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Improved Turbine.

The employment of turbine wheels seems to be on the increase, and numbers of manufacturers are investigating the merits of the several kinds brought before the public with the view of adopting those which yield the largest percentage of the water power. For factories of all kinds, and in places where steady power is required, turbines are fast superseding breast and over-shot wheels. The engravings here published (Figs. 1 and 2) represent a turbine wheel of peculiar construction. The wheel itself, shown isolated in Fig. 2, gives a clear idea of the conformation of the buckets—the principal feature—and the case broken out discloses the wheel as it stands when in use. The advantages of it are thus set forth by the inventor :—

Fig. 1

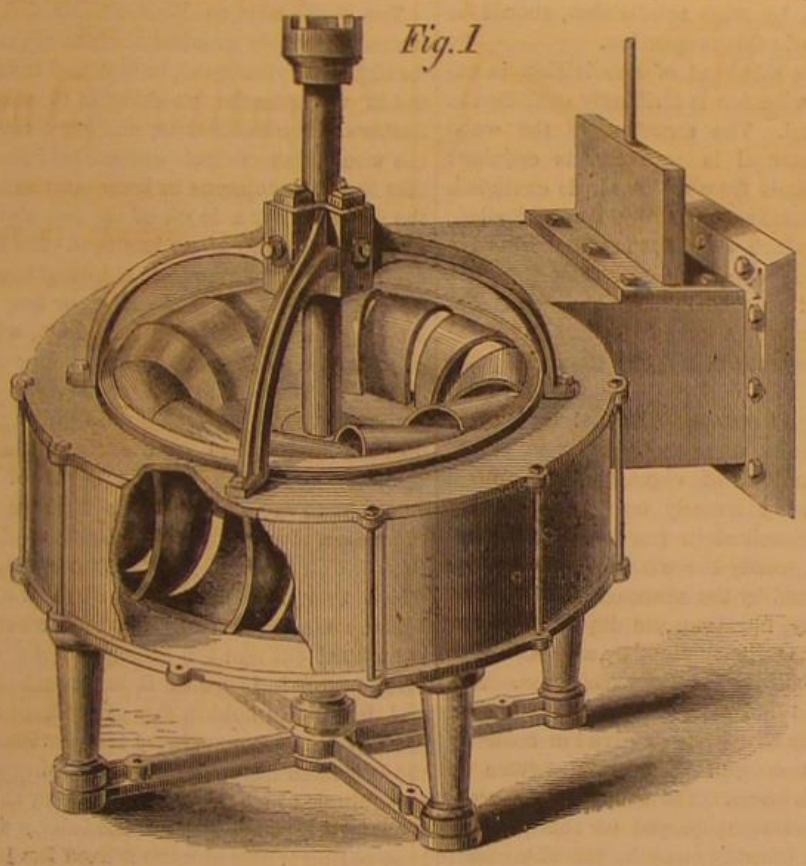
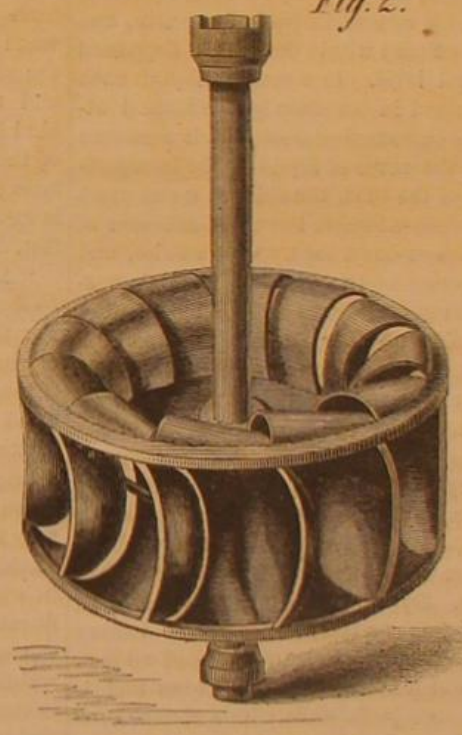


Fig. 2.



GALLAGHER'S TURBINE.

"One of the principal advantages of this turbine is the construction of the buckets, as plainly seen in the engraving, which, being the most important part of the whole machinery for the water to act upon, are prominently shown. In order to gain more power with the same quantity of water used in other turbines, and more fall or head of water, the friction must be reduced and the pit made deeper. To obtain a wheel of the class specified, the buckets must be so constructed that they will admit of the water being discharged immediately after it has acted upon or against the bucket, and without coming in contact with any part of the wheel which would detract from the effect or power of water obtained by its first impact with the buckets.

"This cheap and economical wheel can be put in the place of another wheel of its class in the same scroll or case without any trouble."

This invention was patented through the Scientific American Patent Agency on the 23d of September, 1862, by H. N. Gallagher. For further information address Messrs. Fuller & Lately, manufacturers, Cohoes, N. Y.

A New French Steamer.

It seems that even in these days of engineering progress there are firms who build side-lever engines. A new French vessel built in Scotland has just received a pair of the dimensions stated below:—The *Europe* is 3,400 tuns B. M., and a sister ship to the *Washington* and *Lafayette*, at present plying between New York and Havre. The machinery of the *Europe*, like her sister ships, was made by the Greenock Foundery Company. The engines are side-levers of 800 nominal horse-power. The diameter of the cylinders is 94½ inches, with a stroke of 108 inches. The levers are 24 feet long, and 7 feet broad at the center. The paddles are 37½ feet in diameter. The fact that the start of these three vessels' engines was so successful, and that no after alterations had to be made on them, reflects credit on the engineering department of the company. The boilers of the *Europe* are six in number; four of them are for working the engine, the other two are donkey boilers. The four large boilers weigh, when empty, 60 tuns each. They are 22 feet long, 14 feet high, and 12 feet broad. The four boilers have collectively 1,131 brass tubes, each 7 feet long and 3 inches in diameter. They are fired by 24 furnaces, each 10 feet long.

How the Elswick, Eng., Colliery is Ventilated.

The *London Mining Journal* has the following:—"The ventilator is upon the principle of an exhausting fan; it consists of eight vanes, each of which is formed of 1¼ in. oak cleading, secured by bolts to a pair of bars and angle irons, which are bolted to two cast-iron octagonal bosses, keyed on the main shaft, and interlaced, as shown in an accompanying drawing, forming a very firm structure, at the same time simple and inexpensive, admitting of a speed of as much as 150 or 200 revolutions per minute without danger.

"The outside diameter of the vanes is 23 feet, the width 6 feet 6·75 inches, and each vane extends about 8 feet into the interior of the fan, being inclined at an angle of 67·5° to a radial line through the apex of the octagonal boss. The main shaft is driven by a vertical direct-acting engine-cylinder, 23⅝ in. internal diameter, 19 11-16 in. stroke, worked high-pressure. A wall is built on each side of the fan, giving about 1 in. clearance to the side of the vanes.

Outside of one wall the engine is fixed, and in the other an inlet orifice of proper size is left—in the Elswick arrangement 10 feet diameter, such inlet being connected with the upcast-shaft.

"An arch is carried over the face, giving about 2 in. clearance to the vanes, and in continuation of this arch an invert to a point about one-eighth of the circumference below the center line, at which point the 2-in. clearance is increased gradually, expanding the lower curve of the casting till it ends in the sloping side of a chimney formed between the continuation of the side walls of the fan. A sliding shutter is fitted into cast-iron grooved rails for about one-fifth of the circumference, which enables the concentric circle of the top arch to be completed nearly round the fan—that is, giving the 2-in. clearance to the vanes. This shutter is worked by a chain passing over sheaves at the top of the chimney and to the outside. For convenience a man-hole door is left at the foot of the sloping side of the chimney. The fan being set in motion, the air is drawn through the inlet from the mine, and discharged below the shutter into the chimney, from the top of which it is seen to issue at no great velocity. This system, called from the inventor the Guibal Ventilator, possesses important advantages over other machine ventilators—1. In the simplicity of construction;—2. In the arrangements for covering in of the fan;—and 3. In the shutter chimney. Experimental trials, however, are necessary to determine the best size of outlet for any particular mine. The fan at Elswick was constructed specially for the circulation of 50,000 cubic feet of air per minute, with a water-gage of 1·5 in., which is guaranteed to yield at 60 revolutions; and the generally satisfactory working of the ventilator has been established."

CAPILLARITY.

When your cup of tea is all gone but a spoonful, rest your hand upon the edge of the cup and gradually lower your spoon till the point just touches the surface of the liquid. You will see the bits of leaves floating in the fluid immediately dart toward the spoon converging from all directions.

Again, take two plates of glass, bring the vertical edges on one side in contact, and separate the two opposite edges by a thin wedge; then place the lower edges of the glass plates in a shallow pan of water. You will see the liquid rise up between the plates, ascending the highest where the edges are nearest together. The hight of the column will be inversely as its distance from the angle of contact between the plates, and the surface will consequently describe a hyperbolic curve.

The following facts in relation to capillarity are stated by Professor Miller :—

"The elevation of the column of liquid in tubes of equal diameter varies with the nature of the liquid, the variation depending partly on the difference of cohesion between the particles of the liquid, partly upon the difference of adhesion between the liquid and the glass. In consequence of the decrease of both these forces by heat, the hight of the column diminishes as the temperature rises.

"In liquids, such as mercury, where the force of cohesion preponderates over their tendency to adhere to the sides of the tube, the capillary action is reversed; the surface becomes convex instead of concave, and the hight of the column within the tube is depressed below the general level. In a mass of liquid, each particle is maintained in its place by the mutual attraction of all the surrounding ones; but if a column be isolated from the mass of liquid by the interposition of the walls of the tube, the sides of which exert little or no equivalent adhesive force, the cohesion of the mass below draws down the upper particles, and produces a depression of the column. This depression of mercury in glass renders a certain correction necessary in reading off the hight of the mercurial column in the barometer, which always stand a little lower than the elevation due to the atmospheric pressure. The narrower the bore of the tube the greater is the depression. Experiment has shown that this capillary depression is nearly one-half less in tubes that have had the mercury boiled within them, than in unboiled tubes, as the process of boiling expels the film of air, which adheres to the glass in unboiled tubes. By employing a tube of $\frac{3}{4}$ or $\frac{1}{2}$ an inch in the bore, this correction becomes so trifling that it may be neglected. In a tube of $\frac{1}{4}$ of an inch in diameter, in which the mercury had been boiled, the depression is 0·02 inch, while with a similar tube of $\frac{1}{2}$ an inch in diameter it is only 0·003. The capillary depression of mercury is slightly increased by elevation of temperature.

"Capillary action plays an important part in the operations of nature, and in a variety of ways has been rendered subservient to the wants of man. A familiar illustration of its employment is seen in the wicks of lamps and candles, which, being composed of a bundle of fibrous materials, furnish hair-like channels by which the oil or melted combustible is elevated to the flame, and supplied as fast as it is consumed. Capillary action influences the circulation of the liquids in the porous tissues of organized beings, and it is the principal mode in which water, with the various substances which it holds in solution, is supplied to the roots of growing plants. By its means, during the droughts of summer, fresh supplies of moisture are raised towards the surface, for the maintainance of vegetable life; and in the same way, when during winter the surface is hard bound by a long dry frost, water is constantly finding its way from beneath, is solidified upon the surface, and remains stored up until a thaw ensues; when this occurs, the accumulated moisture mellows the soil and produces the well known soft and plashy state of the ground which follows long-continued frosts, and which extends deeper, the longer the duration of the freezing temperature, although neither snow nor rain may have fallen. Few persons are aware of the immense force which may be developed by capillary action; if a plug of dried wood be fitted into a strong glass tube, and the end of the plug be immersed in water, the wood becomes swelled by the imbibition of liquid owing to capillary action, and the tube is split. In some parts of Germany this force is turned to account in splitting millstones from the rock: holes are bored into its substance in the direction in which it is to be split, and into these holes wedges of dry wood are driven tightly; when exposed to moisture they swell, and large blocks of stone are thus detached with little labor or expense.

"As adhesion takes place solely between the surface of bodies, it is evident that any circumstance which increases the extent of that surface must materially facilitate the exertion of this force. Minute subdivision, by thus increasing the extent of surface, greatly exalts the effect of adhesion:—for example, a cube of 1 inch in the side exposes a surface of 6 square inches, i. e., there is a square inch upon each of its six faces; if this cube be subdivided into a number of smaller cubes, each of which is only $\frac{1}{1000}$ of an inch in the side, it would furnish 1,000,000,000 of these minute cubes. Now as each little cube has 6 sides, the surface which it will expose is $\frac{6}{1000000}$ of a square inch, 1,000.000 of them will expose 6 square inches; that is, as much surface as a solid cube of an inch in the side; the *1,000,000,000* cubes will consequently expose 1000 times as great a surface, or upwards of 41·7 square feet. The force of adhesion, therefore, by such subdivision, should be increased somewhat in this proportion.

"The influence of this kind of subdivision in exalting the effect of adhesion is strikingly exhibited in the case of charcoal. The structure of the wood from which the charcoal is procured is cellular: when heated in vessels from which air is excluded, the volatile constituents of the wood are expelled; and the charcoal, which does not fuse, remains behind in a very porous condition, retaining the form of the wood which furnished it. Mitscherlich calculates that the cells of which a cubic inch of box-wood is formed expose a surface of not less than 73 square feet.

"Adhesion occurs between charcoal and other bodies with degrees of force that vary very much. For the coloring matters of vegetable and animal origin this adhesion is extremely energetic; so that if these bodies be dissolved in any liquid and agitated with charcoal, nearly the whole of the coloring matter will be retained by the charcoal, and on separating the latter by filtration, the liquid will run through colorless. Ordinary vinegar, and port wine may thus be obtained in a colorless condition. Advantage is taken of this fact in the refining of sugar, in which process the sirups are deprived of color by filtration through a column of charcoal twelve or thirteen feet in thickness. The species of charcoal which is most extensively employed for this purpose is that obtained by burning bones in closed vessels; and it is hence termed *bone black* or *ivory black*, or frequently *animal charcoal*. The charcoal is in this case in a state of extreme subdivision; it does not constitute above a tenth or a twelfth of the weight of the mass; the remainder consists of earthy matters, chiefly phosphate and carbonate of calcium. When bone black has been used for filtering liquids, and has ceased to take up any more coloring matter, it is thrown aside and allowed to ferment; if then it be well washed and re-burned, it may be used again with nearly equal effect. Other animal matters, especially dried blood, furnish, when calcined and well washed, a charcoal which is still more efficacious. The addition of carbonate of potassium to the mass before calcination, still further increases the discolorizing power.

Steam in France.

The Government of France has just issued a decree materially altering the regulations laid down in 1843. These were not in accordance with the growth of machinery and trade, and very irksome to those against whom they operated. In 1850 there were but 6,832 steam engines in all France; in 1863 there were 22,516, representing a force of 617,890 horse power, or nearly that of two millions of horses in reality, and which is set down as more than the force of all the men in the kingdom capable of labor. Under such circumstances, and the greatly extended practice and increased knowledge of engine-makers, the old regulations had become quite inapplicable. The new decree greatly simplifies the legislation on the subject. The testing of the various parts of the machinery officially, till now imperative, has been done away with, except as regards the boiler, which will, in future, have to be proved up to twice the effective pressure of the steam. Steam engines are to be no longer regarded as dangerous machines, and may henceforth be set up without authority from the Government officers and without any other form than a declaration of the fact. Boilers are, as heretofore, divided into three classes, according to their capacity and the pressure to be employed; the regulations concerning the first class are greatly simplified, those of the second class may be set up in any factory or workshop *not connected* with the dwelling houses of other parties than the proprietor, his family and workpeople, and the least dangerous class may be introduced even into houses occupied by any number of separate families; and even with regard to other cases, the consent of the neighbors is sufficient to set aside the regulations. Another important provision of the new law is, that all steam boilers shall consume their own smoke, six months grace being, however, allowed for the necessary arrangements to be made. There are other clauses well worthy the attention of governments and sanitary boards.

The Thames Embankment.

The works next to Westminster Bridge are those which attract the greatest amount of public attention, for there everything can be watched from the pumping out of water to the puddling in of clay between the timbers of the coffer-dam, and here, also, can be seen the whole plan of struts and cross timbers which enables the iron caissons to keep out the whole flood of the Thames for a depth of 40 feet above them, and resist a pressure of no less than 120 tuns on each caisson. The caissons are elliptical tubes of wrought iron rings or belts, each ring or belt being 12 feet long by 7 feet wide and 4 feet deep, with a flange or edge that admits of the rings being bolted one to another. Three or four of these rings are bolted together and sunk between guiding piles to their proper position in the bed of the river, then others are similarly added on till the hight of the whole is sufficient to raise them above high water mark, and the weight of the whole is sufficient to sink the hollow tube of iron which they form through the soft mud on which they rest and keep them water-tight from below. When this result has been attained the water is pumped out and the tube gradually weighted with iron to force it lower till it has reached a fair depth, and has a firm hold in the ground, when the agency of the pneumatic machinery is called into play. After the workmen have descended and dug out the gravel and shingle to a depth of some two or three feet below the lowest internal edges of the tube, a weight of sixty tuns of iron is placed upon it from the inside, with an air-tight iron cover, which closes in the top. Through an aperture in the top of this cover the air is forced in by steam power till it has reached a pressure of 8 lbs. to the inch—a pressure which dilates the tube more than half an inch, when the air is suddenly released, and the cylinder as suddenly contracts and sinks through the earth which it has itself enlarged to a depth of two or three feet lower. This process has to be repeated over and over again till all the superincumbent mud and silt and gravel has been penetrated, and that mysterious geological compound, like heavy, brown plaster of Paris, though hard as marble, and known by the name of the London clay, has been reached, when no effort of modern engineering can contrive to get anything much further. The presence of this London clay on the banks of the Thames varies in an almost unaccountable degree. In some cases it crops up close under the mud; in others it can only be found after a laborious penetration of 40 feet below it. Thus one caisson may only penetrate 10 feet below the surface, and its next neighbor may have to go to the depth of 40 feet or 45 feet. Once, however, that it is reached the sinking of the caissons stops, they are merely filled up to the level of low-water mark with solid concrete. The lower parts of these iron banks are never to be removed. The upper parts, which now shut out the Thames at Westminster, will, of course, be taken away, as the wall of the real embankment is built behind them. To take this part as exemplifying the process of construction, we have here a length of 240 feet of iron caissons towards the river, shut in by a cross dam near Montague House, which reaches

back from the caissons to the shore, so as to enclose a water-tight space of nearly an acre and a quarter. From this place the water has been pumped and the mud flushed out, and here in this space next week the labor of building the embankment proper will begin. The first operation will be to clear out all the shingle and gravel to a depth of 14 feet behind the caissons, or more than 40 feet below high-water mark, additional and still more powerful timber supports being added to the caissons as the men get lower down beneath the river, and the pressure of the great mass of water overhead increases. This somewhat hazardous work will be done in short sections at a time, and as fast as the required depth is reached—that is to say, on a level with the concrete with which the caissons are half filled—the excavation will cease, and the space is then to be filled up rapidly with solid concrete. On this will be laid the brickwork, and over all, the river face, the solid blocks of granite, which are to rise in a massive wall to a hight of 30 feet above the river. It may give a good rough general idea of the gigantic proportions of this work if we merely mention the quantities with which Mr. Furness, the contractor for the first portion only, from Westminster to Waterloo Bridge, has to deal. First, then, 71,000 cartloads of earth have to be excavated, and 60,000 cartloads of concrete have to be "tipped in," 4,000 rods, or nearly 70,000 tuns, of brickwork have to be laid and faced with 30,000 tuns of granite, and the whole has afterwards to be filled up behind with 400,000 cartloads of earth. To those who are now so often blocked up in the Strand by the long, slow-moving, dismal string of carts laden with earth for the embankment it will be sorry tidings to hear that at the least 200,000 more cartloads have yet to pass that way. We fear however, that the nuisance is unavoidable. For the present, therefore, we fear that an abatement of this nuisance, however ardently to be desired, is not yet to be looked for. Another section of the embankment besides that we have mentioned, and which Mr. Furness is hurrying forward with the utmost possible speed, is that between Montague House and Hungerford, where the steam pile-drivers are busy every minute of the day. This section is composed entirely of wood. The coffer-dam is formed of wooden piles in two rows 7ft. apart, and driven through the shingle as close as they can be got together. The interval between the first and second row is then "puddled" in the usual manner with stiff clay till it is water-tight, when the water is pumped out, the coffer-dam strengthened with struts, as in the case of the iron caissons, and the work of excavation, filling in concrete, and, finally, building will go on as behind those we have already mentioned. Altogether, no less than 1,300 feet out of the 2,000 feet of the first section to Waterloo Bridge have been dammed in with piles or caissons, and this length will be subdivided by nine cross sections leading backwards, so as to render the work of pumping and subsequently building as easy as possible. The length, however, already inclosed towards the river, and over which the water now flows behind the coffer-dam only on sufferance, is very great, and will, when the Thames is entirely shut out, give a space of nearly eleven acres reclaimed from an unsightly, muddy, foreshore into one of the noblest, and the most needed, thoroughfares in Europe.—*Times.*

A Canal with a Leaky Bottom.

