worcester, Mass. Price \$12 per pair. 15 6°

D. BARNUM'S SELF SEWER OR SELF GUIDE
and Baster for all Sewing Machines, at the Sewing-machine offices, American Institute Fair and Barnum's Museum, \$1 50, with directions. Agents wanted. Inventor's office, No. 548 Broadway, N. Y. 15 4°

FOR SALE.—TEN NEW IMPROVED MILLING MA-
CHINES. Apply to PROVIDENCE TOOL CO., Providence, R. I. 15 4°

BARAGWANATH & VAN WISKER, No. 200 BROAD-
WAY, N. Y., Agents for the sale of Patents in Europe and other countries. Branch offices, London, Paris, and Melbourne. 15 4°

I WISH TO COMMUNICATE WITH MANUFACTUR-
ERS of machinery for making Drain Tiles, also with manufacturers of Drain and Ditching Pliers, with a view to purchase the best. Address S. B. COE, Norwalk, Huron Co., Ohio. 15 3°

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at short notice, of all sizes, the Andrews & Rathbun water-wheels, which gave 84.97 per cent effective force at Fairmount test, Philadelphia, March, 1860; the Risdon Self-acting Circular sawing Machines, of all sizes, the best in use for cutting logs into all sizes of lumber. Also, all kinds of mill work.
THEODORE H. RISDON,
Mt. Holly, N. J.

MAGIC LANTERNS.—OXY-CALCIUM LANTERNS;
Oxy-hydrogen Stereopticons. A priced and illustrated Catalogue sent free by mail on receipt of application.
WILLIAM J. Y. McALLISTER,
No. 728 Chestnut street, Philadelphia, Pa.

WANTED.—A SITUATION BY A MECHANICAL
Engineer, who was engaged before the war in the sale of steam engines and machinery. Is competent to make the necessary plans and estimates for locating new machinery and superintending the erection. Address A. B., P. O. Box 2,178. 14 3°

CHARLES A. SEELY (LATE PROFESSOR OF
Chemistry and Toxicology in the N. Y. Medical College), Consulting and Analytical Chemist. Analyses of Articles of Commerce, Medicines, Ores, Minerals, Etc. Advice and Reports on New Inventions, Instruction in Chemical Processes, Etc. 14 3°

H. C. FREEMAN, CIVIL AND MINING ENGINEER
and Geologist.—Has 15 years professional experience. Is acquainted with most of the Western States, West Virginia, and several Southern States. Best of references East and West. Address, until Oct. 10th, Pomeroy, Ohio. Home address, South Pass, Union Co., Ill. 14 4°

PRESSURE BLOWERS.—B. F. STURTEVANT, MAN-
UFACTURER, No. 2 Sudbury street, Boston. Blowers for all purposes where pressure of air is required, such as Cupola Furnaces, Forges, Brazing, Etc. Pressure of 1 to 1½ pounds to square inch easily obtained; runs easily, and warranted to need no repairs for five years; makes no noise. This Blower will take the place of ordinary Fan Blowers, which make pressure of about ½ pound, and run with one-half the power; will take the place of the largest and most expensive Blowers now used in iron foundries which make pressure of ½ to 1 lb. Price from \$45 to \$175.
Also, Manufacture Fan Blowers of all sizes, up to No. 45, for Steam ships, Iron Mills, Mines, Dry Houses, Etc. 8 11°

SIX THOUSAND AGENTS WANTED, TO SELL SIX
New Inventions, of great value to families; all pay great profits. Send 15 cents and get 20 pages, or 25 cents and get 80 pages and a sample gratis. (9 12°) EPHRAIM BROWN, Lowell, Mass.

FOR DANIELLS'S PLANING MACHINES, CAR MOR-
TISING, Boring Machines, Car-Tenoning Machines, Car Planing and Heading Machines, Etc., address J. A. FAY & CO., Cincinnati, Ohio. 3 1°

OFFICE DEPOT COMMISSARY.

FORT MONROE, Va. September 21, 1865.

GOVERNMENT SALE OF WHISKY.—SEALED PROPOSALS (in duplicate) are invited and will be received by the undersigned at this depot until 12 o'clock M. on the 13th day of October, 1865, for the sale of one thousand seven hundred and fifteen (1,715) barrels of whisky, more or less, as follows, viz:—

LOT No. 1.—Consisting of ten hundred and sixty seven (1,067) barrels of Rectified Whisky, originally inspected in April, May and June, 1864, and January, 1865, containing about forty thousand three hundred and forty five (42,745) gallons. Proposals for five (5) barrels and upward of this lot will be received.