The London *Engineer* says:—

"An unexplained accident happened at Soho, near to Birmingham, on Wednesday evening, which for some time occasioned considerable alarm to the owners of property there and to the authorities of the Great Western Railway. That line between the Soho and the Hackley station runs under a tunnel, 100 yards long, of an arm, about a quarter of a mile in length, of the Birmingham canal. At about 5 o'clock in the afternoon the driver of a train saw some water running through the tunnel on to the line. Soon a stream of water poured out, and a channel was cut by a number of workmen through the embankment on which the station is built, so that the water might run off into some waste ground. The stream, however, increased in volume, and sweeping through this opening carried with it many tuns of the embankment. Subsequently it threw down about one hundred yards of the substantia stone wall which bounds the line from the Park road, and rushing on to the road tore up the roadway and inundated much property. The water seems to have percolated through the bottom of the canal under the wall of the towing path and the roadway beyond, a width of about twenty-six yards, and then found its way out principally at the bottom of the wall on the down line. As the water poured down it carried with it the whole of the sand that had formed the covering of the tunnel, and broke down the solid brickwork (about eight feet wide) which formed the towing path. This fell in masses on the roof of the tunnel, which, although bared by the water, withstood the pressure, and the roof remains quite solid."

Steam on Common Roads.

Between traction engines and pleasure carriages driven by steam on common roads there is a very wide difference, and those who have the greatest good of the greatest number at heart will continue to urge the claims of the former class over the latter. The London *Engineer* in a leading editorial, headed "Steam on Highways," very properly condemns high speed pleasure carriages in the following language:—

"It is to the last degree unlikely that any practical advantage whatever could follow on the general introduction of high speed road locomotives, and up to the present moment every exertion to produce such machines represents but so much mechanical skill wasted which might have borne good fruit if devoted to a better purpose. The advocates of the traction engine should now more than ever be careful to avoid giving even the semblance of offense; and we know of nothing garbed with a thin vail of science so offensive to the tastes and likings of those who use our highways as 'experimental trips' as they are grandiloquently termed, with machines whose only merit consists in running on crowded roads at a pace too fast to serve any good or useful end. Legislation under such circumstances becomes a necessity. We can hardly feel much surprise that it is very sweeping and indiscriminate."

Hot Ashes.

Fire-Marshal Blackburn, of Philadelphia, in his annual report, thus speaks of the danger from hot ashes:—

"Next to that strange and mysterious process of nature, chemical action, in the production of fires, the most insidious agent is hot ashes. They will retain heat for weeks, and start combustion at the moment least anticipated. Neither an ash box nor an ash barrel is ever safe an instant on one's premises, especially if placed on a wooden floor or against a frame wall or board partition. I have been actually amazed in witnessing the carelessness exhibited by people in getting rid of their ashes, and this, sometimes, too, in places, such, for instance, as large storehouses filled with stocks of goods of great value, important manufactories, depots, etc., where I had a right to expect better things of the good sense and forethought of the proprietors, or other persons in charge of them. I am convinced that many of the fires, the commencement of which is wrapped in mystery, come from depositing heated ashes in wooden vessels.

"The owners of dwellings and other buildings in which fire is required, should be compelled to construct bins of brick, stone, or other incombustible material, in their cellars, for the deposit of ashes which the occupants ought to be obliged to have removed, whenever necessary, at their own expense, and all ash carts employed for the purpose should be covered. This would soon diminish fires, and the abominable arrangements we now have for ridding our residences, counting-houses and workshops of ashes would no more annoy us, or mar the beauty and cleanliness of our metropolis.

"Another treacherous promotor of combustion is a cigar stump that has retained fire, thrown into a wooden spittoon containing sawdust, or allowed to smolder among the same ignitable material in a stove box made of boards. I have had some remarkable cases of burning from this cause. If spit-boxes of wood must be used, they should be filled with sand as an absorbent instead of sawdust. But when iron and earthen spittoons are so plenty, and can be bought so cheaply, I can see neither wisdom nor economy in having the wooden utensil in any one's place. As for stove boxes in bar rooms, and other places where there is much smoking, where sand to fill them can be had so readily, there is certainly no excuse for the use of sawdust."

Hydraulic Coal-Cutting Machine.

This machine is intended to take the place of manual labor in "nicking" or "kirving," or as it is termed in Yorkshire, "baring" the coal. It is now regularly at work in the Kippax Colliery, near Leeds, where it has been in successful operation for some months. The only portion of the seam removed by it at the Kippax Colliery is a band of shale, which is also the usual place for baring by hand labor; no portion of the seam is, therefore, reduced to small coal by its action. The direction of the workings is toward the rise. While the machine proceeds with the baring, completing the work at once going over, square pieces of wood and wedges are inserted loosely into the baring, at intervals of four or five feet, to keep the coal in position till the colliers come to remove it. This slight support does not, however, prevent the coal so bared from detaching itself from the unbared part of the bed; the line of fracture being a few inches beyond the extremity or back of the baring, and in one even straight line. The quantity of coal obtained for every yard face is about two tons, and the yield of small coal produced by the breaking up the detached coal and the bottom coal about 6 per cent. Water is the force employed to work this machine, and being for all actual purposes incompressible, it exerts its full power, allowing for the friction in its passage through the pipes, even when transmitted from great distances. This self-acting apparatus consists of an hydraulic reciprocating engine working horizontally, or at any angle to suit the inclination of the coal-seam, or at any required hight above the floor. The piston rod is a hollow trunk or ram, into which is fitted a cutter bar, easily removed, carrying three or more cutting tools. These tools can be adjusted so as to enter the coal at an angle with the line of the face; the actual length of the cutting stroke into the coal is 16 inches and, consequently, the three cutters conjointly give a total depth of four feet. The length of the cutting stroke can be varied according to circumstances. The cutting action of the tools being a steady push or thrust, without any percussion, it is necessary that the machine should be firmly held upon the rails during the cutting stroke, and be released so as to traverse forward at the end of the return or back stroke. This rigid fixing of the apparatus on the rails during the stroke is effected by means of a vertical self-acting holder, on which is a prolongation of the piston rod of another cylinder, mounted upon and becoming a part of the apparatus itself. The piston rod of this cylinder is actuated by means of the same self acting valvular motion as that of the cutting cylinder, and the "holder-on" retains its "grip" by means of a small keep-valve, which retains the water during the cutting stroke. At the return or back stroke, the valve motion opens the keep-valve and releases the water, thus enabling the holder-on to descend and to slacken its pressure against the roof, and thus the machine is free to traverse upon the rails the requisite distance for the next cut. The traversing or progressive motion is also self-acting. The results, as at present obtained, give an average rate of cutting of about ten yards on the face per hour, with a maximum under favorable conditions of thirteen yards. The amount of pressure required for working the machine varies from 150 to 300 lbs. per inch, according to the hardness of the metal.—*London Mining Journal.*

Pyroligneous Acid in Chimneys.

A correspondent of the SCIENTIFIC AMERICAN inquires whether there is any remedy for the condensation of moisture in a chimney, produced by burning wood in a close stove. The SCIENTIFIC AMERICAN knows no remedy and only comforts its correspondent with the assurance that the moisture is a solution of pyroligneous acid, and will destroy his chimney.

We beg the SCIENTIFIC AMERICAN to note and publish the following remedy, for which we have long been indebted to a first-rate practical mason. Pyro-

ligenous acid is always formed in the burning of wood, as the pungency of wood-smoke, sufficiently shows. When wood is burned in open fire-places, the acid evolved has no noticeable effect on the mortar of the chimneys. Why not? Simply because it is largely diluted and rendered harmless by mixture with air. But where wood is burned in a stove with a checked draught, and the smoke-pipe enters a chimney with no other opening than at the top, the acid vapor collects and hangs in the chimney till it is condensed on the walls and destroys the mortar. The remedy is simply to make an opening into the chimney-flue somewhere below the entrance of the smoke-pipe—the lower the better, even if in a lower room. The air drawn through this opening will serve the double purpose of ventilating the room and of diluting and carrying off the acid vapor from the stove. If the chimney-draught is weak, it is well to have the opening into the flue controlled, so that it can be closed when there is need of draught to start the fire; but it should be opened again as soon as the fire will bear to be checked. Many years ago our good mason assured us that he had never known a flue injured where there was such an opening for the passage of air; and our experience since tends to confirm the fact.—*Waltham, (Mass.) Free Press.*

FARMERS' CLUB.

The Farmers' Club held its regular weekly meeting at its Room at the Cooper Institute, on Tuesday afternoon, March 7th, the President, N. C. Ely, Esq., in the chair.

EFFECT OF FREEZING FRUITS AND ROOTS.

Mr. Bergen remarked that turnips might be frozen and thawed without injury, but if the operation were repeated a number of times the root would be destroyed. The same is the case with the onion. But the potato is destroyed by a single freezing.

Mr. Carpenter disputed the statement in regard to the potato. If it is thawed gradually in the ground the freezing will not injure its germinating power.

Mr. Bergen said that the same statement was made in the Club a few years ago, and after that he found two fields of potatoes belonging to lazy farmers who did not finish their harvest before frost set in, and in both cases the tubers were utterly destroyed.

Mr. Carpenter still continued to contend for the correctness of his view of the matter. He said that he knew that it apples were frozen and then thawed suddenly in the air, they were ruined, but they might be frozen as solid as pebbles in tight barrels, and if they were left undisturbed to thaw in the barrels, no man could detect the least sign of their ever having been frozen.

SHORT LIFE OF THE PEACH.

Mr. Forest said that persons of the largest experience in the cultivation of the peach, had come to the conclusion that the best style of pruning, when the tree is transplanted, is to trim off all the side branches leaving the central trunk in the form of a whip-stock.

Mr. Carpenter remarked that the peach tree should always be transplanted at the age of one year from the bud. He also explained that the fruit of the peach grows on the wood of the previous year's growth, and hence the advantage of shortening-in, by cutting off one-third or one-half of the new wood every year.

Mr. Quinn, of Newark, N. J., said that for the last six years he had set from 100 to 600 peach trees every year. He always sets the trees of one year's growth from the bud, and trims off all the side branches at the time of transplanting. The ground is well cultivated, the branches are shortened back every year one-third to one-half of the year's growth, and the trees are carefully examined every spring for worms; notwithstanding this care the trees invariably die at the age of four years.

Mr. Carpenter observed that this mortality is due to the borer, the worm which destroys ninety-nine of every hundred peach trees that are set out in this country. Were it not for this destructive pest we should have peaches in such abundance that we should feed them to the hogs, as was done forty years ago.

Several other subjects were discussed but we select the above for our columns.

HOLLY'S PEN RACK AND CALENDAR.

These engravings represent a neat and ornamental pen rack and inkstand combined with a perpetual calendar. The inventor says, *concerning* this affair, that the calendar consists of two independent cylinders of equal diameters, hung on a common axis. The circumference of one cylinder has upon it the days of the week; the other the dates of the month. The dates are arranged spirally, in such manner that when Fig. 1 is placed opposite to the day of the week on which any given month begins, the date of any day of that month will be found in the division opposite to that day. The spiral arrangement aids the eye in

Fig. 1

following the dates in regular succession, and relieves the calendar of the intricacy common to the several calendars hitherto in the market. The calendars can be readily used in combination with various articles. A few of the varieties are shown in the accompanying illustrations. Fig. 1 is a calendar in combination with a paper weight. The base of the paper-weight is perforated, and may be hung on the desk or wall if preferred. Fig. 2 is a calendar, pen rack and inkstand. Other sizes of pen racks are manufactured, and a sponge cup is also introduced in some of the varieties, with a pen rack. The calendars are

Fig. 2.

furnished in plain japan or in bronze, and are decorated with gold leaf. The artistic skill displayed in the several designs will render them ornaments to any desk or table, while their merits will doubtless make them standard articles. We are using these calendar pen racks in our office and find them admirably adapted to the purposes for which they are designed. The invention was patented January 3, 1865, through the Scientific American Patent Agency. For further information address the assignee of the patent, John T. Fanning, of Norwich, Conn.

New Bituminous Substance from Brazil.

At a recent meeting of the Royal Society of Scotland, Professor Archer read a communication on a new bituminous substance, imported at Liverpool from Brazil, under the name of coal. The Professor stated that the substance—a few specimens of which were presented to the meeting—had been submitted to chemical analysis, and had been found to yield a much larger percentage of oil than any of the bituminous coal which had been examined in Great Britain, not even excepting the Torbanehill mineral. It had little of the appearance of ordinary coal, but seemed to be indurated clay, and yielded a similar series of products to those afforded by other bituminous coal. It was very light, extremely buoyant in water, and was exceedingly inflammable, burning at a very low temperature.

PHOTOGRAPHIC ITEMS.

The Steaming of Albumen Paper prior to sensitizing is said to result in marked advantages. The albumen paper, prepared in the ordinary manner, is placed in a perforated box, within a chest, into which a jet of steam at 30 lbs. pressure is admitted, for 100 seconds. Albumen paper thus steamed will keep much longer, and is said not to discolor the sensitizing bath, the albumen being rendered partially insoluble. Another advantage is that the steamed paper, when sensitized, will keep in good condition twice or three times longer than the ordinary sensitive paper.

The Wothlytype.—This new process has met with but little favor thus far, having been voted "worthless" in the discussions of some of our photographic societies. Those who are so ready to condemn have probably had little practical acquaintance with the subject. Before long they will doubtless be glad to practice an improvement which just now they do not hesitate to reject. We have lately seen some most beautiful specimens of Wothly or uranium pictures. They compare with the best silver prints, and would do honor to any photographer. In London the Wothly collodion, also sensitized paper, which will keep in good condition for months, is now on sale; and at some of the photographic galleries negatives are taken, printed on paper by the Wothlytype process, and delivered to the sitter the same day.

New Intensifying Salt.—In Seely's *Journal of Photography* we find the following article by M. Carey Lea:—

"The extreme opacity of a strong red color to the actinic rays of light, renders it peculiarly adapted for negatives. Images of this color may be obtained in the following easy manner:—After fixing and washing the negative in the usual way it is first to be iodized to a bright yellow color. This may be effected in any convenient manner. It may be simply placed in a bath of iodine dissolved in water, or in a solution of iodine in alkaline iodide; or tincture of iodine may be poured over it. Or the negative may first be treated with bichloride of mercury, and subsequently with iodine solution, or both may be applied together in the form of a solution of corrosive sublimate in iodide of potassium. The conversion of the yellow picture to scarlet is effected by Schlippe's salt, the sulphantimoniate of sodium. A tolerably strong solution of this substance is poured over the plate, and moved backwards and forwards till its action is uniform. The color produced varies slightly in shade; when the operation has been properly performed, a brilliant scarlet color is obtained. The red coloring matter which gives the scarlet tint to the picture is probably the sulphantimoniate of silver, a substance of sufficient permanency to justify its employment, especially as it is to be further protected by varnish. The scarlet image thus obtained may be again modified by new treatment. An ammoniacal solution of nitrate of silver brings it from a scarlet to a purple color. This I mention merely as a matter of curiosity, the advantage being manifestly in favor of the first color.

"As Schlippe's salt is not everywhere to be had, and as many photographers may desire to prepare it for themselves, I give the following directions. Place in a closed vessel the following mixture, viz.:—

Gray sulphide of antimony	22 parts.
Crystallized carbonate of soda	44 "
Well-burnt lime	17 "
Water	48 "
Flowers of sulphur	4 "

"The lime is slaked with the water, and the whol is then mixed in the vessel, 140 more parts of water added; a large bottle is best, corked, and well shaken from time to time. At the end of twenty-four hours it is filtered, water poured on the filter to carry the soluble parts through, and the filtrate is evaporated to the crystallizing point. An abundant crop of large lemon-yellow crystals of beautiful forms (regular tetrahedral) is obtained. These should be dried and secured in a well-closed bottle. They are less permanent in solution, a ten per cent solution will however keep for some days; in proportion as the solution is weaker it becomes less stable.

"In preparing Schlippe's salt, the process may be very much expedited by heat. The materials may be placed in a large flask and boiled together for two or three hours. The test of the completion of the oper

ation, whether heat is used or not, is that the gray insoluble powder at the bottom becomes white.

"The keeping properties of a solution of Schlippe's salt may be greatly increased by rendering it alkaline, for example, with a few drops of ammonia. But the brilliancy of the color produced is thereby greatly impaired. So, too, the mother water from which the Schlippe's salt has crystallized out, may be used. This produces a sort of deep red-black picture very opaque to the active rays. In fact it has occurred to me, latterly, that when it is merely wanted to produce an effectual strengthener, and a scarlet color is not especially sought for, it is scarcely necessary to crystallize the salt. This materially simplifies the operation. The ingredients already mentioned might simply be placed together in a large bottle, and set aside for a day or two until the whiteness of the insoluble portions indicates that the whole of the gray sulphide had been decomposed. It then might be simply filtered and placed aside for use. This liquid would doubtless keep well. I have not tried it, but as the mother water after crystallization does, it can scarcely be doubtful that this would also. I must repeat, however, that if a scarlet color is desired, the crystallized Schlippe's salt must be employed.

"I directed in the foregoing part of this paper to flow the plate with the solution of the salt. But I latterly prefer to use a rather weaker solution, or to drop the plate into a sufficient quantity to cover it, placed in a porcelain dish.

"There exist various compounds of a nature analogous to Schlippe's salt which would doubtless produce results very similar to it. The sulphantimonite of sodium, for example, would probably afford a very similar coloration. So, too, the various compounds of arsenic, sulphur and alkali, alkaline hyposulpharsenite, sulpharsenite and sulpharseniate. The reactions of these substances were not examined as there seemed no reason for expecting better results from them than from the sulphantimoniate, which is more easily prepared and less poisonous.

"In conclusion, I may remark that while a proper proportion of caustic soda is essential to the stability of the salt, an excess would be likely to be very injurious; the proportions I have given may be used with advantage. Red stains on the hands and on vessels, occasioned by the use of this substance, are easily removable with weak caustic alkali."

On Drops.

Mr. Guthrie, Professor of Chemistry and Physics at the Royal College, Mauritius, has made to the Royal Society an elaborate communication on Drops, from which we extract the "laws" which he deduced from his observation :—

Law 1.—The drop size depends upon the rate of dropping. Generally, the quicker the succession of the drops, the greater is the drop; the slower the rate, the more strictly is this the case. This law depends upon the difference, at different rates, of the thickness of the film from which the drop falls.

Law 2.—The drop size depends upon the nature and quantity of the solid which the dropping liquid holds in solution. If the liquid stands in no chemical relation to the solid, in general, the drop size diminishes as the quantity of solid contained in the liquid increases. The cause of this seems to be that the stubborn cohesion of the liquid is diminished by the solid in solution. When one or more combinations between the liquid and solid are possible, the drop size depends upon indeterminate data.

For example: certain variations in the drop size of solutions of chloride of calcium of different strengths point to the existence of definite hydrates ; while the regularity of the variation of drop size in the case of nitrate of potash points to the absence of hydrates.

Law 3.—The drop size depends upon the chemical nature of the dropping liquid, and little or nothing upon its density. Of all liquids examined, water has the greatest, and acetic acid the least drop size. It is remarkable that butyric acid, which has sensibly the same specific gravity as water, gives rise to a drop less than half the size of the water drop.

Law 4.—The drop size depends upon the geometric relation between the solid and the liquid. If the solid be spherical, the largest drops fall from the largest spheres. Absolute difference in radii takes a greater effect upon drops formed from smaller, than upon those formed from larger spheres. Of circular horizontal planes, within certain limits, the size of the drop varies directly with the size of the plane.

The fact that the drop increases in size according as the radius of the sphere increases from which the drop falls, and that the difference from this cause may amount to half the largest drop size, the author regards as important to dispensers of medicine. The lip of a bottle from which a drop falls is usually annuloid. The amount of solid in contact with the dropping liquid is determined by the size of two diameters, one measuring the width of the rim of the neck, the other thickness of that rim. In most cases the curvature and massing of the solid at the point whence the liquid drops is so irregular as not to admit of any mathematical expression.

Law 5.—The drop size depends upon the chemical nature of the solid from which the drop falls, and little or nothing upon its density. Of all the solids examined, antimony delivers the smallest, and tin the largest drops.

Law 6.—The drop size depends upon temperature; generally the higher the temperature the smaller the drop. With water the effect of a change of temperature of 20° C. to 30° C. is very small.

Law 7.—The nature or tension of the gaseous medium has little or no effect upon drop size.—*Druggists' Circular.*

Mining Phenomenon.

The effect of a current of warm air issuing from a mine in a cold day is sometimes quite remarkable, often giving the mouth of the mine the appearance of a hugh steam discharge pipe. The phenomenon is properly described, as follows, by the Virginia *Union*, in an account of a recent visit to the Savage mine near Virginia city:

We stopped a few minutes to watch the operations at the old hoisting works of the Company. Every moment or so a car, loaded with ore or waste dirt, would come rushing up the shaft to the surface, to be rolled out and sent thundering down the dump, where numerous heavy quartz teams were waiting to transport the ore to the mills. But to one uninitiated in such things the strangest phenomenon was the immense volume of steam which came rushing forcibly up and out the mouth of the shaft, enveloping the brakeman and the hoisting machinery in a dense fog, which, condensing, kept everything dripping with water. One would naturally suppose that some heavy steam machine was blowing off away down in the bowels of the earth. The philosophy of it is simply this, which we would state for the benefit of those who are not familiar with such things. In all shafts consisting of two or more compartments, a strong current of air invariably and unceasingly pours down one compartment and up another. Even when there is no air stirring on the surface, this current will pour up with such force that a newspaper, or other article, will not drop down that part of the shaft, and if thrown will immediately return to the surface. The air in the depths of the mine, is many degrees warmer than at the surface, and like all heated air has a tendency to rise; therefore, gathering in from the different drifts and chambers, it finds egress through the shaft—the supply and circulation being kept up by air shafts in different parts of the mine. This warm air, on arriving at the surface during the cold weather, and especially on a frosty day like that on which we made the visit in question, assumes the form of steam, and being condensed by the cold air, drips from everything which it envelops. Of course in warm weather none of this steam would be seen, for obvious reasons. It is decidedly an interesting sight to stand and see car after car come swiftly up to the surface, on the "cage," or little square platform, at the end of the big rope; and occasionally, while you are looking, a man will come bouncing up on a cage from the bowels of the earth, with startling suddenness, reminding you of one of those wonderful little painted boxes to be seen at any toy shop, which, if you unhook the lid, it flies back and a hideous little witch pops up before your astonished vision.

A MECHANIC of Milwaukie has manufactured two wonderful pieces of cabinet work intended as presents for the President and Mrs. Lincoln. One is an ordinary sized center table, of octagonal form, composed of twenty thousand different pieces of wood.

The British Army and Navy.

The British army and navy estimates for the year 1865-6 have just been announced. The cost of the aamy is £14,348,447—a reduction of £495,000 from last year; of the navy £10,392,447—a decrease of £316,000. Total estimates for the military and naval establishments for the coming year, £24,740,671; or, in American currency, $123,703,355.

In the naval estimates, a million of dollars are appropriated for the completion of the iron-clads *El Toussin* and *El Monassir*, which have cost heavily already. The officers and seamen in the navy number 88,000. There are also 7,000 boys in the service and 7,000 men in the coastguard service.

The navy consists of 540 vessels classified as follaws:

Steamships, 445, of which 357 are screw, and 88 paddle; 26 screw ships are buiding; 69 effective sailing ships are afloat; making the total of steam and sailing ships 540. The building of three line-of-battle ships, 1 corvette, 4 gun vessels, and 4 gunboats is suspended. The classes into which these vessels are divided; deducting those which are suspended, are as follows: Screws—armor-plated ships, iron, third-rates, afloat 6, building 3; ditto, iron, fourth-rates, afloat, 2; ditto, wood, third-rates, afloat 6, building 1; ditto, wood, fourth-rates, afloat 4; ditto corvettes, wood, sixth-rates, afloat 1, building 1; ditto sloops, wood, afloat 2; ditto gunboats, iron, building 3; ditto floating batteries, iron, afloat 3; ditto ditto, wood, afloat 2; ships of the line, afloat 55; frigates, afloat, 37; building 1; block ships, afloat 8; corvettes, afloat 26; sloops, afloat 35, building 3; gun vessels, afloat 37; gunboats, afloat 105, building 2; tenders, tugs, etc., afloat 7; mortar ships, afloat 4; troop and store ships, afloat 15; yachts, afloat 1. Paddle: Frigates, afloat 6; sloops, afloat 19; small vessels, afloat 13; dispatch vessels, afloat 4; tenders, tugs, etc., afloat 40; troop and store ships, afloat 1; yachts, afloat 5.

Scale in Boilers.

[For the Scientific American.]

As incrustation is the sole cause of the destruction of boilers, we do not see why owners do not employ some means to obviate the evil. The thickness of an eggshell between the water and the iron compels the use of 15 per cent more fuel to generate steam; and as a crust, one-fourth to one-half inch is no uncommon occurrence, the immense waste of fuel, and the more rapid burning of the iron, are readily seen. Repairs to some of the western boilers cost $2,000 a year; this, and the fuel wasted, might both be saved if the boilers were kept clean, as iron cannot burn with water next it. Boilers using pure water have been run over thirty years without one dollar of repairs; hence will be seen the advantages and necessity of preventing scale. The item of stopping works "to scale boilers" is no inconsiderable amount; the apparent loss of the day is trifling, but in large establishments, where large capital is idle; the men off on a frolic, not to turn up when wanted, should induce every mill-owner to save this lost day, which need occur but once in six or twelve months if no scale formed. As proof, boilers in New York are cleaned but once a year, the water being pure enough to incur no risk of burning from incrustation formed in that time; boilers elsewhere could be run as long if kept free from scale. We, therefore, urge engineers and others to adopt some means to prevent scale, and as the Incrustation Powder, invented by Mr. H. N. Winans, of this city, has proved a reliable and uninjurious article for this purpose during the last ten years, and many of our citizens recommend it, we are confident it will save time and money where scale exists. E.

THE Lydians were the first who coined money, and they used iron first, then copper. "Athelstan first enacted regulations for the government of the English mint, in A. D. 928." The first gold coinage in England was in the reign of Edward the Third. Tin was coined by Charles the Second, and pewter by James the First.

THE first bank formed in the United States, was the Massachusetts Bank of Boston, in 1784; the first in New York was the Bank of New York, in 1800; and next the Manhattan Company.

Correspondence

Petroleum Gas for Engines.

MESSRS. EDITORS:—I propose to drive the engines in the oil regions by combustion of the gas arising at the mouth of the well, conveying it by a tube to the bottom of a tank of water under a tubular boiler, and inflaming this gas as it arises at the surface. The advantages of this plan will be, I think, these: No explosions from a volume of gas diffused in the atmosphere coming in contact with the furnaces; complete control of the amount of heat, which may be cut off in a moment, and as immediately re-applied, and an accumulation of force—the gas accumulating in the holders when the engine is not running; economy in the use of combustible material now wasted.

I propose to drive the machinery of a saw-mill, where there is but a small quantity of water but plenty of fall, by an overshot wheel with a drum beneath it, both covered by a band, to which the buckets shall be attached. In this case the weight of the water would act much longer than in the ordinary wheel.

I have read your paper for some years and have never met any suggestions of this kind. If in any way valuable I hope you will notice it in your next issue. W. S. H.

New York, March 4, 1865.

[Both good suggestions, but neither of them new. The plan of a water wheel, the same as a grain elevator reversed, has been a favorite one of ours for a small stream with great fall. In this situation we cannot see why it should not be a cheap, economical and efficient motor.—EDS.

Raw Pork and Tape-Worms.

MESSRS. EDITORS:—In your paper of Nov. 19th I noticed an article entitled "Beware of Raw Pork," and giving as the reason for the caution:—"Fortunately the tape-worm is very rare, but when it does occur, it is caused by eating raw pork."

Here in California the tape-worm is very common, and I should judge that two or three persons out of every hundred adults are troubled with them. All ages and both sexes, from 14 years and upward, and people of all classes and nationalities, are equally subject to them, so far as my observation extends. As for being caused by eating raw pork, that is about the last thing to which an intelligent observer who had resided any length of time in this southern part of California would attribute it. Many of the persons here who have a tape-worm have never eaten a mouthful of raw pork nor raw flesh of any kind. Not only this, but *herbivorous animals*—sheep, deer, antelopes, and neat cattle—after being killed, are frequently found with one or more tape-worms in the intestines. I once killed an antelope that had a tape-worm. In taking out the entrails, the small intestine was torn or cut, discovering the parasite still alive. Through this opening I drew out several yards of the worm. On inquiring of butchers who are reliable and observing men, I find also that they have frequently seen tape-worms in sheep and beef cattle.

Having been familiar with these facts for some time, it is difficult for me to understand how your Atlantic physicians could have adopted the theory stated by you. COLBERT A. CANFIELD, M. D.

Monterey, Cala., Dec. 26, 1864.

The Problem of Two Wheels.

MESSRS. EDITORS:—I noticed in your paper some time since a "Problem of Two Wheels," upon which, however, I had not bestowed much thought until I saw a reply in your last number. Your correspondent says that:—"The periphery of each wheel will, in rolling, require to travel a distance equal to twice that which the center moves," etc. A point in the circumference of a rolling wheel (rolling on a plane) generates a cycloid, and while the center of the wheel travels a distance equal to the circumference, a point in the periphery travels over the arc of a cycloid. Now the arc of a cycloid is proved by the higher mathematics to be four times the diameter of the generating circle. The distances passed over by the center and a point in the circumference of the wheel will therefore be to each other in the ratio of 3.14159 to 4. But this does not affect your correspondent's conclusions, and with regard to the motion of the two wheels I think he is right. For if two equal weights move over the same vertical space, impelled by gravity, one will perform precisely the same amount of work as the other, whatever may be their velocities. In the case under consideration, the work generated by the wheels in rolling down the plane, with the exception of the small amount necessary to overcome the rolling friction, is absorbed in imparting motion to the wheels, and will be given out when they come to a state of rest. As their weights are equal and the spaces passed over also equal, the amount of work accumulated will be equal. When the wheels roll along the horizontal plane, this accumulated work is used in overcoming the resistances, and, if the resistances encountered by each wheel are equal, both will come to rest at the same distance from the point of starting. As, however, more work is absorbed in imparting the rotary motion, and therefore less in imparting rectilinear motion to the wheel with the iron periphery than to the other, the former will reach the horizontal plane with less velocity and encounter less resistance from the air than the latter, and if the velocities be high enough for this difference to be appreciable, the former will be found to roll further than the latter along the horizontal plane. W. A. A.

Delaware Literary Institute, Franklin, N. Y., Feb. 27, 1865.

Loss of Heat in the Steam Engine.

MESSRS. EDITORS:—In our present modes of converting heat into mechanical power, and vice versa, it seems that one of two facts must exist. Either that our present modes of converting heat into power by mechanical means are very defective, or else there must be some error in the tables set down for the reconversion of mechanical power into heat. There is an irreconcilable disparity between the two processes. For instance, according to Joule's equivalent, the heat expended in raising the temperature of one pound of water one degree is equivalent to the mechanical work of raising the same weight of water 772 feet. Now taking this as a basis, let us see how much power there is in a pound of coal. Some boilers evaporate as high as 12 pounds of water for each pound of coal. It requires not less than 1,000° of heat to evaporate each pound of water—making 12,000° of heat given out by one pound of coal in evaporating 12 pounds of water. Now if we multiply these 12,000° of heat by Joule's equivalent for one degree, we have 12,000° multiplied by 772 foot-pounds, which gives 9,264,000 foot pounds—which reduced to horse-power is 4½ horse-power per hour for each pound of coal. Few engines give a better result than one horse-power for two pounds of coal; or, in other words, few engines give a better result than $\frac{1}{9}$th part of the above indicated power of fuel.

Joule's equivalent may be correct; if so, it does not seem possible that we are always to continue to use fuel on so wasteful a plan, and it looks quite improbable that we must remain content for all time with a fragment only. A few bushels of coal used on the basis of Joule's equivalent would indeed work wonders.

The same amount of power can be derived from a degree of heat expended on water to form steam as though the degree of heat were expended on atmospheric air. The idea that a degree of heat expended on air gives four times the effect that it does on water is fallacious. This I hope to conclusively substantiate in a future article. F. A. MORLEY.

New York, March 8, 1865.

[It is not claimed that a *degree* of heat expended on air will give four times the effect that it does on water, but that a *unit* of heat will. The quantity of heat that will raise the temperature of a pound of water one degree will raise the temperature of a pound of air four degrees. Still we shall be pleased to see our correspondent's argument.—EDS.

Burgh's Rules for the Steam Engine.

MESSRS. EDITORS:—Please correct the error in regard to "Burgh's Rules" recently noticed in the SCIENTIFIC AMERICAN. The notice stated that the price is $2 by mail, free of postage. The application for free copies, *postage paid*, is becoming quite a nuisance, and I fear that those who have paid $2 will imagine they have been swindled. I presume the balance of the demand—certainly the entire demand created by that notice—will be for free copies. The demand promises to be unprecedented, and thus far one man has sent about half money enough to pay postage. All others have preferred free postage.

HENRY C. BAIRD.

Philadelphia, March 9, 1865.

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:—

Riveting Buttons to Cloth.—This invention consists in constructing an automatic machine for riveting buttons to cloth or other material, whereby the cloth is pierced to receive the body of the rivet and the various movements and operations necessary to feed the rivet and the button, and insert the rivet in the cloth and through the center of the button, and clinch them together are performed automatically. W. J. Gordon, of Philadelphia, is the inventor.

Improved Padlock.—This invention consists in providing a padlock with a series of tumblers, having hooks at each side of them, and arranged in such a relation with the eye of the shackle that each tumbler, in unlocking the lock, will required to be moved in a certain position relatively with the eye, in order to release the shackle, a slight deviation from this position rendering it impossible to withdraw the shackle. The object of the invention is to obtain a padlock of simple and economical construction which cannot be readily picked or illegitimately opened. Edward Coyle, of Albany, N. Y., is the inventor.

Gas Stove.—This invention relates to a stove for heating apartments, cooking, etc., by gas, such as is used for illuminating purposes. The invention consists in the employment of a gas-chamber or reservoir in connection with a combined air and gas receiver and a series of flues, all arranged and combined in such a manner as to insure the perfect combustion of all the gas which passes into the stove and the radiation of all the heat generated by said combustion. The stove is very simple in construction and may be afforded at a moderate cost, and will prove an economical heat-diffusing device. Luther Erving, New York city, is the inventor.

Combustion Pump —This invention is an improvement on that class of pumps or water elevators in which, by the combustion of a hydro-carbon liquid, a vacuum is produced whereby the water or other liquid is caused to rise through the suction pipe and to discharge at the desired point. The invention consists in the use of steam combined with the hydrocarbon liquid in the interior of the reservoir or chamber, in which the vacuum is to be produced in such a manner that, by the condensation of the steam, the intensity of the vacuum is considerably increased and the raising or elevating of the water is materially facilitated. The water from which the steam is to be formed is placed in a shallow pan over a similar pan containing the hydrocarbon liquids in such a manner that the heat evolved by the construction of the hydrocarbon liquid volatilizes the water and a sufficient quantity of steam is obtained to produce the desired result. The hydrocarbon liquid is measured by means of a bell-shaped or other vessel or spout attached to the supply tube, and it is ignited by introducing into said spout, after the pan in the interior of the reservoir has been filled, a small quantity of hydrocarbon liquid, and lighting the same, so that it runs into the reservoirs while burning, and ignites that portion of the liquid in the pan. The gaseous products of combustion are allowed to escape through the reservoir pipe, which is provided with a hinged drop valve fitting into a cavity filled with liquid in such a manner that, so soon as the gases have escaped, the valve can be dropped and an air-tight joint is obtained, whereby the operation of the apparatus is not disturbed. Thomas J. Linton, of Providence, R. I., is the inventor.

Machine for Gathering Quicksilver.—The water running off from amalgamators contains a large quantity of quicksilver mixed with the rock in a fine spray, and this quantity of quicksilver has hith-

erto been considered a mere waste. The object of this present invention is to collect this quicksilver and bring it to such a state that it can be used again and again. The invention consists in a vat provided with an amalgamated bottom and with a series of slats which do not extend close down to the bottom of the vat in combination with an agitator, or without, in such a manner that the water let into the vat at one side has to pass through all the spaces left between the slats and bottom before it is allowed to discharge through apertures in the opposite side of said vat, and during its passage under the slats the quicksilver is compelled to come in contact with the amalgamated surface of the bottom, and thereby it is caused to gather, so that it can be readily scooped out and used again and again in the amalgamating process or for other purposes. By the use of an agitator moving between the slats, and by imparting to the vat a reciprocating motion the process of gathering the quicksilver can be materially facilitated. M. B. Dodge, No. 21 Broad street, New York, is the inventor.

Self-centering Chuck.—This invention consists in the employment of wedge-shaped jaws fitted into the head of the chuck and acted on by a spring which has a tendency to force said jaws out in combination with inclined diverging ways and with a screw cap, in such a manner that by unscrewing the cap the jaws will open, and by screwing the cap down the cap jaws close concentrically, and a rod or tool placed between is centered without loss of time. In order to prevent the jaws from dropping out of their ways, these outer edges are thread or expanded and fitted in corresponding cavities at the outer ends of their ways. A chuck is thus produced which is easily operated, and which is not liable to get out of order. T. H. Worrall, of Manchester, N. H., is the inventor.

Smoking Pipe.—This invention consists in constructing a connection or bracket for a pipe which shall have a socket in one part for receiving the stem and in the other the bowl of the pipe, and at the same time have a chamber or cup for receiving the nicotine from the smoke before it reaches the stem of the pipe; to effect this the cup is made with a neck which fits into a socket directly under the bowl, the communication to it being through a small tube set in the bottom of the bowl. This neck has a slot cut in its side which, by turning the cup, is made to correspond with a tube leading to the stem of the pipe. By this arrangement the smoke on reaching the neck of the cup becomes somewhat cooler, and the nicotine falls therefrom to the bottom of the cup, and then passes through a small tube to the stem, and there is no possibility of drawing the nicotine up into the stem. The pipe, as a whole, is a very neat and pretty article and seems to answer the ends for which it is designed. The inventor of the above is Robert Nagler, of No. 40 John street (*Belletristic Journal* office), New York, who may be addressed for the purchase of the patent or patent rights.

Hay Rake and Loader.—The improvements in this hay-raking and loading machine, consist, first, in a wedge-shaped device situated at the top of the elevator, for clearing the hay from the elevating fingers when it arrives at the point from which it drops into the hay wagon; and, secondly, in an improved manner of suspending and holding each tooth of the rake so that, by a sliding vertical movement, they may readily pass obstructions, or accommodate themselves to any uneven surfaces of ground; and, thirdly, in combining and using, in connection with the rake teeth, a circular guard board, to prevent hay from escaping the elevating fingers by working through between the rake teeth, and also prevent hay from clogging and obstructing the rake teeth. William A. Duncan, of Syracuse, N. Y., is the inventor.

Well Borer.—This invention consists in the arrangement of an oscillating lever which has its fulcrum on a pivot secured in an upright post and which is provided with a roller at about the middle of its length to operate in combination with the rope from which the borer is suspended, and with a windlass and tappet wheel, in such a manner that when the rope, after having been wound round the windlass, is drawn through under the roller in the oscillating lever and over a pulley in the top of the upright post, any up-and-down motion imparted to the roller in the oscillating lever, produces twice as much motion of the drill; that is to say, if the roller be depressed an inch, the drill rises two inches, and *vice versa*, and by these means the hight of the stroke is doubled. A double gear is attached to the windlass and a hand crank to the pinion. By means of this crank the drill is easily raised or lowered, according to the pleasure of the operator, whether the machine is in motion or not, and the danger of breaking the drill is avoided, which arises either from too large an accumulation of drillings in the well or from the fact of the drill getting into bad openings in the rock. Furthermore, the hight of the stroke can be adjusted to a fraction of an inch. For the purpose of holding the drill when the joints are loosened, a pair of shears are applied to the platform which are locked together by a catch, so that they hold securely all the weight below against any accident. Two windlasses are combined with the boring machine, one to contain the drill rope, and intended to be worked by a belt from the main or fly-wheel shaft of the machine, and the other to contain the bucket rope, and intended to be operated by hand, and a double windlass being applied in combination with a stirrup catching over pins projecting from the sides of the upright post in such a manner that the drill can be readily raised and the drill hole bored out at any moment. Walter Hyde, of 769 Broadway, New York, is the inventor.

Machine for Cutting Stay Bolts, etc.—The numerous stay bolts in the fire-box sheets of steam boilers are usually cut off, after their ends are screwed to their proper place, by a cold chisel and hammer. This method of cutting them off is slow and expensive work, and the rest of the bolt is usually injured by reason of the jamming of the thread, so as to require trimming before it can be again inserted in the sheet. Besides this, that portion of the bolt which enters the sheets and the sheets themselves are subjected to injurious strains by the old method, owing to the successive and violent blows of the workman in cutting off the bolt, and the bolts are thereby often loosened in their holes, and the holes altered in their outline, whereby it becomes necessary, in riveting them upon the sheets, to subject the bolts to an excessive amount of hammering which is injurious to them. This invention provides against these injurious tendencies and the disadvantages of the present method of doing this sort of work by means of a tool composed of an annular stock, whose base is to rest upon or over the fire-box sheet, and whose sides are slotted to receive a cutting tool having its head pivoted to the side of the stock. The tool is held to the work by a clasp sleeve. Joseph Renshaw, of Michigan city, Ind., is the inventor.

Machine for Cleaning, Hulling, and Polishing Rice, etc.—This invention consists in the employment of two cones, one inside the other and revolving in opposite directions or in the same direction and with different velocities (in contradistinction to two cylinders), said cones being provided with suitable rubbing surfaces arranged in such a manner that either one or both can be adjusted in a longitudinal direction, and the rubbing surfaces can thereby set closer together or further apart, as may be desired, to suit the operation to be performed. The rubbing surfaces consist of a series of short pieces of wire set endwise into movable frames, or of brushes or stones or other suitable material secured in said frames, in such a manner that each rubbing surface can be adjusted independent of the others whenever it is desirable or necessary, and different rubbing surfaces applied to the same cylinders or cones by removing one set of frames and substituting therefore another set. Chas. E. Rowan, 131 Seventh street, Brooklyn (E. D.), N. Y., is the inventor.

On Silvering Surfaces of Glass.

[From the British Journal of Photography.]

The advantages of being able to produce reflecting surfaces are often very great, and it is desirable that the photographer should know how to produce them. On the Continent silvered specula are in many instances taking the place of the more costly achromatic object glasses of the telescope; and we have seen a large photograph of the moon, produced by a glass mirror silvered by one of the methods about to be described, which could not have been surpassed by an achromatic lens. All our astronomical and scientific readers are aware of the powers of such silvered specula, but only few, perhaps, know how the silvering is effected.