LOT No. 2.—Consisting of four hundred and sixty (460) barrels of Pure Rye Whisky, originally inspected in February, 1865, containing about four thousand eight hundred (4,800) gallons. Proposals for three (3) barrels and upward of this lot will be received.

LOT No. 3.—Consisting of one hundred and twenty (120) barrels of Pure Rye Whisky, originally inspected in February, 1865, containing about four thousand eight hundred (4,800) gallons. Proposals for three (3) barrels and upward of this lot will be received.

LOT No. 4.—Consisting of sixty-three (63) barrels Pure Old Rye Whisky, originally inspected in February, 1865, containing about two thousand five hundred and twenty (2,520) gallons. Proposals for two (2) barrels and upward of this lot will be received.

LOT No. 5.—Consisting of five (5) barrels Pure Old Bourbon Whisky, originally inspected June, 1864, containing about one hundred and sixty-three (163) gallons. Proposals for one (1) barrel and upward of this lot will be received.

The whisky was originally selected with great care, and is all pure and of prime quality. The Rectified was designed for issue to the troops in the field, and the Bourbon and Rye for sales to officers, and are equal if not superior to any whisky now in the market; has all been regaged within the present month, and is in excellent order, packages being of the best quality.

Samples of the whisky can be seen and blank proposals can be obtained at the offices of the following-named officers of the Subsistence Department, viz:—

Colonel H. F. CLARKE, A. D. C. and A. C. G. S., New York.
Brevet Brigadier-General THOS. WILSON, C. S., Baltimore, Md.
Major GEORGE BELL, C. S., Washington, D. C.
Captain THOMAS C. SULLIVAN, C. S., Richmond, Va.
Captain E. D. BRIGHAM, C. S., Boston, Mass.
Captain J. B. WIGGINS, C. S., Philadelphia, Pa.

The Government reserves the right to withdraw any or all of the above lots, and to reject any proposals deemed too low.

Payment to be made in United States currency within ten (10) days after notification of acceptance of bid and prior to delivery of the property.