The first process is that of Mr. Bird. The mirror or speculum to be silvered is suspended, face downward, in a silver bath prepared thus:—A large flat shallow vessel of glass or porcelain is provided to contain the solution. 750 grains of nitrate of silver are dissolved in six ounces of distilled water, and to this is added pure liquid ammonia, drop by drop, until the precipitate which is thrown down is redissolved. 2 ounces of caustic potash are dissolved in fifty ounces, by measure, of rain water; and fifteen ounces of this solution are added to the ammoniacal solution, when a brown-black precipitate will be produced. Ammonia is again added, drop by drop, until this precipitate is just redissolved; and 29 ounces of distilled water are then added to the whole. To this mixture is again added, drop by drop, stirring with a glass rod, a strong solution of nitrate of silver, until a precipitate, which does not redissolve, begins to be formed.

Previous to immersing the speculum, one part, by weight, of powdered milk sugar to ten parts, by measure, of distilled water must be prepared in a separate vessel, and filtered until a clear solution is obtained. Then, to ten parts, by measure, of the silvering solution must be added one part, by measure, of the milk sugar solution and, finally, fifty ounces of the compound solution will be sufficient to silver a speculum nine inches in diameter.

As the success of the process depends greatly on the glass surface being made chemically clean previous to immersion in the bath, the utmost pains must be taken to accomplish this object. The surface is first covered with thick whiting cream free from grit, which, when dry, is rubbed off with the purest cotton wool. The surface is then wetted entirely with dilute nitric acid, and afterwards thoroughly washed with distilled water poured over it; and, last of all, the piece of coated glass is suspended in a flat vessel containing alcohol, where it remains until the bath is ready to receive it.

To facilitate the suspending, a circular block of wood is very firmly cemented to the back of the speculum with marine glue or pitch, and three pins inserted at equal distances round the margin, to which strings may be fastened. On lowering it into the bath care must be taken that no air bubbles intervene, that the speculum be not deeper in the liquid than half its thickness, and that a depth of two inches, at least, intervene between the face of the speculum and the bottom of the vessel. In ten minutes after immersion a metallic film will be seen forming on the glass, and in an hour or two a compact silver coating will be laid over the whole surface.

The speculum should remain in the bath for four hours, by which time the process is completed; it is then carefully removed, copiously washed with distilled water, and placed on its edge to dry.

It is now ready for polishing. To accomplish this, rub the surface gently, first with a clean pad of fine cotton wool, and afterwards with a similar pad covered over with cotton velvet which has been charged with fine rouge. The surface will, under this treatment, acquire a polish of intense brilliancy, quite free from any scratches. The method employed by our correspondent is as follows:—

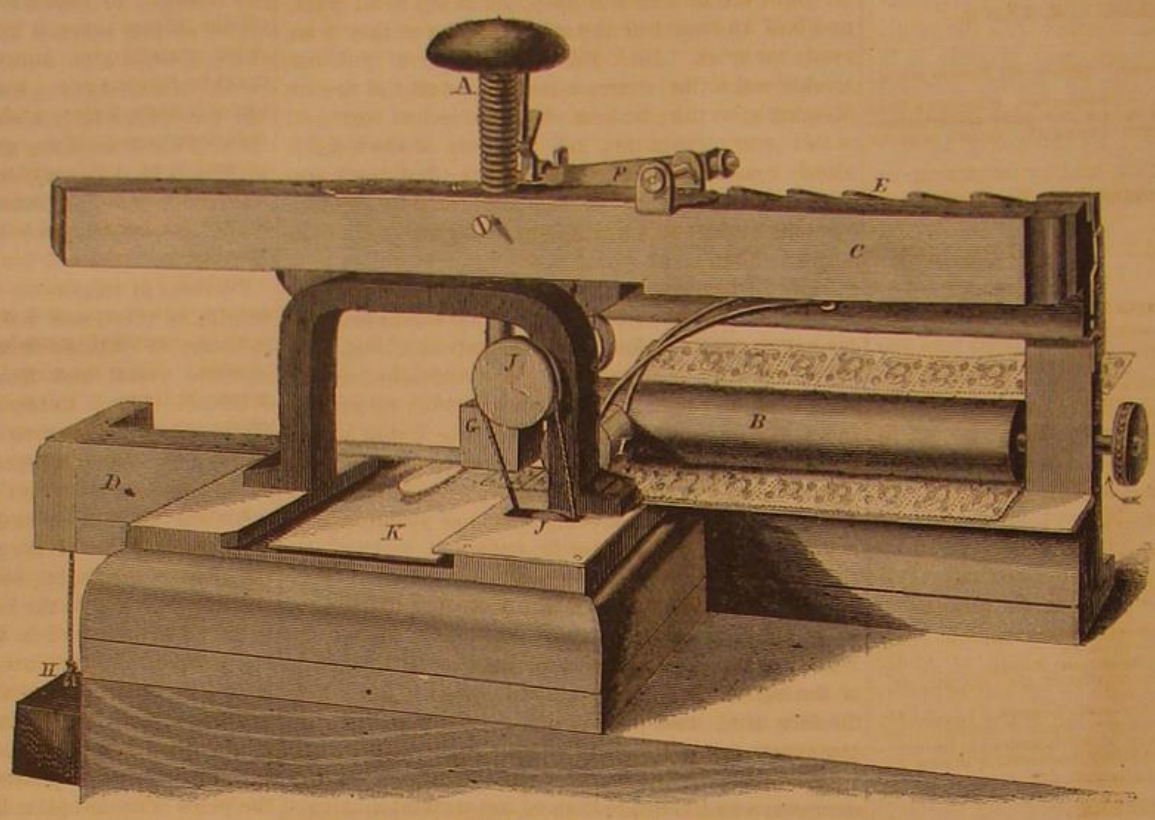
Make a solution of ammonio nitrate of silver, of the strength of three grains to the ounce. Render it very slightly turbid by excess of nitrate of silver, and then filter it. Just before using add to each ounce of the foregoing solution two and a-half grains of Rochelle salts.

Having scrupulously cleaned the glass intended to be silvered, place it in a convenient vessel about one inch from the bottom, supported on three little cones of white wax. The glass plate may be suspended; but in that case there is more difficulty in avoiding vibration, the absence of which is essential to success Expose to a northern light, or any other subdued light, and in about two hours the deposit of silver will be sufficiently thick. It must now be carefully removed, washed, and dried.

In the processes which we have detailed, when the surface next the glass is to be used as the reflector the glass side should be cleaned by nitric acid if the state of its surface so require; and the silvered side should receive a protecting coating of a good tough black varnish.

Machine for Applying Stamps.

Some months ago a photographer wrote a letter to the SCIENTIFIC AMERICAN, saying that a machine for applying stamps to *Carte de Visites* or other pictures, would be a very useful thing, and that one was much wanted by professional men. The inventor of the machine here illustrated has taken the hint thrown out, and in this engraving the means he has adopted to secure the end are shown. By a simple downward motion of the hand on the knob, A, the stamps are affixed as rapidly as the movement can be kept up, or the cards fed in. The stamps are inserted in the sheet, as shown at the roller, B. Below this roller there is another one, and the sheet is held between both; these rollers set in the carriage, C, which is made to slide in the frame, D, by a very simple arrangement. It is this. There is a rack, E, in the carriage which is held stationary (while the stamp is being stuck on) by the pawl, F; when the knob moves upward, after the stamp has been fastened by the block, G, this pawl is lifted and the carriage is drawn along the frame by means of the weight, H, at the end, thus carrying the stamp with it and presenting another to the action of the block, G.



SMITH'S MACHINE FOR APPLYING STAMPS.

Provision for moistening the stamps is made by the roll, I; this presses the sheet on a roller below which runs in a little tank of water, said under roll being operated by the pulleys, J.

When all the stamps on one row have been affixed, a new strip is presented by turning the rollers, B, in the direction of the arrow. The stamps are detached from the sheet by withdrawing the card, shown at K.

Thus all the requisite features in a machine of this class are provided for, and in its operation it answers the purpose. One of them, we are told, has been for some time used by Meade Brothers, this city. The machine is about two and a half times larger than the engraving. These machines can be used for applying stamps to labels, packages, envelopes, match boxes, or for any purpose where stamps are used. The inventor will sell State or shop rights to manufacture, and samples can be seen by applying to John Frank Smith, Box 5257, P. O., New York.

A patent is now pending on it through the Scientific American Patent Agency, by Robert L. Smith, of Stockport, N. Y.; for further information address him at that place.

A Mud Sucker.

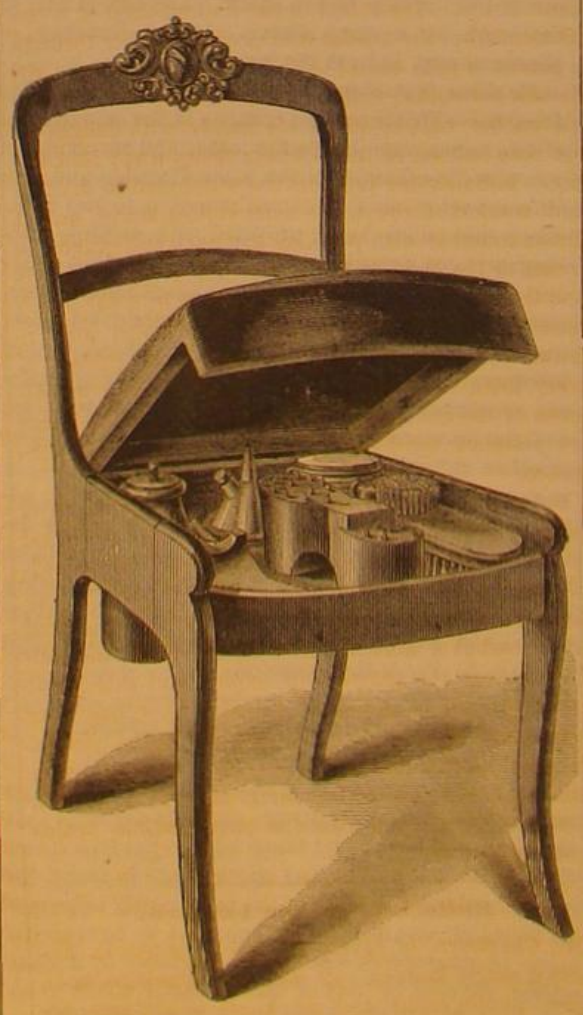
M. Agudio, the Italian engineer, who has undertaken the railroad which is to cross Mont Cenis, has invented a machine intended to be added to the mechanical sweepers, which are daily at work during this very muddy season, in the streets of Paris. The machine consists in a cast-metal receiver on four wheels, to the lower extremity of which is fixed a wide tube. A small air pump attached to the carriage creates a vacuum in the receiver. It is only requisite that the tube should graze the surface of the street for the mud to be, as it were, inhaled into this receiver—a sort of rake, fixed to the lower end of the tube, receiving the mud and facilitating its ascension.

New Method of Electro-Plating.

M. Well, a French chemist, announces a new method of depositing metals. The baths he employs consist of metallic salts or oxides in alkaline solutions by means of tartaric acid, glycerine, albumen, or other substances, which prevent the precipitation of the oxide by the fixed alkali, in some cases with, and in others without, the aid of zinc or lead, and at various temperatures, according to circumstances. He claims, also, to be able by like means, to give variety of color to articles covered with copper, by his process. M. Well says that the most important application of his discovery is the deposit of copper and the bronzing of iron (cast as well as wrought) and steel, without the preparatory dressings with conducting substances, which are necessary in proceeding according to the ordinary methods before the object is placed in the bath and submitted to galvanic action. This, if it bear the test of practice, is a very important fact. Iron and steel thus coated with copper may says M. Well, be afterwards silvered or nickelized by his process.

HARDING'S SHOE-POLISHING CHAIR.

A benefactor is by some one defined as a person who makes two blades of grass grow where but one



grew before. Inventors are, then, benefactors, for although they may not make grass grow literally, they make one thing serve two purposes sometimes, which is quite as much to the point, and very convenient to boot. The invention here illustrated relates to boots, and very closely, for those who desire to appear in a shining light, before men, as to their feet, must polish their shoes properly. It is all very well to throw the responsibility of this upon a servant; but what if one has no servant? What if one boards, or has a room of his own somewhere? What if one is a wretched bachelor without privileges or "fixins" of any kind, clearly he must provide himself with some such arrangement as that here illustrated. The object of it is apparent at once. The inventor has taken advantage of the fact that mankind are prone to put their feet on the nearest chair when their boots are to be polished, and has therefore provided an assortment of all the tools, instruments, and paraphernalia of whatsoever name and nature, used in the art and mystery of shoe-blacking within the compass of a common chair bottom, so that by merely lifting the seat there lies disclosed the wonderful machinery plain to the eye. The engraving illustrates this invention so clearly and beautifully that nothing is needed to explain it. Brushes, pots, boxes and water-can, are all at hand, ready for use. The model for this unique affair is one of the handsomest that has come into our hands for some time, and the inventor is deserving of praise for the skill and pains bestowed upon it. A patent is now pending through the Scientific American Patent Agency by F. G. Harding, of Boston, Mass.; for further information address him at 35 Sheafe street.

Subterranean Pneumatic Railway.

Of the new lines in London probably the most reremarkable is that proposed under the name of the Waterloo and Whitehall Railway. This is a pneumatic line, not for the conveyance of parcels only, not an iron tube like the gigantic pipe between the Post Office and Euston Square; it is an extension of the plan that has been for some time exhibited in operation in the grounds of the Crystal Palace at Sydenham. The tunnel admits about a full sized omnibus carriage, which is impelled by a pressure of the atmosphere behind the vehicle, produced by lessening the density of the air in front. It is an underground railroad worked without locomotives. The proposed line will run in a tunnel under the Thames, and open a communication between Whitehall and Waterloo Station, near Vine street. As a means of communication between one part of London and another this line will be quite an experiment.

Burglars Using Wedges.

The Birmingham correspondent of a London cotemporary says:—

"By the aid of the wedge now so much used by burglars, a safe, considered thief-proof, was opened in Birmingham on Friday night last, at the office of Mr. H. Dixon, of the Old Wharf. The safe was 3 feet by 2½ feet, and was made of three-eighth inch plates. The door was forced open, and such was the violence that had been applied that one of the sides was not only bent and broken, but the bolts by which the safe was riveted together were driven completely out of the metal. The noise of the concussion of a sledgehammer upon the wedge seems to have been muffled by the use of a book. There was only 3½d. in the safe."

THERE are now packed away in the different storehouses on the banks of the Hudson about 153,000 tuns of ice, gathered this season.

THE

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VOL. XII. NO. 12...[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, MARCH 18, 1865.

Contents:

(Illustrations are indicated by an asterisk.)

*Gallagher's Turbine	175	Loss of Heat in the Steam Engine	180
A new French Steamer	175	Burgh's Rules for the Steam Engine	180
How an English Colliery is Ventilated	175	On Silvering Surfaces of Gluss	181
Capillarity	176	*Smith's Machine for Applying Stamps	182
Steam in France	176	A Mud Sucker	182
The Thames Embankments	176	New Method of Electroplating	182
A Canal with a Leaky Bottom	177	*Harding's Shoe-polishing Chair	182
Steam on Common Roads	177	Subterranean Pneumatic Railway	182
Hot Ashes	177	Small Boilers	183
Hydraulic Coal-cutting Machine	177	Expiration of the Goodyear Patent	183
Pyroligneous Acid in Chimneys	177	Reflecting Magic Lantern	183
Farmers' Club	178	Cheap Soap	183
*Holley's Pen Rack and Calendar	178	A Significant Fact	183
New Bituminous Substance from Brazil	178	Patent Claims 184, 185, 186, 187, 188	
Photographic Items	178	Notes and Queries	188
On Drops	179	*Collins's Shaft Coupling	190
Mining Phenomenon	179	Flow of Solids under Pressure	1
British Army and Navy	179	*Zahn's Kerosene lamp Screen	190
Scale in Boilers	179		
Petroleum Gas for Engines	180		
Raw Pork and Tape Worms	180		
The Problem of two Wheels	180		

SMALL BOILERS.

One of the commonest mistakes committed in engineering practice is to allow too small a proportion of boiler to steam engine. We see evidences of it every day in steam vessels, and more frequently in factories. In ships with limited boiler power a continual struggle is going on between the water tenders, the coal passers, the firemen and the engine. It is a matter of interest which of these machines shall get ahead. The steam gage is anxiously inspected; the pressure is continually falling; a brief "spurt" on the part of the fireman for a time causes the pressure to gain, but when this ceases it falls to the old point again, and no judicious throttling; no loud and imperative commands to carry less water; no skillful slicing of fires; no scientific dilution of the gases with air through the furnace doors; no busy whirling of blowers, can raise the pressure beyond the point at which the capacity of the boiler stops. One may as well attempt to pour five quarts out of a four-quart vessel as to get more steam than it has the capacity to generate. Like spurs applied to a tired horse, the goading is of no avail, and, unless other boilers are put in, no results, except poor ones, are obtained.

A shocking waste of fuel occurs when small boilers are used. The green fuel thrown in is no sooner fairly aglow, and parting with what heat it contains, than fresh charges are put on top of it, the blast is turned on, and that heat which should have been devoted to raising steam is employed to burn the cold fuel, and is soon sent whirling up the smokestack, to be lost in the outer air. If a man fed the hopper of a fanning mill with greenbacks, and blew them out of the dust-opening thereof, he would have a practical exemplification of the waste occurring in boilers too small for their work. Not only is fuel wasted, but the boiler itself rapidly deteriorates, as does every other machine, implement, vessel or apparatus taxed beyond its capacity.

An incessant opening of furnace doors, a continual introduction of fresh fuel, an unremitting torture of said fuel by "slicing," poking, "rousting," and other ingenious devices, to prevent the coal from burning, transpires throughout the day when the boiler is too small. Every cook knows that if she give her range no peace there will be no dinner; the domestic steam will not be raised in a desirable manner, and with a steam boiler continually urged the proprietor suffers daily loss.

A most striking example of the utility of large boilers and the assertions here made was noticed by us some years ago in a factory. The proprietor of it had a small steam engine driven by a boiler large enough for two such engines. That boiler actually used less coal than one half its size for the same work; the fire once made in the morning burnt slowly through the day. Once or twice firing was all that was necessary, and the doors were continually ajar. The sluggish combustion was accelerated when new fuel was added by closing them for a few minutes. At night the fires were banked, remained so all night, and half an hour before work commenced they were ready for work. No kindlings were used from one week's end to the other, except to start the fire on Monday morning; no coal was burned to heat cold water every morning; no fuel was wasted, for it slowly roasted away to ashes, and the burning gases rising slowly through the flues and heating surfaces remained in contact with them, and gave forth their utmost value.

Half, if not more, of the miraculous economy claimed for cut-offs for engines with peculiar pistons; for valves with crooked openings instead of straight; for valves with three-fourth stems instead of seven-eights, arises solely from their engines having surplus boiler power, wherein the coal is thoroughly burnt; where every ounce is reduced to ashes—not consolidated to cinder—and where the heat, instead of being discharged at the smokestack as soon as generated, is utilized in turning water into steam.

EXPIRATION OF THE GOODYEAR PATENT.

There has never been a more illustrious exhibition of the beneficent operation of the patent laws than in the case of Charles Goodyear's invention of the vulcanization of india-rubber. The unflagging perseverance that carried the inventor through his early struggles was the result of the splendid reward which these laws offered as the crown of his success. For twenty-one years the inventor and his assigns have enjoyed a monopoly of the invention, and a number of magnificent fortunes have been acquired from this monopoly.

But great as have been the profits to the owners of the patent, they are small indeed compared with the advantages which the invention has bestowed upon the community. The properties of vulcanized rubber are so peculiar and so valuable, that the article has come into use in almost every art and every department of life. The infant draws its first drop of nourishment from the tender bosom of its mother through a patent nipple shield of india-rubber, the little girl dances her rubber doll upon her knee, the boy bounds his rubber ball, or claps his hands with delight as his rose balloon of india-rubber floats away into the sky. India-rubber protects the watchman in dryness and comfort through the most violent storm, and it draws together with peculiar elegance and grace the corset of the belle, it keeps the dust from our hands and the water from our feet; we ride in a car which runs smoothly upon india-rubber springs, and is drawn by an engine packed with india-rubber in every joint. In short, all the comforts and conveniences of life are augmented, and all its jolts and jars are softened by this elastic and all-pervading substance.

But even yet there are some nooks and corners of the arts from which india-rubber has been excluded by the operation of the Goodyear patent. Many valuable inventions which depend upon the use of vulcanized rubber are lying dormant till this material can be had at a more moderate price. On the 15th of next June the patent will expire, and this great invention—one of the most valuable that has ever been made—will become the property of the public. Then will its innumerable applications be still further multiplied, and new devices for its use will come forth in endless succession from the inexhaustible brains of our inventors.

Reflecting Magic Lantern.

Mr. Chadburn, of Liverpool, has patented in England a magic lantern, by which engravings upon paper, photographs and all kinds of pictures are readily produced upon the wall by reflection. The principle upon which this instrument operates is the same as that patented in this country on the 19th of April, 1864, by Geo. Siebold, of Philadelphia, Pa.

CHEAP SOAP.

Soap for family use can be made very cheap and of excellent quality with little trouble by the use of a common article sold in all drug stores. This is lye put up in a concentrated form in small iron boxes holding one pound. These boxes cost twenty-five cents in ordinary times, now we believe they retail at forty or fifty cents, and will make twenty-five pounds of green or new soap. The plan of procedure is merely to take a box of this substance, knock off the lid and throw it into a gallon of boiling water. After standing ten hours the lye will be clear, and must be thrown into a wash boiler with another gallon of boiling water; when the contents of the vessel boil, four pounds of any grease must be added slowly, poured in in a thin stream and stirred well. When intimately mixed the boiler should simmer slowly for four or six hours, and half an hour before taking off another gallon of hot water may be added together with half a teacupfull of salt. The latter is not necessary, however, and if two much is thrown in the soap is curdled or made short so that it breaks and wastes. When the soap is thought to be done plunge a case knife in, if the mass drops clear and ropy and chills quickly it is soap and will be firm and hard when cold. Have ready a wash tub well wet on the bottom and sides; pour the soap in and let it set; in a few hours it will be hard enough to cut out and as white as snow. This process makes twenty-five pounds of soap, or, by the aid of grease, four pounds, lye, one pound, twenty-four pounds of water, less two quarts driven off in boiling, (one gallon weighs eight pounds nearly,) are converted into soap of excellent detersive properties. Since the grease is saved from the family waste the soap has only cost what the lye has come to, and, as the loss by drying is only 25 per cent, eighteen pounds of soap can be made for fifty cents, a little over three cents per pound. We have made hundreds of pounds of this soap in all varieties and use it constantly for domestic purposes.

A SIGNIFICANT FACT.

We have frequently called public attention to the fact that, notwithstanding the existence of war and the consequent disturbance of business, the arts do not languish nor does trade stagnate to the degree that might have been expected. Repeated calls for men to fight the battles of the nation have drained the North of large numbers of its most skillful craftsmen. Eager to uphold the national credit and honor under all circumstances, machinists, carpenters, engineers, farmers, masons, indeed, members of every calling, have laid down their several implements and hurried to the field. Nay, more, they have also unloosed their purse strings, and while they have shed their blood in their country's defense, they have loaned to the Government the wages received for this very service.

In consequence of the absence of manual labor, machinery has been, and still is largely in demand to supply the demands of trade, and we call attention to the unprecedentedly large list of patent claims in this number as the fullest evidence that inventors are awake and equal to the emergency. Machines, plans, processes, designs and apparatuses are all recorded there, and it would be difficult to find a branch of manufacturing not represented.

The present list is the largest ever issued from the United States Patent Office, and numbers no less than one hundred and fifty-one cases.

Our friends and patrons will be pleased to learn that the SCIENTIFIC AMERICAN PATENT AGENCY is, as usual, largely represented here, and may fairly claim the lion's share in the number of patents procured. Out of the whole number SEVENTY-THREE were obtained through this office, and we present this naked fact as the best evidence of the confidence of the inventive portion of the community in our efforts to serve them.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING MARCH 7, 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.

46,616.—Protecting trees from Injury while Plowing.—Ruel Alden, East Toledo, Ohio:

I claim the employment or use of india-rubber or other elastic substance in the form of rollers or otherwise applied to one or both ends of a whiffletree to serve as a cushion or guard to protect, while plowing, trees from the action of the whiffletree substantially as set forth.

[This relates to a new and useful attachment to be applied to whiffletrees in plowing in order to prevent the latter abrading trees a contingency which always attends the plowing of grounds in orchards, especially young orchards, as the plow approaches the trees sufficiently near, or should, if the ground be properly plowed, to cause the whiffletrees to come in contact with the trees.]

46,617.—Cartridge Retractor for breech-loading Fire Arms.—Ethan Allen, Worcester, Mass.:

I claim a link, F, hung in front of the center of action of barrel, B, in combination with discharger, E, substantially as described.

46,618.—Apparatus for Oxidizing Metals.—Wm. Atwood, Cape Elizabeth, Maine:

I claim the invention of a revolving chamber so constructed as to admit the passage of a constant current of atmospheric air over and through the material to be oxidized while the same is kept in constant motion and exposed to any desirable degree of heat.

46,619.—Process for Desulphurizing and Disintegrating Ores.—Dr. James C. Ayer, Lowell. Mass. Ante-dated Jan. 24, 1865:

First, I claim the application of treating rock or ores while in the heated state with an alkaline solution substantially as described for the purpose of partial disintegration desulphurization and oxidation of the same.

Second, I claim the application of re-treating ores which have been heated substantially as above described and the same repeated for the complete disintegration desulphurization and oxidation of the same.

46,620.—Process for Desulphurizing and Disintegrating Ores, etc.—Dr. James C. Ayer, Lowell, Mass. Ante-dated Jan. 24, 1865:

First, I claim the application of treating rock or ores while in the heated state with a saline solution substantially as described for the purpose of partial disintegration, desulphurization and oxidation of the same.

Second, I claim the application of re-treating ores which have been heated substantially as above described and the same repeated for the complete disintegration, desulphurization and oxidation of the same.

46,621.—Process for Disintegrating, Desulphurizing and Oxidizing Ores.—Dr. James C. Ayer, Lowell, Mass. Ante-dated Jan. 24, 1865:

First, I claim the application of heating ore while in a heated state with water substantially as described for the purposes of partial disintegration, desulphurization and oxidation of the base metal in same.

Second, I claim re-treating ores which have been treated substantially as above described and repeating the same for the complete disintegration, desulphurization and oxidation of the metals in the same.

46,622. Gaiter Boots.—Samuel Babbit, Kokomo, Ind.:

I claim a gaiter boot constructed with a folding extension, C, substantially as and for the purposes set forth.

46,623.—Attaching Sleigh Bells to Straps.—Wm. E. Barton, East Hampton, Conn.:

First, The metallic seat having a recess conforming to the boss of the bell a hole for the coupling screw to pass and impinging surfaces on the leather side to keep the seat in place substantially as described.

Second, In combination the bell with short boss and screw hole the metallic seat strap and coupling screw substantially as described.

Third, In combination the coupling screw flaring washer strap metallic seat and bell substantially as described.

46,624.—System of Supporting Combustion.—J. A. Bassett and E. L. Norfolk, Salem, Mass.:

We claim supporting or effecting combustion in furnaces, stoves, etc., by the introduction of superheated steam with or without air substantially as herein described.

[This invention consists in supporting or effecting the combustion of carbonaceous fuel in furnaces or stoves by the introduction of superheated steam mixed with or without atmospheric air below or among the incandescent fuel by which an instantaneous decomposition takes place into hydrogen and carbonic oxide, both of which are combustible and burn as gas above the layer of fuel, and this decomposition is more or less energetic as the steam is more or less heated.]

46,625.—Ordnance and Projectile.—Benjamin F. Bates and Charles R. Macy, New York City:

First, we claim a projectile made with a small head, B, a smaller body, C, to pass through an aperture in the breech of the gun and a disk, D, to fit the bore of the gun substantially as herein described.

Second, A gun having guide blocks, G G', applied to its breech in the manner described and employed in connection with a projectile formed with a longitudinal rear extension, C, either for the purpose of guiding the latter in a central position or imparting rotation to the projectile as herein set forth.

46,626.—Seeding Machine.—Wm. N. Bates, Center Point, Iowa:

I claim the combination and arrangement of parts herein described consisting of a mitered seed box with a regulating slide, C, with its spring inside of the seed-box, a gate, I, operated by a handle from the exterior, and a toothed reciprocating agitator, F, moving on bearings at the upper part of the seed box, with its teeth extending down nearly to the seed aperture, and operated by connection with a vibrating block, and a link from a wrist on the driving wheel.

[This invention relates to certain improvements in that class of seeding machines which sow the seed broadcast, the end being placed in a suitable box and made to discharge through an opening or crevice the size of which can be regulated by a suitable slide or which can be closed by a gate, the discharge of the seed being facilitated by an agitator to which a reciprocating motion is imparted from the driving gear of the machine.]

46,627.—Bone Mill.—Edwin P. Baugh, Philadelphia, Pa.:

I claim, first, Making the grinding surface of mills for grinding bone and other substances, when the same are of cast metal, in sections or divisions so that the outer grinding surface shall be composed of vertical sections, b, surmounted and held in place by a ring, c, whose periphery is also a grinding surface, substantially as above described.

Second, I claim making the ring, L, which serves as a foundation for the lower edges of the grinding surface, separate and distinct from the shell, A, which surmounts the said outer grinding surface, substantially as above described.

[The object of this invention is to construct a mill suitable for grinding and reducing bones to the fine condition required when they are to be used as a fertilizer, and also for grinding other refractory substances, and it consists among other things of a novel construction of the grinding surfaces sometimes called the dress, an improved mode of securing them in the mill, and other improvements hereinafter set forth.]

46,628.—Harvesting Machine.—A. Belchamber, Ripley, Ohio:

I claim the flange, I, attached to a rod, H, at the upper end of the rotating shaft, D, and provided with sockets in which the rake-bars, J, are permanently secured and the reel-arms, J', secured by pivots or pins, g, in connection with the cam way, M, all arranged to operate substantially as and for the purpose herein set forth.

[This invention relates to a new and improved reaping and mowing machine of that class in which horticultural rakes and reel-arms are employed, and it consists in a novel manner of arranging the same whereby machines of this class are much simplified.]

46,629.—Corn Planters.—George I. Bergen, Galesburg, Ill.:

First, I claim the runner, D, having a concave edge along its front part, and a slightly descending straight edge from a', to a'', as shown and described.

Second, I claim uniting the front and rear frames of a corn planter by means of the curved slotted box, f, and bar, g, in combination with the loose joint, d e.

Third, I claim a guide for planting, consisting either of two points, or a broad plane surface, substantially as set forth.

Fourth, I claim the hopper, C, when constructed as herein set forth.

Fifth, I claim the plate, k, when constructed and used as and for the purposes described.

Sixth, I claim the scrapers, H, constructed as described and mounted on the roller, I, in such a manner as to automatically remove themselves from contact with the wheels, as and for the purpose set forth.

Seventh, I claim the seed tube, E, when constructed as shown and described.

Eighth, I claim the rubber cut off, j, when constructed and operating as herein set forth.

Ninth, I claim the sliding rod, K, having the bent arms, t, and operating in conjunction with the standards, t, and seed slides, o, as and for the purpose set forth.

Tenth, I also claim pivoting the valve, m', on the removable pin, q, and having the stem of said valve resting loosely in a notch, o, in the edge of the seed slide outside of the hopper all arranged and operating as herein described.

46,630.—Reaping Machine.—H. W. Bill, Cuyahoga Falls, Ohio:

First, I claim removing the grain from the machine and depositing it upon the ground in gavels, by means of the frame, F, raised and rotated by one continuous operation substantially as set forth.

Second, I claim the guards, H, in connection with the frame, F, as and for the purpose set forth.

Third, I claim the bearers c c, in connection with the frame, F, as and for the purpose set forth.

Fourth, I claim rotating the frame, F, by means of the pawl, e, and spring, s, in combination with the shaft, b, and catches c c, substantially as and for the purpose set forth.

46,631.—Street Lamps, Lanterns, etc.—John Binney, Boston, Mass.:

First, I claim the construction and arrangement of street lamps or lanterns or other lamps exposed to winds or currents of air substantially as herein described.

Second, A lantern or street lamp cap composed of a chimney provided with apertures and overhanging bands in combination with an annular shield the whole being constructed for operation in the manner and for the purpose set forth.

46,632.—Apparatus for Amalgamating Gold and Silver.—H. Bolthoff, Buddington, Iowa:

First, I claim the employment or use of the two mullers, O K, placed one above the other in the pan, B, and arranged in such a manner as to rotate in reverse or opposite directions, substantially as and for the purpose herein set forth.

Second, the arrangement and combination of the central fixed conical hub, C, at the center of the fan, B, spindle, E, tubular shaft, D, conical hub, J', of muller, K, and the hollow hub, Q, of muller, O, provided with arms, R, fitted on the sleeve, M, which is placed on the upper part of the spindle, E, with the screw, N, fitted in it, substantially as and for the purpose described.

[This invention consists in using within a pan two rotary mullers arranged in such a manner that they will rotate in reverse directions said mullers being provided with openings and placed one over the other, whereby the pulp will be thoroughly ground and the mercury intermixed therewith so that all the particles of precious metals contained in the former will be brought in contact with the mercury and amalgamated, the work being rapidly performed and in a very efficient manner.]

46,633.—Apparatus for Distilling Petroleum, etc.—Edward Braggins, Titusville, Penn.:

I claim the method described of producing a vacuum in the condenser, k, by water in the manner described when done by the aforesaid combination for the purposes set forth. I claim the combination of the water tank, F, with the tubes, O and N, the condenser, k, the tube, R, and the retort, A, with the tubes, E F C, when the same are constructed as described and in the aforesaid combination for the purposes set forth.

46,634.—Safe.—Martin Briggs, Rochester, N. Y.:

I claim the construction essentially as herein shown, the lock, C, being secured within the inner side or back of the door, with its back resting through in such a manner as to be readily opened and used in combination with the plates, A B, and packing, D, so that the packing will surround the lock on the outside and ends to protect it substantially as set forth.

In combination with lock, C, plates, A B, and packing, D, as above described, I also claim arranging the bar, H, and its bolts, g g, in the inner flange of the door and rendering them accessible by the chamber, i, substantially as herein set forth.

46,635.—Oil Can.—John Broughton, New York City:

I claim an oil can or oiler having a transparent chamber applied to or combined with its metallic or opaque body and nozzle to operate substantially as and for the purpose specified.

[This invention relates to an improvement in the construction of oil cans or oilers, such as are generally used by mechanics for lubricating machinery, depositing oil on stones or hones, etc., etc. The object of the invention is to facilitate the filling of the can and prevent the overflowing of the same, a contingency of frequent occurrence and which is the cause of considerable annoyance attended with waste of oil or other lubricating material used.]

46,636.—Composition for Lining Oil Barrels.—Wm. Budd and J. L. Husband, Philadelphia:

We claim the manufacture of the firm elastic impervious coating and the use of the same as herein before substantially set forth.

46,637.—Corn Planter.—W. E. Chesney, Abington, Ill.:

I claim the cams, L L, and lever, M, in combination with the bar, K, seed boxes, F F, and springs, J J, all arranged to operate as herein set forth.

[This invention relates, first, to a new and useful improvement in mounting the frame of the machine and annexing the driver's and dropper's seat thereon, whereby the same may be readily turned in the field at the ends of rows of planted corn, and at the same time remain in a proper position to admit of the forward shares being raised out of the earth and held in an elevated state while the machine is being turned.]

46,638.—Pump.—M. R. Clapp, New York City:

I claim inducting the water into the main cylinder, B, through openings, f' f2, which surround or nearly surround the cylinder at each end, controlled by valves, G' G2, as specified, and delivering the water through valves or sets of valves, M' M2, the several parts being arranged and adapted for joint operations and easy access substantially as set forth.

46,639.—Receiving Magnet for Telegraphs.—James J. Clark, New York City:

I claim the revolving wheel, A, with roughened edge in combination with a telegraph receiving or main magnet applied in the manner and for the purpose as herein before specified.

46,640.—Can for Preserving and Transporting Milk.—Moses M. Clark, Monroe, N. Y.:

I claim the filling in of milk cans between the inner and outer covers with pulverized charcoal as a means of preserving milk, in such a manner as to protect the milk from heat.

46,641.—Gold Washer.—N. D. Clark, Bentonsport, Iowa. Ante-dated March 3, 1865:

First, I claim the providing of a separator for the above described purpose with a series of elastic slips attached to the open end, to serve in separating nuggets from among the stones.

The providing of a separator as above with a second bottom, made hollowing or inclined from the sides inward to some point where there is an opening downwards, to serve in collecting and discharging the dirt at one place.

Third, The providing of the above described separator and gold-pan with a sifting or oscillating motion.

Fourth, The double use of the water, first as a propelling force and then to wash the dirt.

46,642.—Car Brake.—J. M. Collins, New Bedford, Mass.:

First, I claim the mode of securing the shoes, D D, to the heads, B B, by means of the dovetail projections, c, on the shoes fitted in the dovetail grooves, b, in the heads when combined with the dovetail plugs, E, and the bolts, e, provided with the dovetail heads, f, all arranged as set forth.

Second, The cast-iron shoe bar, A, when attached or fitted to the heads, B B, when constructed in the manner substantially as herein shown and described.

46,643.—Padlock.—Edward Coyle, Albany, N. Y.:

I claim the combination of the spring, E, with the shackle, B, plurality of double hooked tumblers, C, and springs, d, all constructed, arranged and operating as and for the purposes specified.

46,644.—Machine for Making Fish Hooks.—C.O. Crosby, New York City:

First, I claim the combination of an intermittent feeding device with a cutter, L, or its equivalent, when both are constructed substantially as herein set forth.

Second, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translating movement of the blank with a cutter, L, and header, B4, or their equivalents, substantially as described.

Third, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translating movement of the blank with header, B4, and barb cutting instrument, P2, or their equivalents, substantially as described.

Fourth, The presser, 13 when formed so as to press upon the blank forward of the barb to bend the blank over the bed P', on which it rests, and to prevent the barb from curling over, substantially as set forth.

Fifth, The combination of the holder, 14, back of the barb cutting instrument with the presser, 13, forward of the barb cutting instrument, substantially as and for the purpose specified.

Sixth, The combination of the holder, 14, back of the barb cutting instrument and the presser, 13, forward of the barb cutting instrument with the block or bed, P', on which the blank rests, substantially as and for the purpose set forth.

Seventh, The combination of the holder, 14, back of the barb cutting instrument the presser, 13, forward of the barb cutting instrument, and the bed, P', on which the blank rests with the barb cutting instrument, P2, substantially as described.

Eighth, The combination of a carrier constructed and operating as described producing intermittingly a progressive translatory movement of the blank with barb cutting instrument, P2 and one or more pair pressing or clipping dies, substantially as specified.

Ninth, The combination of a carrier constructed and operating as described producing intermittingly a progressive translatory movement of the blank with one or more pair pressing or clipping dies, barb cutting instrument, cutter, L, or its equivalent and intermittent feeding device, substantially as described.

Tenth, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with one or more pair pressing or clipping dies barb cutting instrument, P2, and header, B4, or their equivalents substantially as specified.

Eleventh, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with one or more milling devices, substantially as set forth.

Twelfth, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with two or more pair of pressing or clipping dies, substantially as specified.

Thirteenth, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with two or more milling devices, S, substally as described.

Fourteenth, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with a barb cutting instrument and one or more milling devices, substantially as set forth.

Fifteenth, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with a header, barb cutting instrument and one or more milling devices substantially as described.

Sixteenth, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with a bender or former, T2, substantially as described.

Seventeenth, the combination of a carrier constructed as described, producing intermittingly a progressive translatory movement of the blank with one or more milling devices, and a former or bender, T2, substantially as specified.

Eighteenth, The combination of a carrier constructed as described, producing intermittingly a progressive translatory movement of the blank with a barb cutting instrument and bender or former, T2, substantially as specified.

Nineteenth, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with a header, B4, and barb cutting instrument substantially as described.

Twentieth, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with a bender, T2, and cutting device, L, substantially as described.

Twenty-first, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement with a grooved guide, I5, substantially as and for the purpose specified.

Twenty-second, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank with a holder, c', which grasps and securely holds the blanks during their movement from one instrument to another, substantially as set forth.

Twenty-third, The combination of a carrier constructed and operating as described, producing intermittingly a progressive translatory movement of the blank and holder, c', which grasps and securely holds the blanks during their movement from one instrument to another with a bender, T2, substantially as described.

Twenty-fourth, The combination in one machine of an intermittent feeding device, cutter, L, a carrier constructed and operating as described, header, B4, barb cutter, P2, pointing devices and bender, T2, or their equivalents, in the manner and for the purpose substantially as herein set forth.

Twenty-fifth, The adjusting guide, P3, for regulating the depth of the cut, in combination with the barb cutting instrument, P, substantially as described.

46,645.—Apparatus for Gathering Quicksilver.—M. B. Dodge, New York City:

I claim the slats, D, inserted into the vat, A, so as to have channels, a, between their lower edges and the bottom of the vat in combina-

tion with an amalgamated bottom, B, and with or without an agitator, E, constructed and operating substantially as and for the purpose set forth.

Also, imparting to the vat, A, and to the agitator, E, a reciprocating motion in opposite directions, as and for the purpose specified.

46,646.—Water Filters.—Nicholas Downes, Syracuse, N. Y. Antedated Feb. 2, 1863:

I claim the combination of the ice disk reservoir partition, K, and tube for cleansing with the filtering medium as and for the purposes set forth.

46,647.—Machine for Raking and Loading Hay.—William A. Duncan, Syracuse, N. Y.:

First, I claim the slotted clearing wedge, K, when located in front of the upper shaft, Y, and constructed with slots, i i, projecting over the said shaft and with an inclined conductor, I, all as herein shown and described.

Second, the vertical sliding rake teeth, H, operating substantially in the manner and for the purpose set forth.

Third, I claim the springs, n, when constructed as herein shown and described and employed in combination with the channels, L, and teeth, H, in the manner and for the purpose specified.

Fourth, The combination of the springs, s, and the springs, n, with the teeth, H, whereby a yielding horizontal and a yielding vertical play is alowed to the teeth, H, substantially in the manner and for the purpose described.

Fifth, The longitudinal adjustment of the rake head, g, to and from the elevator, substantially in the manner and for the purpose set forth.