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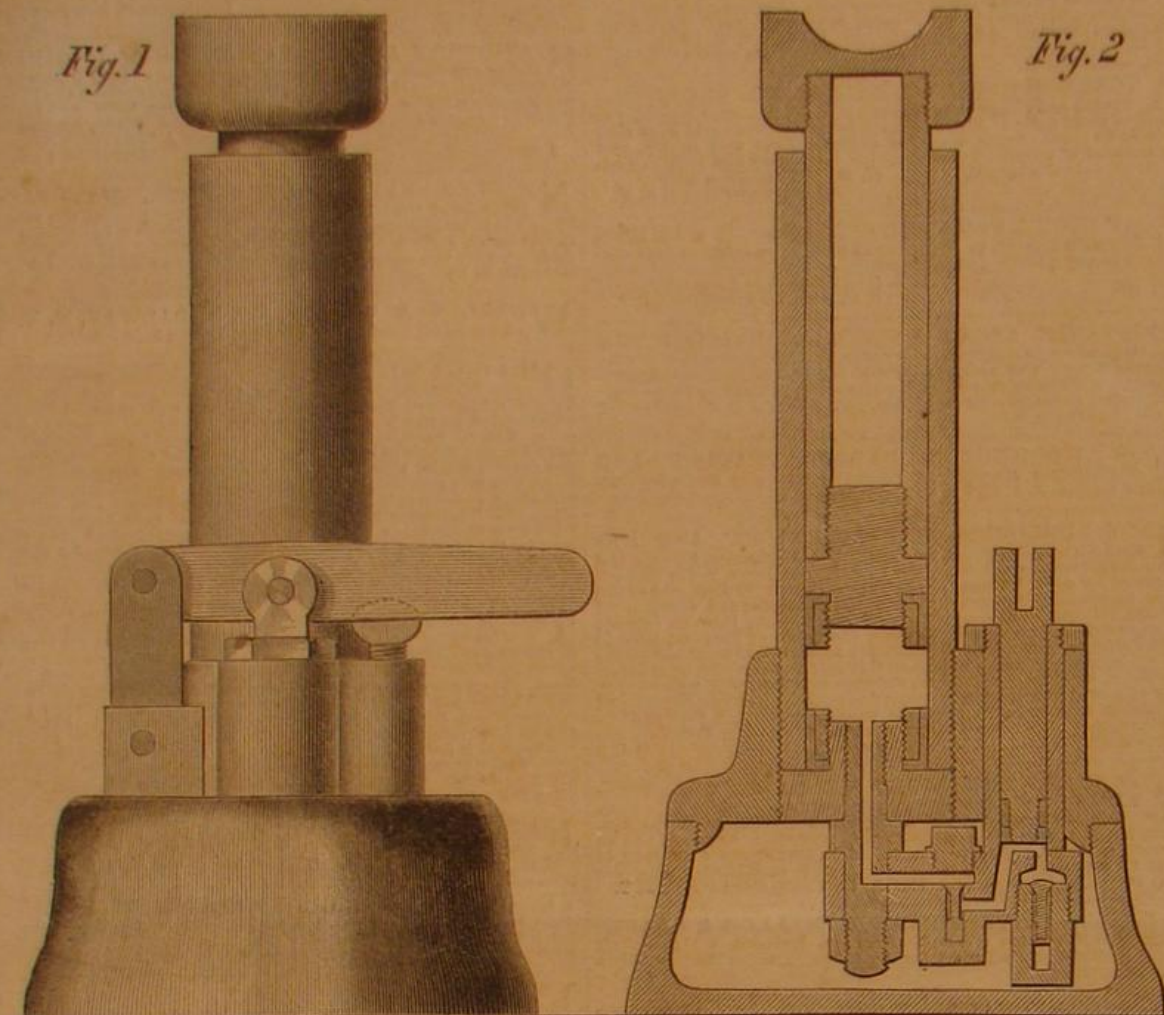
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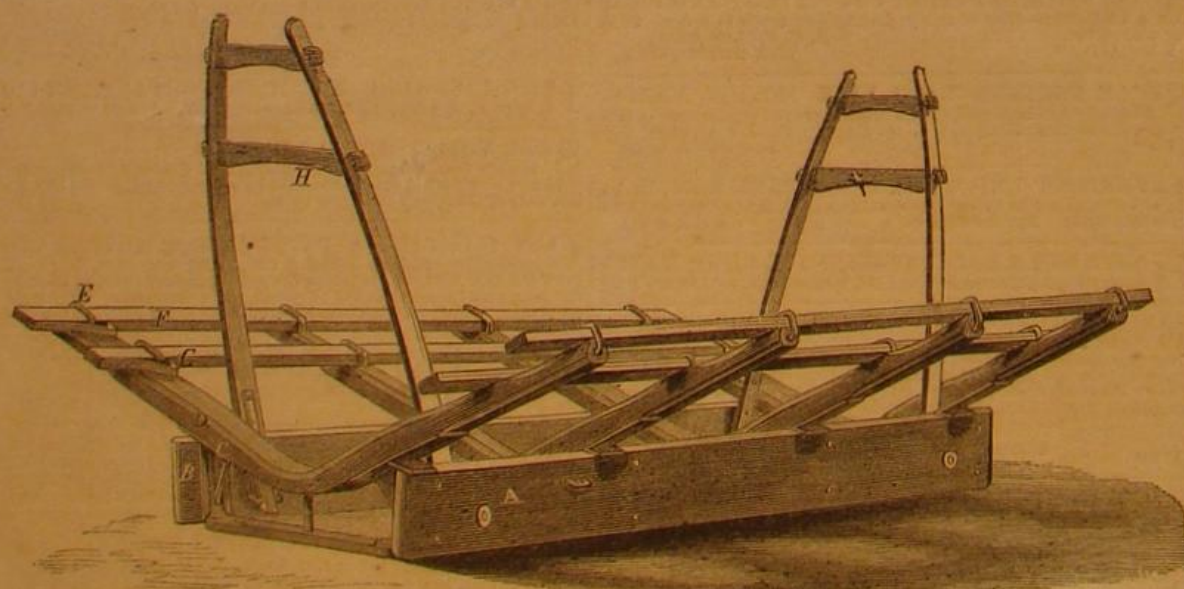
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