Sixth, The combination of the slotted clearing wedge, K, the curved guard board, m, and the vertical sliding rake teeth, H, with the endless apron or elevator, D, all arranged substantially in the manner and for the purpose described.

46,648.—Extension Ladder.—Calvin Eaton, Webster, N. Y.:

I claim the combination and arrangement of the detachable section or extension, B, constructed as set forth with the main ladder in the manner and for the purposes shown and described.

46,649.—Foot Warmer.—Augustus Eckert, Trenton, Ohio:

I claim in combination with the casing, A, and door, B, the lamp F, and chimney, G, flaring plate, J, horizontal plate, K, and channels, j j, constructed arranged and operating as and for the purposes described.

[This invention consists in an arrangement of parts whereby a foot-stove or foot-warmer is made to combine in itself a lantern and a nursing or cooking lamp also.]

46,650.—Latches.—Henry H. Elwell, South Norwalk, Conn.:

First, The employment or use of the catch or fastening, E, fitted on a pin, a', of the part, C, of the slide latch, and arranged substantially as shown to engage with the part, C, of the latch, for the purpose set forth.

Second, The actuating of the catch or fastening, E, by means of the key of the lock through the medium of the tumbler or any equivalent arrangement, substantially as described.

[This invention relates to a new and improved means employed for reversing the slide latch of a lock so that the same may be adjusted to suit either a right or left hand door.]

46,651.—Gas Stove.—Luther Erving, Brooklyn, N. Y.:

I claim the gas chamber, D, provided with a perforated top, E, in combination with the air and gas chamber, G, all arranged substantially as and for the purpose herein set forth.

I further claim the arrangement of the flues, F I J, when used in combination with the gas chamber, D, and air and gas chamber, G, substantially as and for the purpose specified.

46,652.—Chronometer Escapements.—Charles Fasoldt, Albany, N. Y.:

I claim the pallet, e, arranged in combination with the pallet lever, c, wheels, a b, and balance, f, in the manner and for the purpose substantially as herein shown and described.

46,653.—Latch for Doors.—Samuel W. Fordick and A. C. Dakin, Clinton, Mass.:

I claim the catch, C, formed with a horizontal gravitating hooked arm, e, adapted to catch in the plate, F, and an upwardly projecting arm provided with a knob, E, by a direct pull upon which the latch is retracted, all as herein described.

[This invention relates to a new and improved latch for doors, designed more especially for closet and cupboard doors.

46,654.—Teeth for Cultivators.—Henry Francisco, Lake Mills, Wis.:

First, I claim the eccentric standard to a cultivator tooth, constructed and operated substantially as described.

Second, The slotted slide and set screw, arranged and operated in the manner and for the purpose described.

Third, The combination of the set and set retaining device with the eccentrically hung shank of a cultivator tooth, substantially as and for the purpose described.

46,655.—Making Volute Springs.—John Freeland and Danl. Ward, New York City:

I claim a solute spring composed or formed out of a single plate cut or divided longitudinally nearly its whole length with the cut portions spread apart, and the plate rolled, substantially as herein shown and described.

[This invention relates to a new and useful improvement in volute springs for railway cars, and for other purposes. The object of the invention is to obtain a spring of the class specified which will possess a greater degree of elasticity than usual and be stronger or less liable to break and more durable.

46,656.—Car Couplings.—Francis M. Gifford, Brant, N. Y.:

First, The drop bolt or pin, F, and link or shackle, D, in combination with the pivoted bar, H, and the brace or stay, E, all arranged in relation with the draw head to operate substantially in the manner as and for the purposes herein set forth.

Second, the pin, E', in the rear part of the draw head when used in connection with a link or shackle, D, and a brace or stay, E, substantially as and for the purpose specified.

[This invention relates to a new and improved car coupling, of tha class which are commonly termed self coupling.]

46,657.—Cultivator.—John H. Given, Henry Hutsonpiller, and H. Chas. Gilbert, Des Moins, Iowa:

We claim the frame, D, pivoted or attached to the draught pole, A, as shown in connection with the jointed set bar, O, angle plates, p, and the plates, r, all arranged to admit of the ready elevation of the plows, as set forth.

We further claim the uprights, H H, connected at their upper parts to the lever, J, and connected at their lower parts to the plow standards, F F, and pivoted to the frame, d, substantially as shown and described, to admit of the lateral movement of the plows, G, as described.

[This invention relates to a new and improved cultivator for plowing or cultivating corn and other crops which are grown in hills or drills.

46,658.—Boltling Apparatus.—Henry B. Goodyear, New Haven, Conn.:

First, the combination with the wire instrument for seizing and drawing up and forcing internal elastic ball valves into the necks of bottles for the purpose of closing or stopping the same of a check piece, operating in conjunction with said wire instrument in the manner and for the purpose set forth.

Second, The machine or apparatus herein described for closing bottles by means of internal elastic valves, in the manner shown and set forth.

46,659.—Snap Hooks.—Robt. A. Goodyear, New Haven, Conn.:

I claim, first, The recessed shank of the closing bar, when constructed for operation substantially in the manner and for the purposes set forth.

Second, As a new article of manufacture I claim a snap hook, the same consisting of a hook, a recessed hinge or closing bar and spring combined in the manner substantially as set forth.

Third, In combination with the recessed hinge bar and hook of a vulcanized india rubber spring the whole being constructed and combined in the manner and for the purposes set forth.

46,660.—Machine for Riveting Buttons in Cloth.—William J. Gordon and Edmond D. Gilbert, Philadelphia, Pa.:

We claim, first, In machines for attaching buttons to cloth or other material, feeding the rivet and the button, perforating the material, placing the rivet therein, advancing the cloth and rivet to the button, and uniting them by riveting, by mechanical devices, constructed, arranged, and operating as a whole substantially as described.

Second, We claim the needle and its tubular casing, T, constructed and operating substantially as described.

Third, We claim the jointed hook, Q', with its inclined face, 29, for operating the hammer, in its connection with the button riveting machine, substantially as described.

Fourth, We claim the combination of the punch stick, K, casing, J', punch, M, and spring, K', constructed, arranged and operating substantially as described.

Fifth, We claim the button chamber, L', in the bottom of the punch stock, substantially as described.

Sixth, We claim the button chamber, L', in combination with the centering tube, J', constructed with a centering end, M', substantially as above described.

Seventh, We claim releasing the rivet from its carriage by the impact thereon of the punch stock, substantially as described.

Eighth, We claim the rivet-carriage, constructed substantially as above described.

Ninth, We claim the hopper in combination with the channel, V, chamber, L', and the feeding slide, W, substantially as described.

Tenth, We claim operating the punch stock by means of the upper arm of the lever, H, substantially as described.

Eleventh, We claim operating the button feeding slide, W, by means of its sliding rod, X, or its equivalent, and the sliding pin, 10, substantially as described.

Twelfth, We claim the combination of the ratchet, G, bent lever, I, 14, and lever, H, substantially as described.

Thirteenth, We claim operating the pawl, I, on the return movement of the lever, H, in the manner and by means substantially as described.

Fourteenth, We claim the cross heads, 18 and 19, constructed as described in combination with the standards, S S, and Q4, and cam, E, for the purpose described.

Fifteenth, We claim operating the cam by means of the pawl, I', on the lever, B, and the ratchet, G, on the cam shaft, substantially as described.

Sixteenth, We claim operating the rivet carriage by means of the lever, H, and lever, Y, substantially as described.

46,661.—Machine for Making Heads to Barrels.—John Greenwood, Rochester, N. Y.:

I claim so arranging the clamp heads, C C', upon the swing frame, B, and combining therewith the sliding shaft, D, that the said heads first clamp the boards in place, and then move up to cut the barrel head, substantially as herein set forth.

In combination with the sliding shaft, D, and clamps, C C', I also claim the lever, E, and wedge cam, G, operating substantially as and for the purpose specified.

I also claim the combination of the spring, d, pin, g, and collar, h, with the shaft, D, provided with the cavity, c, slot, I, the whole so arranged as to produce the reaction of said shaft, to separate the clamps, and so as not to interfere with the twining of the shaft substantially as described.

I also claim the disk wheel, M, mounted on the arm, N, and both used in combination with the swing frame, B, and piston wheel, O, in such a manner that the forward motion of said swing frame will bring the two wheels in contact, and the back motion of the frame will disengage them substantially as herein specified.

In combination with the subject matter of the preceding clause, I also claim the spring catch, t, substantially as specified.

I also claim the arms, S S', in combination with the clamp heads C C', and swing frame, B, to operate in such a manner that when the swing frame is drawn back, the said arms will rest under the clamps to sustain the boards, but when moved forward the clamps will clear from them, substantially as described.

46,662.—Collision Brake.—C. B. Guy, Lybrand, Iowa:

I claim a collision brake for railroad cars composed of a double inclined truck mounted on wheels and placed in front of a train, and arranged so that the locomotive or front cars of two approaching trains, in the event of a collision, will ascend the inclined tracks and loose their momentum during their ascent, substantially as herein described.

[The object of this invention is to prevent accidents arising from collisions on railroads, and it consists in the employment or use of a double inclined truck mounted on wheels and placed in front of the locomotive of a train, the locomotive being connected to the inclined track in such a manner that it will disconnect itself in the event of a collision and the locomotives and forward cars of the two trains will pass up the inclined tracks and lose their momentum in the ascent.

46,663.—Passenger Register.—Edward Hackett, New-York City:

I claim the roller, E, provided with a spiral groove, g, and marked with alternating figures and ciphers placed in a spiral row to operate in combination with the slide, I, and with the hinged step, A, sliding rod, B, and weight, C, or its equivalent, in the manner and for the purpose substantially as set forth.

[This invention consists in the employment or use of a roller to which an intermittent rotary motion is imparted by connecting it in a suitable manner with the hinged step of a street car, omnibus, or other public conveyance, and which is marked on its circumference with a series of figures placed in a spiral row, and also provided with a spiral groove to operate in combination with an endless apron carrying the indicating slide in such a manner that for each start given to the roller by the weight of a passenger acting on the step the slide is propelled a proportionate distance and a new figure is brought opposite to an opening in said slide, thus indicating the number of passenges passing in and out of the conveyance with perfect accuracy.]

46,664.—Horse Hay-fork.—A. M. Halsted, Rye, N. Y.

I claim a horse fork provided with a shank, C, having an oblong clot, c, for the pivot bolt, d, which connects the shank with the tines, to pass through in connection with the catch, D, in the head, B, and the lip or projection, e, on the shank—all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved trip mechanism for a horse hay-fork—that is to say, a means whereby the fork is held in a position to retain its load while being elevated, and which will admit of being readily manipulated so that the fork may discharge its load when required.]

46,665.—Portable Heater for Liquids.—Wm. A. Hancock, Salem, N. J.

I claim the combination of the heater, A, provided with tubes, B, and the base, C, provided with sockets, C', the heater being adapted to slide up and down within the base and retained at any desirable hight, substantially as and for the purposes specified.

[This invention relates to an apparatus of very simple construction and compact form, especially adapted for the use of soldiers on picket duty, for heating coffee, water or any beverage or stimulant.]

46,666.—Cultivator.—Lorenzo D. Haughey, Atlanta, Ill.

I claim the pivoting of the axle, A, to the draught pole, D, to admit of the lateral movement or adjustment of the plows as set forth.

I also claim the semicircular frame, C, attached to the front side of the axle, in connection with the friction roller, F, and bolt or rod, G, attached to the draught pole, D, substantially as and for the purpose specified.

[This invention relates to a new and improved cultivator for cultivating or plowing corn and other crops which are grown in hills or drills, and it consists in a pivoted axle and a novel construction and arrangement of other parts whereby it is believed that several advantages are obtained over other devices for the purpose specified.]

46,667.—Construction and Hanging of Gates.—J. Healy, South Dansville, N. Y.:

I claim the gate above described, constructed and applied substantially as above set forth.

[This invention has for its object to produce a gate which may be opened from the right or left-hand sides, and suspended at different hights above the ground to allow small animals to pass beneath, and which may be lifted off its points of suspension without making any changes in the gate or its posts.]

46,668.—Pneumatic Drill.—Herman Haupt, Cambridge, Mass.

I claim the method of and apparatus for drilling rock for mining, tunneling, and boring purposes, substantially as herein before described.

46,669.—Apparatus for Folding Paper Collars.—Albert H. Hook, New-York City:

I claim the elastic folding surface in an inclined position on which the knife acts in folding as described, in combination with the gages, m, substantially as and for the purposes set forth.

46,670.—Stove-pipe Damper.—James L. Howard, Hartford, Conn.

I claim, First, Retaining the dampers of stove-pipes in any desired position by means of the elasticity of the pipe, substantially as above described.

Second, I also claim releasing the damper or its axis from the indentations, e, or other device for holding the damper in place, by shortening the diameter of the pipe in the line of the axis of the damper, substantially as described.

[This invention consists in a novel mode of applying a damper to a stove-pipe, wherein the elasticity of the pipe is employed to keep the damper in any desired position, and its flexibility is employed for the purpose of releasing it in order to take a new position.]

46,671.—Breech-loading Fire-arm.—Frederick Howe, Providence, R. I.

What I claim in combination with the hinged breech piece is constructing the hammer and the latch bolt substantially as herein described, that they shall act as a stop to prevent the closing of the breech unless the hammer be first drawn back as set forth and for the purpose specified.

And I also claim the special construction of the wing for drawing out the cartridge cases from the barrel with its flanches fitted to sockets in and combined with the breech piece, as herein described.

And I also claim making the hinged swinging breech piece hollow to receive and contain the mechanism of the lock, in combination with the abutting shoulders at the sides to resist the recoil by abutting against corresponding shoulders in the mortise of the surrounding metallic case, as and for the purpose described.

46,672.—Steam Engine.—W. Huston, Wilmington, Del.

I claim, First, The cylinders, E E* E' E'*, secured to the ends of heads, D D', mounted on eccentric shafts, C C', and operating in combination with a common piston rod and pistons, F F* F' F'*, in the manner and for the purpose substantially as set forth.

Second, The use of the compound piston rod, G, constructed as shown in figures 7 and 8.

The disk valves, H H', applied in combination with the revolving heads, D D', and with the common starting and reversing bar, I, in the manner and for the purpose substantially as described.

[This invention consists in an engine composed of four cylinders which are secured one to each end of two heads mounted on the ends of two shafts which are parallel but not situated in line with each other and coupled together by a compound piston rod, moving in suitable guide grooves in said heads in such a manner that each pair of cylinders revolve in a true circle around the shaft to which they are connected, but the pistons of one set of cylinders act eccentrically on the shaft of the other set, and vice versa.]

46,673.—Well Borer.—Walter Hyde, New York City:

I claim, First, The pulley, c, arranged in the oscillating lever, C, in combination with the drill rope, E', pulley, g, windlass, D, and tappet wheel or cams, constructed and operating substantially as and for the purpose set forth.

Second, The double gear, g h, pawl, j, or its equivalent, and hand crank, i, applied in combination with the drill rope and cams, substantially as herein described, so that the stroke of the drill can be adjusted and the drill raised or lowered while the machine is running.

Third, The shears, I, applied in combination with the platform, A, and sectional drill rod, H, substantially as and for the purposes specified.

Fourth, The use of a double windlass, W W', and adjustable stirrup, S, in combination with the drill rope, E', and bucket rope, E'', constructed and operating substantially as and for the purpose described.

46,674.—Elastic Fabric.—Hector Hyves, New York City:

I claim making an elastic fabric suitable for bed bottoms and other analogous purposes by means of securing the strands to the frame and lacing them to resemble lattice work by passing the adjacent angles formed by the sinuosities of the cord through thimbles or short sections of india-rubber tubing, as described and represented.

[The object of this invention is to produce a fabric which shall be suitable for the bottom surfaces and backs of chairs, settees, sofas, cots, beds, berths, and all manner of surfaces in which it is desirable to combine the qualities of lightness, elasticity, cleanliness, and economy.]

46,675.—Cultivator.—John W. Ingle and R. H. Wright, Livingston, Ill.

We claim the frame, D, attached to the axle, A, by a pivoted bolt, a, and provided with pivoted plow standards, H, connected by rods, k, the segment tears, J K, and levers, L L, in combination with the levers, G G, attached to the frame, D, and draught pole, C, all arranged to operate substantially as and for the purpose set forth.

[This invention relates to a new and improved cultivator designed for cultivating those crops which are grown in hills or drills.]

46,676.—Screw Plates.—John Jennings and George C. Sweet, West Meriden, Conn.

We claim the employment or use of pins, C C, fitted in the plate, A, and provided with recesses, e e, as shown, for the purpose of securing the dies, B B', in the plate, A, admitting of their ready removal from the plates, as set forth.

46,677.—Engine Lathe.—James L. Johnson, Ashburnham, Mass.

I claim, first, The method herein giving to the tool stock an automatic motion back and forth at the termini of the stroke of the slide rest by means of the slide, g, and cam slot, f, constructed and applied substantially as set forth.

Second, The application of adjustable lugs, l, to the hand wheel, d, and screw, b, which serves to operate the tool stock, in combination with a spring stop, k, constructed and operating substantially as and for the purpose described.

46,678.—Broom.—O. W. Kellogg, Ripon, Wis.

I claim the broom above described as a new and improved article of manufacture.

[This invention consists in making a broom for household and other uses by securing the handle in the upper and smaller end of a metallic holder, and the "brush," or other material composing the sweeping surface, in the other end.]

46,679.—Mode of Weaving Button-holes in Fabrics.—Lucius J. Knowles, Warren, Mass.

I claim my improved mode, substantially as described, of weaving a fabric with button holes, the same consisting in weaving alternately of increments of the two marginal portions inclosing the button-hole and running the weft thread on the outside of the fabric between the weaving of any two consecutive increments, the same being essentially as herein before explained.

In combination with my said improved process or mode of weaving webbing with a button-hole, I claim the running of the first and last shoots of the wefts of each increment of a marginal portion between the upper and lower sets of warps, the same being for the objects specified.

46,680.—Whip Socket.—John Lake, Haydenville, Mass.

First, I claim the springs, B, placed within the socket and arranged substantially as and for the purpose set forth.

Second, The plate, C, with the spring, D, underneath it, arranged with the lower part of the socket to operate substantially as and for the purpose specified.

Third, The securing of the socket to the dashboard by means of the springs, E, substantially as shown and described.

[This invention relates to an improvement in the whip socket whereby the whip will be firmly retained therein, and the lower end or bottom of the socket prevented from being broken out or detached under the thrust of the whip when hurriedly shoved into the socket—a contingency of frequent occurrence with the ordinary sockets in use. The invention further relates to an improved mode of attaching the socket to the dashboard of the vehicle, whereby the socket may be readily detached from the dashboard of one vehicle and applied to that of another.]

48,681.—Punch and Die.—William K. Lewis, Boston, Mass.:

First, I claim the pricking needle, F, applied in combination with the yielding center piece, D, die, B, and punch, A, substantially as and for the purpose set forth.

Second, The combination of the center piece, D, and needle, F, separately adjustable in hight, and employed in connection with the spring, E, in the manner and for the purposes explained.

[This invention relates to an improvement in that class of punches and dies which are used for cutting and pricking studs, cups or covers for tin cans, etc., at one operation.]

46,682.—Ice Sandal.—Thomas J. Linton, Providence, R. I.:

I claim an ice sandal, stamped or otherwise, produced out of sheet metal, to fit the sole of a tool or shoe, and provided with a grater surface and lugs, and with a suitable fastening, by which it can be secured to the foot, substantially as and for the purpose set forth.

[This invention consists in an ice sandal, stamped or otherwise, produced out of sheet metal, to fit the formation of the sole of a boot or shoe, and provided with a large number of holes punched in, so as to form beards on the outer surface similar to that of an ordinary grater, in combination with lugs or ears catching over the edges of the heel and sole, and with a series of leather straps or other suitable fastening, in such manner that the sandal can be readily and easily attached to the sole of a boot or shoe, to which it had been fitted, and that by the action of the grater surface a firm foothold is obtained on ice or snow.]

46,683.—Pump.—Thomas J. Linton, Providence, R. I.:

First, I claim the shallow pans, B B', in combination with the reservoir, A, and induction pipe, C, constructed substantially as set forth.

Second, The producing a vacuum in the reservoir, A, by the combined action of hydrocarbon liquid and steam, substantially in the manner set forth.

Third, The arrangement of the water pan, B, and hydrocarbon pan, B', and reservoir, A, whereby the combustion of the hydrocarbon liquid in the pan, B, will vaporize the water in the pan, B, and thereby produce a partial vacuum in the reservoir, substantially as described.

Fourth, The measuring spouts, d d', applied in combination with the pans, B B', and closed reservoir, A, substantially as specified.

Fifth, The method herein described of igniting the hydrocarbon liquid in the pan, B', by igniting a portion of said liquid in the spout and running such ignited liquid into the reservoir, A, substantially as set forth.

Sixth, The drop valve, E, in combination with the ascension pipe, D, induction pipe, C, and reservoir, A, all constructed substantially as and for the purpose described.

46,684.—Red Ink.—Thomas J. Lumnrus, Lynn, Mass.:

I claim the use of a solution of the above-named salt in alcohol or other equivalent neutral spirit, as a red writing ink or fluid, substantially as described.

46,685.—Globe Valve Cock.—F. Lunkenheimer, Cincinnati, Ohio:

I claim a globe valve, in which the nut and stuffing box for the valve stem are made of one piece, or rigidly connected, the same as in an ordinary globe valve, but the nut instead of being provided on its outer surface with a screw thread is turned off smooth, and fitted in the socket of the shell, where it is held by a cap, substantially in the manner and for the purpose set forth.

[This invention consists of a globe valve, in which the nut and stuffing box for the valve stem are made one, the same as in the ordinary globe valve, but the nut, instead of being provided with a screw thread on its surface, is turned off smooth and fitted into a socket in the body or shell of the globe valve, and it is held down by means of a cap fitting over the outside of the nut and socket, in such a manner that when said cap is unscrewed the friction of the spindle in the stuffing box prevents the same from turning in the nut, and the valve can be ground with the greatest ease and precision, the nut itself forming the guide during the operation of grinding.]

46,686.—Washing Machine.—Lansing Marble, Vassar, Mich.:

I claim the cylinder, C, provided with the balls or spheres, a, at its periphery, in combination with the endless apron, I, arranged in connection with the fixed rollers, e' e', all arranged to operate substantially as and for the purpose herein set forth.

[This invention consists in the employment or use of a cylinder, provided at its periphery with balls or spheres placed in rows parallel with the axis of the cylinder, in connection with an endless belt and rollers, arranged within a suds box.]

46,687.—Artificial Leg.—A. A. Marks, New York City:

I claim, first, The oblique boxes, b, applied in combination with the gudgeons of the T-shaped bracket, D, and with the shell of the leg and thigh, in the manner and for the purpose substantially as set forth.

Second, The pear-shaped button, f, in combination with the spring, d, oscillating box, g, and with the bracket, D, applied to the thigh and leg, in the manner and for the purpose substantially as described.]

[An engraving and description of this invention will shortly be published in the SCIENTIFIC AMERICAN.]

46,688.—Trough for Raising Dough.—H. S. McKean, Alleghany, Pa.:

I claim the employment or use of a box or chest, A, provided with a steam pipe, B, arranged substantially as shown, in connection with a dough chest, C, provided with feet, or arranged in any suitable way, so that it may be fitted in A, with its bottom above the steam pipe, or above the bottom of A, for the purpose of raising dough for baking, as set forth.

I also claim, in combination with the box or chest, A, heated by steam, as described, one or more perforated shelves, D, for the purpose specified.

[This invention is designed to facilitate the raising in cold water of dough for bread.]

46,689.—Hot-air Engine.—Henry Messer, Roxbury, Mass.:

First, I claim the arrangement in a hot-air engine of the lower part of the cylinder, the air pump, the fire box and the feed box, substantially as specified.

Second, Also the arrangement of the conduit around the cylinder, substantially as described, for keeping the upper part of the cylinder cool, and utilizing the waste heat.

Third, Also the employment in the unoccupied space in the foundation m, of a hot-air engine, for reception of water, so that steam can be generated by utilization of radiated and conducted caloric, which would otherwise be wasted, substantially as described.

Fourth, Also in connection with the space in the foundation, m, the separation of the cylinder therefrom, by a casing, a, substantially as and for the purpose described.

Fifth, Also dividing the space contained in the foundation, m, of a hot-air engine, by means of the partition, p, when provided with a flange, as shown, by which a tight joint between the partition and covering plate, n, can be secured, substantially as and for the purpose described.

Sixth, Also the grate, as constructed, when arranged with reference to passages admitting air, both with or through it, and with provision for discharging the air between the fire pot and its lining, substantially as described.

Seventh, Also the employment, in combination with cup packing, of springs, by which the cup packing is so held to its place as to operate as designed under pressure.

Eighth, Also in a hot-air engine a tightly-closed fire box, and working all the volatile products of combustion through the cylinder, the injection into the fire box, in connection with ignited solid fuel of combustible fuel, substantially as described.

46,690.—Combined Measure, Tunnel and Faucet.—Henry Mitchell, Richmond, Ind.:

I claim the arrangement, construction and combination of the pipe, B, cylinder, C, measurer, D, and faucet, H, as herein described and for the purposes set forth.

46,691.—Mode of Suspending Burners for Lamps.—Albert Moore and James A. Cole, Northville, N. Y.:

We claim, first, A temporary hinge for lamp burners, operating substantially in the manner and for the purpose specified.

Second, Providing a loop to guide the wick, for the purpose substantially as described.

Third, Hinging the spring, C, to the lower portion of the burner, substantially as shown

46,692.—Knife, Fork and Spoon Holder.—G. Livingston Morse and L. M. Herrick, Harrison, N. J.:

We claim the combination of the hinged rest, A, with the clasp, B C, constructed and employed as described.

46,693.—Tobacco Pipe.—Robert Nagler, Brooklyn, E. D., N. Y.:

I claim the combination of the bracket, B, formed separately from and adapted for the reception of the pipe bowl, A, the sockets, a b, tubes, c d, stem, C, and reservoir, D, when the said parts are constructed and connected, as and for the purposes herein specified.

46,694.—Fruit Ladder.—A. W. Olds, Green Oak, Mich.:

I claim the two holders, A A', in connection with the brace or connecting rod, C, and the support, B, and wheels, d', all arranged substantially as and for the urpose specified.

[This invention consists in constructing a ladder in such a manner that it may be used as an ordinary step ladder for picking fruit, and for other purposes, and be capable of being readily moved from place to place, and also capable of being adjusted so as to form, when desired, a single or continuous ladder, such as are used by house painters and others.]

46,695.—Churn.—James N. Pease, Panama, N. Y.:

I claim the churn, A, placed in a frame, B, mounted on rockers, C C, in combination with the bars, F F, arms or levers, G G, and bar, I, attached to dasher rod, H', all arranged and applied to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved churn of that class which are provided with rockers and have an oscillating motion. The object of the invention is to obtain a churn of the class specified, which will have, in connection with a rocking or oscillating movement, a reciprocating dasher, operated automatically from the rocking movement of the churn, whereby butter may be produced much more expeditiously than by either a rocking movement of the churn alone or with a fixed churn and reciprocating dasher.

46,696.—Artificial Arm.—Jacob Peterson, Canoga, N. Y.:

I claim, first, The use of the flexor cords, f f f, Fig. 1, and the strap, F, for the purpose of closing the fingers and thumb, essentially as above described.

Second, The use of the elastic strap, o, Fig. 4, in combination with the strap, F, and the flexor cords, f f f, Fig. 1, for the purpose essentially as above described.

Third, The use of the hook and eye, marked p, Fig. 5, said cross piece, r, Fig. 5, in combination with the elastic strap, o, Fig. 4, and the flexor cords f f f, and strap, F, Fig. 1, and rod or shaft, X, Fig. 5, substantially as above described.

Fourth, The wrist joint, constructed essentially as above described, in combination with the flexor cords, f f f, and strap, F, Fig. 1, as above described.

46,697.—Spring Catch for Door.—J. Plumer, Boston, Mass.:

I claim, first, The use of rubber in spring catches, when so arranged in reference to the inelastic portion of the catch as to partially or entirely encompass it, and operating by means of its flexibility or bending property in any or all directions.

Second, The combination of the rubber with the catch, as above described, substantially as and for the purposes enumerated.

46,698.—Hot Blast Pipe.—Wm. B. Pollock, Youngstown, Ohio:

I claim, first, The combination of the trunks, B B', with the sectional pipes, C, and connecting pipe, D, arranged substantially in the manner and for the purpose set forth.

Second, The combination of the trunks, diaphragms and section pipes, substantially in the manner described, so that an injured or worn tube or section may be singly removed, and a new one inserted, without stopping the blast longer than merely to make the removal or change of the section.

Third, Making the continuous pipes in sections, and so uniting them with the trunks that any one of the several pipes may expand unequally and independently without fracturing the other, having a different expansion, as set forth.

46,699.—Picture Card Frame.—R. W. Potter, New York City:

I claim a card frame, A B, made in the manner herein shown and described.

Also cutting and embossing the hole, a, in border, B, in the card, A, by one and the same operation, as set forth.

46,700.—Process for Treating Navassa Guano.—Robert Potts, Camden, N. J.:

I claim the within-described process of making superphosphate of lime from Navassa guano, or all guano containing more than 6 per cent of iron and alumina, by sprinkling the requisite quantity of sulphuric acid over the guard, in the form of rain, or as near as possible in that form, while the mass is continually agitated, substantially as and for the purpose set forth.

[The object of this invention is to make a dry superphosphate of lime from Navassa guano, by adding sulphuric acid in small portions at a time, keeping the batch agitated or stirred with such rapidity as to prevent heating as much as possible, and thereby keep the batch dry and granular, ready for sale in a few hours, instead of a wet and sticky mass, totally unsaleable as made by the old process. Secured by patents in the United States and in Europe.]

46,701.—Machine for Washing and Cleaning Clothes, Etc.—Wm. Price, Cincinnati, Ohio:

I claim the combination of the arms, C C, with the horizontal pins, d d, the vertical pins, e e e, and hand lever, D, substantially as and for the purposes herein set forth.

46,702.—Sand-paper Holder.—Jerome Redding, Maplewood, Mass., and Nathaniel W. Redding, Charlestown, Mass.:

We claim, first, The employment, of two pieces, A B, of metal or other suitable material, in connection with a thumb nut and screw, for holding and affording a bearing for sand paper and emery cloth, substantially as herein described.

Second, We claim the deflected parts, b b, and fingers or prongs, b' b', in combination with the guide, A', and guide way, B', the whole being employed to facilitate the application of the emery cloth or sand paper to the holder, in the manner herein explained.

46,703.—Tool for Cutting Off Stay and other Bolts.—Joseph Renshaw, Michigan City, Ind.:

I claim, first, The clasp sleeve for holding the tool to the bolt to be cut, constructed substantially as described.

Second, The combination of the clasp sleeve and the stock, I, substantially as described.

46,704.—Key for Lock.—Edwin Reynolds, Mansfield, Conn.:

I claim a key made with a series of auxiliary bitts, interlocking with the main bitts, and so as to be capable of rotation and operation therewith, in one direction, and independently thereof in the other direction, substantially as set forth.

46,705.—Velocipede Trotting or Pacing Horse.—Harvey A. Reynolds, New York City:

I claim, first, A velocipede trotting or pacing horse, mounted on wheels, and having the axle of the forward or driving wheels provided with reversed cranks, to act on the jointed legs, B B, substantially as explained.

Second, The jointed legs, B C, connected by rods, L, and the latter secured to the stirrups, K, of the axle of the driving wheels, substantially as and for the purpose specified.

[This invention relates to a new and improved toy or velocipede horse for children, and it consists in having the horse mounted on wheels, the axle of the driving ones of which is provided with cranks, having stirrups applied to them, and arranged in such a manner that the driving wheels may be turned by a direct application of the feet of the rider to them.]

46,706.—Manufacture of White Lead.—Wm. Archer and Clinton Rice, New York City:

We claim the continuous or intermittent removal of the white lead from the surface of metallic lead, as fast as desirable, by means of a stationary revolving or reciprocating brush or scraper, applied in combination with a revolving or stationary drum or frame, substantially as described.

46,707.—Method of Preserving Fruit, Etc.—Esek C. Roberts, Salem, Mich.:

I claim, first, The herein-described construction of one or more chambers, arranged with an ice house or fruit house, and surrounding the same with a poor conductor of heat, as and for the purposes herein set forth.

Second, I claim one or more condensers, constructed as described, and placed within the chamber, as and for the purpose specified.

46,708.—Machine for Hulling, Cleaning and Polishing Rice.—Charles E. Rowan, Brooklyn, N. Y.:

I claim, first, The combination of the two concentric cones, D and E, provided with open removable frames, G, and adjustable endwise in relation to each other, in the manner and for the purposes herein specified.

Second, I further claim constructing the rubbing surfaces of steel wires, I, set endwise in the frames, G, as herein shown and described, so as to admit of setting or repairing the rubbing surfaces by tapping the wires from the back, as explained.

46,709.—Knife for Opening Tin Cans.—Charles A. Ruff, Providence, R. I. Ante-dated Feb. 23, 1865:

I claim a knife, provided with a fulcrum to rest or rock on, the tin being cut, constructed and arranged substantially as described.

46,710.—Curry-Comb.—Cyrus W. Saladee, Putnam, Ohio:

I claim the arched frame or back, A A A1 A2, of the curry-comb, in combination with the handle, C C1, in the manner and for the purpose substantially as shown and described.

46,711.—Stirrup.—Cyrus W. Saladee, Putnam, Ohio:

I claim the cross bar, C, in combination with the guard, B, and the stirrup, A, in the manner and for the purpose substantially as shown and described.

46,712.—Stirrup.—Cyrus W. Saladee, Putnam, Ohio:

I claim the cap, A, in combination with the cross bar, F, and stirrup leather, E, in the manner substantially as shown and described.

46,713.—Machine for Pulverizing Sand, Etc.—Joseph G. Savage, South Reading, Mass.:

I claim the machine, constructed and operated substantially as above described, for pulverizing and reducing sand and other material, and sifting the same, as set forth.

46,714.—Machine for Rifling Gun Barrel.—William and Coleman Sellers, Philadelphia, Pa.:

We claim, first, Arranging the movements of a machine for rifling gun barrels in such a manner that they shall take place in a series or order, the starting of each one of the series being dependent upon the final movement of the previous one of the series, substantially as and for the purpose specified.

Second, Stopping the motion of the rifling rod at one end of its stroke, and causing the other movements to take place, as described, while the rifling rod is at rest.

Third, Arranging the driving power of the rifling rod, in such a manner that it shall be able to perform the work required, but will disconnect itself and stop under a strain too great for the rod to bear with safety.

Fourth, The use of a washing box or boxes, substantially as described and for the purpose specified.

46,715.—Liniment.—G. W. Smith, North Whitehall Township, Pa.:

I claim a liniment, composed of the ingredients herein specified, and mixed together, substantially in the manner and about in the proportion set forth.

[This invention is intended as a remedy for such diseases as the sweney in horses, or for other similar afflictions, and when applied twice or three times to the afflicted part it gives relief in a very short time.]

46,716.—Side-hill Plow.—Hannibal B. Smith, Springfield, Mass.:

I claim the combination of the mold board, D, with the share, B, flange beam, A, spring catch, c, and lip, d, or their equivalents, operating substantially as described.

46,717.—Machine for Making Heads of Casks.—E. R. Spaulding, St. Louis, Mo.:

First, I claim the combination in a lathe of the rotating disks or heads, I, the vibrating arms carrying tools for cutting out and chamfering the heads of kegs, and other work of like character, and the sliding table which carries the arms, substantially as and for the purpose described.

Second, I also claim constructing and arranging the chamfering tool stock, and the cutting tool stock, C, in the order and manner herein shown, upon vibrating arms, constructed and operated so as to be adjustable for different diameters and sizes of work, and for different thicknesses of bevel, substantially as above described.

[This machine is especially adapted for cutting out bottoms of pails and tubs and bottoms and heads of kegs. The cutters are set so as to work at right angles to the plane of the stuff, while the chamfering tools or planers are set so as to produce a bevel.]

46,718.—Manufacture of Skirt Wire.—T. S. Sperry, New York City:

I claim the above-described skirt wire as an article of manufacture, consisting of a close coiled covering of wire, with a non-corrosive surface over a central skirt wire, substantially as described and represented.

[This invention consists in the use of thin metal wire in place of cotton or other fibrous materal, for the purpose of covering skirt wire, said wire to be applied by braiding, or simply by winding it on in such a manner that a permanent and durable covering for the skirt wire is obtained, which will effectually protect said wire, and not be liable to pull off or break out.]

46,719.—Lever Buckle.—Leonard A. Sprague, New York City:

First, I claim a lever buckle in which the lever is composed of a single strip, and secured to the hinge bar by means of stoppers cut out of the body of the lever, substantially as set forth.

Second, In lever buckle, operating as described, I claim forming the frame of sheet metal, and corrugating or bending the front or impinged bar thereof, so as to prevent a lever surface to the front edge of the lever, substantially as set forth.

46,720.—Fruit Can.—John J. Squire, Windsor Locks, Conn.:

First, I claim, in jars for preserving fruits, meats and other substances forming pedestals on the bottom thereof, so as to obtain a free circulation of the heating medium beneath them when they are placed in such medium, in the process of putting them up for market, substantially as described.

Second, I also claim the cover, C, formed with projections, c F F', in the described combination with the packing ring, b, and locking bar, E, for the purposes set forth.

[This improvement embraces two particulars, one being the providing the bottom of jars in which fruits, meats or other substances are to be preserved, with pedestals or feet, and the other consisting in a novel method of applying a packing ring to the cover, to make a tight joint with the neck of the jar.]

46,721.—Lock.—Nelson Stafford, Brooklyn, N. Y.:

First, I claim a series of tumblers, swinging in a plane at right angles, or nearly so, to the line of motion of the bolt, and moving with said bolt, in combination with stationary wards, substantially as specified.

Second, I claim the combination of a plate key with a sliding bolt and tumblers, when said bolt is moved by an endless motion given to said key, as specified

Third, I claim the bolt carrying the tumblers, and fitted as specified, in combination with the key and stationary ward bar, as set forth.

46,722.—Binding Attachment for Sewing Machines.—Jacob S. Steiner, St. Louis, Mo.

First, I claim, in combination with the edge turners, e e', the inclosed pressure guide, d, secured to the adjustable plate, B, and arranged and operating substantially in the manner and for the purpose herein set forth.

Second, The spring pressure plate or foot, h, combined with the tapering edge turners, e e', and inclosed pressure guide, d, arranged and operating substantially as and for the purpose herein set forth.

Third, The slides, m m', and guides, i and t, combined and arranged substantially in the manner and for the purpose herein set forth.

Fourth, The employment of the adjustable guide, w, substantially in the manner and for the purpose herein set forth.

46,723.—Piston Packing.—A. J. Stevens, San Francisco, Cala.

I claim the arrangement of a T-shaped ring, E, two L-shaped rings, F, piston head, A, and follower, D, constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention consists in the employment or use of a T-shaped and two L shaped rings in combination with the head and follower of a steam piston in such a manner that the three rings are held in position by each other and by the piston head and follower, and that the L-shaped rings project up over the outer edges of the head and follower and flush with the outer surfaces of the same, and thus an increased bearing surface is obtained between the piston and cylinder, and said piston is more securely guarded than a piston of the same size constructed in the usual manner.]

46,724.—Apparatus for Filtering Liquids.—Robert Stewart, Brooklyn, N. Y.

First, In connection with the filtering chamber, G, I claim the construction and arrangement of the central receiving chamber, K, and hollow shaft adapted to prevent the escape of the vapor and the overflow of the liquid, substantially as set forth.

Second, I claim the distributing disk, L, arranged and employed substantially in the manner and for the purpose herein described.

[The principal object of this invention is to prevent the escape of vapor during the process of distillation, and preclude the possibility of overflow while providing adequate means for the introduction of the liquid.]

46,725.—Boiler Furnace.—Emerson C. Strange and Geo. R. Huntley, Taunton, Mass.

First, We claim the combination of a wind wheel with a series of perforated pipes placed in the walls of a furnace, either above or below the grate bars thereof, substantially as and for the purpose above set forth.

Second, The combination of the open casing, B, provided with perforated pipes leading from a central hub, as described, with doors, F, for shutting off the supply of atmospheric air, substantially as above set forth.

[This invention consists in a new method of supplying mingled or separate currents of air and steam to furnaces of steam boilers and to other furnaces.]

46,726.—Faucet.—Herman Strater, Jr., Boston, Mass.

I claim the arrangement of the sleeve, o o, and the elastic packing, p p, placed within the cap, n n, as described.

Also, in combination with the above arrangement, the metallic packing furnished with an elastic backing, and operating substantially as described.

Also, the stop, m, for preventing the wear of the metallic washer on its backing, as described.

46,727.—Faucet.—Herman Strater, Boston, Mass.

First, I claim the spaces or chambers to which air has free access around the tube through which the liquid passes in such a manner that when a vacuum or partial vacuum is created in the chamber in which the said tube is located by the downward current of the said liquid, the air and liquid will be commingled, substantially as specified.

Second, The combination of the screw plug, h h, extension tube, d d, and in spaces or chambers, g g, arranged and operating with regard to each other substantially as described.

46,728.—Faucet.—Herman Strater, Jr., Boston, Mass.

I claim the arrangement of the traveling socket and extension tube, operating together substantially as described.

46,729.—Stove.—T. L. Sturtevant, Boston, Mass.

I claim a stove provided with an internal heating chamber, B, open at its top, closed at its bottom, and communicating at its lower end with the external air by means of a number of radial tubes, b, which extend across the space or flue, a, between the chamber, B, and the case of the stove, substantially as and for the purpose specified.

I further claim, in combination with the air heating chamber, B, arranged as shown, the perforated plate, D, as and for the purpose set forth.

[The object of this invention is to obtain a stove which will possess a greater heat-radiating surface and greater heat-radiating capacity than any now constructed.]

46,730.—Lamp.—Dexter Symonds, Lowell, Mass.

I claim the thin metal jacket, B, formed with elongated air openings, b b, placed on or around the wick tube, C, and insulated from the latter by means of a non-conducting plug, E, all substantially as and for the purpose herein set forth.

46,731.—Clothes Dryer.—E. B. Taylor, Natick, Mass.

First, I claim the frame, B, provided with the rope, D, and applied to the window, A, substantially as shown, in connection with a clothes frame, F, suspended to B, and provided with cords for the purpose specified.

Second, The construction and arrangement of frame, F, to admit of the revolving of the same, and the winding of the clothes upon it, for its ready application to and removal from frame, B, substantially as described.

[This invention relates to a new and improved clothes dryer of that class designed to be applied to windows.]

46,732.—Attaching Drill Teeth to Seeding Machines.—J. H. Thomas and P. P. Mast, Springfield, Ohio:

We claim bracing a drill tooth or tube to a drag bar by means of a separate brace bar in such a manner as to allow the drill tooth to swing or fold forward without breaking the wooden pin, substantially as and for the purpose set forth.

46,733.—Piston Packing.—Wm. R. Thomas, Catasauqua, Pa.

I claim the double shell, D E, provided with holes, f, in the outside shell, and with a partition, a, and flange, c, in combination with holes, d d, in the head and follower of the piston, and with secondary packing rings, F, and main packing rings, G—all constructed and operating in the manner and for the purpose substantially as herein set forth.

[This invention relates to an improvement in that class of pistons in which steam is used to keep the packing rings in contact with the inside surface of the cylinder.]

46,734.—Composition for Coating Oil Barrels and for other purposes.—Jesse G. Thompson, Carbondale, Pa.

I claim mixing linseed oil with glue as herein described, for the purpose set forth.

46,735.—Machine for Cutting the Curd of Cheese.—Sardis Thomson, Monterey, Mass.

First, I claim the hollow cylinder with the groove fleams, knives, and throats, in combination with the cams.

Second, The semi-cylinder or bed-piece with its grooves, slides, springs, and fleams, in combination with the cylinder.

46,736.—Flexible Forms for Graining, Printing, etc.—Henry Tubesing, Pittsburgh, Pa.

I claim making flexible and elastic forms for printing, graining, etc., of india-rubber or gutta-percha, or a mixture of india-rubber and gutta-percha, with a body or backing of printers' roller composition (glue and molasses), substantially as herein before described.

46,737.—Adjustable Eccentric.—D. F. Walker, Bowling Green, Ky.

I claim the sleeve, h, provided with wedges, g, inclined in opposite directions, and fitted to the shaft, A, by feathers, i, in combination with the disk, B, furnished with an oblong slot, c, and fitted to the shaft by notches, d—all constructed and operating substantially as and for the purpose set forth.

[This invention consists in the use of a grooved sleeve provided with two wedge-shaped projections and made to slide in a longitudinal direction on the shaft which carries the eccentric disk said wedge-shaped projections being made to operate in combination with the eccentric disk in such a manner that by shifting the sleeve on the shaft the eccentricity or throw of the eccentric can be regulated at pleasure without stopping or interrupting the motion of the shaft on which the eccentric is mounted or that of the eccentric itself.]

46,738.—Corn Planter.—C. L. Westbrook, New-York City:

I claim the peculiar A-shaped harrow, or its equivalent, with the plowshare, F, the converging covers, l, the peculiar placing of the share, flexible tube and coverers, together with the arms, k and j, and cross-piece, k, as attached—the whole, as constructed and described, as and for the uses and purposes herein stated.

46,739.—Churn.—Amos Westcott, Syracuse, N. Y.

I claim, First, The use of the funnel-shaped box, T, figure 5, with the method of packing the same, essentially as above described, in combination with the rectangular bars, H, the body of the churn, and the shaft and dasher paddles, as above described.

Second, The method of attaching and securing the shaft, I, figure 3, in the body of the churn, as above described, in combination with the body, rectangular bar, pinion wheel and shaft, as above described.

Third, The method of introducing air into the body of the churn, essentially as above described, in combination with the shaft and dasher, paddles, body, and rectangular bar, as above described.

46,740.—Bolt for Doors.—Amos Westcott, Syracuse, N. Y.

I claim, First, The method of fastening the bolt when the same is thrown out and also when it is drawn back, substantially as above described.

Second, The use of the spiral spring, or other similar device, in combination with the projection, a, figure 2, and the holes in the side of the bolt, substantially as and for the purpose above described.

46,741.—Animal Trap.—Jay Wheelock, San Francisco, Cala.

I claim the lever, G, provided with the plate, H, and spring, I, in combination with the slot, e, in the partition, F, and the revolving platforms, C, all arranged in connection with the box or animal receptacle, A, to operate substantially as and for the purpose specified.

I further claim the bait-box, E, connected to the box or animal receptacle, A, and arranged in relation with the lever, G, partition, F, and revolving platforms C, substantially as and for the purpose set forth.

46,742.—Ox-yoke.—John H. Whitney, Sandisfield, Mass.

I claim the adjustable fulcrum screw, D, and the thumb screw, E, in combination with the bow slides, H, as and for the purposes set forth.

46,743.—Sugar-cane Mills.—E. A. Williams, Columbus, Ohio:

I claim, First, The application of one or more screens to the troughs or side conduits of the bottom plate of a cane mill in such a manner that the juice flowing over the angles formed by the said plate and the troughs into the troughs, b b', will be deprived of cane trash, substantially as described.

Second, The flaring spring guides, J J, in combination with the side fenders, G G, substantially as described.

Third, The combination of the bottom plate with side troughs, crushing rollers, partly overhanging the troughs, and the screens, substantially as and for the purpose set forth.

Fourth, Providing for the removal of the cane trash from both ends of the crushing rollers when the top and bottom plates of the mill are brought in close proximity to the ends of said rollers, substantially as described.

Fifth, The arrangement of guides and fenders as described, or their equivalents, directly over the front trough, b, substantially as described.

46,744.—Self-rocking Cradle.—Horace G. Williams, Hamilton, Iowa:

I claim the operating of a cradle, A, and fan if desired, through the medium of a weight, F, or an equivalent spring, an ordinary clock movement and rocking pallet bar, Q, with its upright, R, engaging with the forked bar, S, of the cradle, in combination with the counterpoise, laterally adjustable, weighted bar, T, substantially as described and represented.

[This invention relates to a new and improved arrangement for operating a child's cradle and fan whereby the use of the hand or foot for that purpose is entirely avoided, and the cradle rendered capable of being perfectly balanced and regulated, so as to operate with greater or less speed as may be desired.]

46,745.—Roasting and Desulphuring Ores.—Riley P. Wilson, New York City:

First, I claim fire-clay retorts, A, in combination with conveyers, C, as a whole or in sections, for the purpose of desulphurizing gold, silver, and other metalliferous bearing ores.

Second, I claim the construction of a furnace in such manner that a series of clay retorts, A, may be placed in a horizontal position side by side, or one above the other, so that the desulphurized ores may be conveyed back and forth during the process of calcination.

Third, I claim the hollow shaft, C, in combination with the retorts, A, as shown herein.

Fourth, I claim the flanges or wings, K, of the conveyers as adjusted to the shaft for the use and purpose herein stated.

Fifth, I claim the use and application of copper or gun metal, or its equivalent, both for a sheathing for the shafts of the retorts, as also for the flanges or wings, K.

Sixth, I claim the introduction of a jet of steam into the retorts in combination with the air; also, the box or vessel, J, containing the salt or brine, substantially for the uses and purposes herein described.

Seventh, I claim the use of a receiving vessel or vat, G, in combination with the mullers or stirrers, g, into which the desulphurized ores collect—said vat being partly filled with water, having a flue or pipe for the egress of the steam into the furnace; a faucet, j, for the extraction of surplus water; a syphon, i, for the discharge of the debris or refuse material, and the faucet, h, for drawing the amalgam.

46,746.—Twin Wood Stove.—Adam Worley, Saint Paul, Minn.

I claim, First, The convexo concave plate, C, and curved or elbow pipe, d, in combination with the inner or fire cylinder, B, substantially in the manner and for the purpose herein described.

Second, The curved or bent partitions, c c, in the receiver, in combination with the inner cylinder, D, and outer one, A', substantially in the manner and for the purpose herein described.

Third, The combination of the stove, A, with the receiver, A', when used with their interior arrangements as described, substantially in the manner and for the purpose herein set forth.

46,747.—Self-centering Chuck.—Thomas H. Worral, Manchester, N. H.

I claim the wedge-shaped jaws, b, and corresponding ways, a, in combination with the spring slide, d, and cap, B, constructed and operating substantially as and for the purpose set forth.

46,748.—Lamp Shade.—Henry Zahn, New York City:

I claim suspending the shade of a lamp from the top edge of the cylinder by means of hooks or straps, a, or by any other equivalent means, substantially as and for the purposes herein shown and described.

[This invention consists in suspending the metal ring which supports the shade by means of two or more straps or hooks from the top edge of the cylinder or chimney in such a manner that said ring does not come in contact with the surface of the cylinder, and that by the current of air passing up between the cylinder and ring the temperature of the latter is kept at such a degree as to prevent the paper shade from being scorched or burned, and at the same time the liability of the cylinder to break is materially reduced.

46,749.—Churn.—Jonn Aiken (assignor to Erastus Wilkins), Warner, N. H.

I claim the combination in a churn of the rocking shaft, B, vibrating lever, C, and adjustable connecting rod, D, attached to the lever by a swivel joint, and to the dasher by a rigid joint, in the manner and for the purpose above described.]

[This invention effects a compound movement of the dasher—that is to say, a change from a horizontal to an angular position during each ascent of the dasher, and from an angular to a horizontal position during each descent, thereby producing a very energetic agitation of the contents of the churn by a slight movement of the operating lever.]

46,750.—Composition for Insulating Telegraph Wires.—Samuel C. Bishop (assignor to the "Bishop Gutta-Percha Company"), New-York City:

I claim a composition for insulating telegraph wire, consisting of gutta-percha or india-rubber and paraffine mixed with either resin and wheat flour, or with a tannate of gelatine and white oxide of zinc, substantially in the manner and about in the proportion herein set forth.

[The object of this invention is a composition which will serve to insulate telegraph wire over or under ground, and particularly under water, and to effect this purpose a composition must be used which is absolutely impervious to water, and which will protect the wire even if the same should be immersed to a considerable depth.]

46,751.—Clothes and Hat Rack.—Charles Bradfield (assignor to himself and Paul Swenson), Newark, N. J.:

I claim, first, The combination of the escutcheons, b and d, connecting bar, c, the whole constituting a shank for the attachment of the hook, D, in the manner explained.

Second, In combination with a hook constructed as above specified, I further claim the bars, A B, and divided sockets, C C, constructed, arranged and employed as described.

[This invention consists of a clothes and hat rack in which there are two rails inserted in a metal socket without fastenings so as to be removable; the hooks being so formed that their shanks fit between the rails and can be made to slide along between them to any desired position.

46,752.—Corn Plow.—S. W. Hammon, (assignor to himself, Joseph H. Lincoln, S. Lincoln and A. P Hammon,) Montford, Wis.:

I claim, first, the two semicircular frames, E C, applied to the draught pole, D, in the manner substantially as shown to form the main frame of the machine.

Second, The axle, A, connected to the draught pole, D, by the pivot bolt, a', in the manner as shown or in any equivalent way to operate as herein described

Third, The toothed segments, C C, arranged as shown in combination with the shaft, F, and bar, H, for the purpose of moving or adjusting the axle, A, as set forth.

Fourth. The attaching of the plows, T, to the standards, S, by means of the stems, h, fitted in bearings, i, the former being provided with nuts, j, and all arranged substantially as described.

Fifth the method of adjusting and holding the frame, k, by means of the toothed segment, N, segment bar, M, and lever, Q, all arranged substantially as set forth.

46,753.—Rudders.—Jonas Higbee, Northport, N. S., assignor to himself and Joseph B. Denton, Newton, N. S.:

I claim the hinged segmental rudders, B B', provided with fins, a a', and applied in combination with the posts, C C', in the manner and for the purpose substantially as herein shown and described.

[This invention consists in the employment or use of two segmental rudders one at the bow and one at the stern and hinged to the lower ends of the rudder posts in combination with pins attached to the surfaces of each rudder in such a manner that said rudders adjust themselves automatically according to the direction in which the vessel moves, that at the rear end or stern of the vessel being turned out in its working position and at the bow or forward end being turned in out of harms way.]

46,754.—Loom for Weaving plush or piled Fabrics.—Samuel Holt, Newark, N. J., assignor to Charles A. Bulkley, New York City:

I claim, first, The levers, k l, attached to the heddles as specified in combination with the tappets, f g h, and levers, i m n, to actuate the warps in the manner set forth for weaving two pieces of cloth with the pile between substantially as specified.

Second, I claim the arrangement of the wheel, v, drum, w, levers, x, and tappets, y, for actuating the center knife, r, by means of the cord or strap, t, as specified.

46,755.—Plow.—Josiah Kilmer, Barnesville, N. Y., assignor to himself and August Kilmer:

I claim a regulator, R, to be employed in combination with the drag chain, C, in the manner and for the purposes set forth.

[The present improvement consists in the application of a regulator, in combination with the drag chain above referred to, in such a manner that the position of the chain can be adjusted instantaneously, according to the force required to throw the stalks, etc., under.

46,756.—Sand Pump for Artesian Well.—Thomas J Lovegrove (assignor to himself and Henry Baldwin, Jr.), Philadelphia, Pa.:

I claim, first, An air chamber, connected to and vibrated with a sand pump, substantially in the manner described, for the purpose set forth.

Second, A chamber connected to and vibrated with a sand pump, to receive the heaviest portions of the detritus passing through the pump.

Third, The combination with a vibrating sand pump of a flexible and extensible hose or discharge pipe, for the purpose of accommodating the movements of the pipe to those of the pump, without lifting the weight of the pipe at every stroke of the pump.

Fourth, The combination in a sand pump of an air chamber next the valve, with a sand chamber above the air chamber.

Fifth, The combination with a sand pump of a sand chamber, hav-

ing an induction pipe projecting above its bottom, substantially as described, to relieve the induction valve from the weight of the detritus, as set forth.

Sixth, The combination in a sand pump of an air chamber, and conducting pipe with a sand chamber, when so arranged that the eduction pipe of the air chamber forms the induction pipe of the sand chamber.

Seventh, The combination in a sand pump of an air chamber, a valve, a conducting pipe, a sand chamber and a discharge pipe.

46,757.—Rock Drill.—Thomas J. Lovegrove (assignor to himself and Henry Baldwin, Jr.), Philadelphia, Pa.:

I claim, first, A rock drill, having its cutting edges sloped with the center to the circumference, and with more cutting edges on one side than on the other, so that the stroke of the drill will tend to force the drill to one side, and thus make a hole larger than the drill, substantially in the manner described.

Second, A rock drill, having a chamber or concavity in its face, surrounded by polygonal cutting edges, substantially in the manner described, for the purpose set forth.

Third, A rock drill, having one cutting edge on one side, three or more cutting edges on the other, substantially in the manner described, for the purpose of cutting both radial and transverse lines, as set forth.

Fourth, A rock drill, having a chamber on its face surrounded by cutting edges, substantially as described, and a channel leading therefrom to the head of the drill, for the purpose of cleaning away the chip at every stroke of the drill, and thus leaving a clear surface to operate upon.

Fifth, The combination of a perforated drill with a flexible hose or discharge pipe, substantially as and for the purpose set forth.

Sixth, The combination of a perforated drill, a valve and a flexible hose, substantially in the manner and for the purpose described.

64,758.—Machine for Cutting Keyseats.—J. C. Morgan (assignor to Wm. A. Nixon and J. S. Everhard), Alliance, Ohio:

I claim, first, Chucking the piece of work, while the key eat is being cut to a slotted mandrel, which may be fixed or movable, substantially as set forth.

Second, Providing the mandrel with a slot, substantially as described, so as to allow the saw to pass through it.

Third, The set screws or guides, a' a', applied in combination with the socket, C, mandrel, D, and saw, E, substantially as and for the purpose set forth.

Fourth, The knuckle, j, and shoe, k, applied in combination with the slide, n, feed screw, f, and saw, E, substantially as and for the purpose described.

[This invention consists in a machine provided with a mandrel, which may be fixed or movable, and on which the piece in which the keyseat is to be cut, can be chucked. This mandrel is slotted, so as to allow the saw to pass through it, and the saw is adjusted at the requisite angle for cutting by a guide or set screws, which hold the lower part of the same in position. The feeding arrangement is composed of a screw with a dog hinged to a knuckle in such a manner that the saw is thrown forward when cutting and allowed to drop back when not cutting.]

46,759.—Piano-forte.—S. T. Parmelee (assignor to Parmelee Piano Company), New Haven, Conn.:

I claim, first, The entire isolation of both the metallic frame and sounding, in the manner and for the purpose substantially as specified.

Second, Combining and uniting the sounding board with the frame, substantially as and for the purpose specified.

46,760.—Cranberry Gatherer.—Geo. Shove (assignor to himself and Chas. Thacher), Yarmouth, Mass.:

I claim the arrangement and combination of the lifting comb, B, in the manner substantially as described, with the receiver, A, provided with teeth, as explained.

I also claim the combination of the partition, b, with the toothed receiver, A, and the lifting comb, B, arranged and so as to operate together, substantially as described.

I also claim the arrangement of the handle of the lifting comb at an inclination as described, with the comb, when such comb is disposed with a toothed receiver, substantially in manner as set forth, the purpose of such arrangement being to cause the comb while being raised upward, to be tilted backward so as to discharge the berries into the space in rear of the partition of the receiver.

46,761.—Heel Polishing Machine.—James M. Thompson, Stoneham, Mass., and Seth D. Tripp, Lynn, Mass., Assignors to Seth D. Tripp, Lynn, Mass.:

We claim, first, The rocking plate, L, in combination with the supports of the rotating disk, J, substantially as above described.

Second, We claim the adjustable arm, M, and spring, N, in combination with the frame, K, which holds the rocking plate, substantially as above described.

Third, We also claim operating the disk, J, and its supports, I H, by means of the treadle, C, and spring, D, substantially as described.

Fourth, We also claim cooling the polishing wheels of machines for polishing heels of boots and shoes by the application of a blast of air to the same, substantially as and for the purpose above described.

Fifth, We also claim the combination in machines for polishing the heels of boots of a grinding and a polishing wheel upon the same shaft, substantially as above described.

[This invention consists in various improvements in the devices for holding the work up to the polishing wheels; in providing two or more polishing wheels which slide upon their shaft and so are brought opposite to the holding devices, and in a method of cooling the polishing wheels during their operation.

46,762.—Repeating Cannon.—Timothy Tufts, Somerville, Mass., assignor to J. H. W. Page, Boston, Mass.:

I claim the combination, composed of machinery for imparting to the magazine its intermittent rotary motion—machinery for stopping the magazine when a charge chamber may be brought in line and in communication with the barrel—machinery for releasing at the proper time the stopping mechanism of the magazine, in order to enable the rotation of the magazine to be effected—machinery for elevating the hammer—machinery for holding the hammer at cock—machinery for discharging the hammer, and finally, machinery for advancing the priming ribbon, and operated by the reciprocating movements of a hand lever or brake, arranged and applied with respect to the stock, substantially as specified.

I also claim the application of the stock to the axle, and the carriage by a compound joint (as described) in combination with the vertical and horizontal screws and their blocks, the whole being substantially as and for the purpose specified.

And in combination with the barrel, the stock and the magazine, and the boxes of its journals, I claim a mechanism substantially as described, for moving the said boxes, so as to maintain the periphery of the magazine in its proper relation to the breech of the barrel.

46,763.—Machines for Planing Buttons.—John G. Valentine (assignor to himself and R. H. Isbell), Naugatuck, Conn.:

I claim, First, The use of a series of cutters, F F, in a rotary head, E, to operate in combination with a clamp, G, secured to a reciprocating slide, H, in the manner and for the purpose substantially as herein set forth.

Second, The springs f, studs, g, and abutment, h, applied in combination with the movable jaw of the clamp and with the reciprocating slide, H, substantially as and for the purpose described.

[This invention relates to a machine for making square or polygonal buttons of bone, ivory, India-rubber, or other suitable materials, and said machine is composed of a revolving cutter head, carrying a series of cutters calculated to shape the face or back of the button and its edges, and operating in combination with a sliding clamp in which the button is fastened in such a manner that by passing said sliding clamp with the button through under the cutter head its face or back and two of its edges are brought to the proper shape, and a large number of buttons can be made with little trouble or loss of time.]

46,764.—Submerged Pump.—J. H. Williamson (assignor to himself and Levi Beemer), Branchville, N. J.:

I claim the tubular post or standard, A, with the two pump cylinders, B B, permanently attached with valves, b, at their upper parts, in connection with the reciprocating yokes, D D, provided with the tubular pistons, F F, having valves, f, at their upper ends, all arranged to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved double-acting pump, and it consists in a novel arrangement of parts, hereinafter shown and described, whereby a very simple and economical pump is obtained, and one which may be kept in repair or proper working order by any one of ordinary ability.]

RE-ISSUES.

1,898.—Machine for Making Paper and Paper Boards.—John F. Jones, Rochester, N. Y. Patented Oct. 13, 1863:

First, I claim forming paper or paper board of any thickness, in a continuous sheet, by adding to the web a succession of any number of layers of pulp, each succeeding layer being added and pressed to the preceding one in the aggregate or compound web, before leaving its felt, and the compound web being subjected to pressure, after each addition of a layer of pulp, substantially as and for the purposes herein specified.

Second, I also claim forming paper board of a continuous or indefinite length, by means of any required number of separate paper-making machines, arranged as a whole or as a combined machine, in such a manner that each separate machine successively deposits a layer or web of its own to form the aggregate layers of the board in the act of formation, or passing through the combined machine, substantially as herein set forth.

Third, The combination of a system of cylinder molds, as herein above specified, and a continuous series of drying cylinders and calendering rolls, in such a manner that the manufacture either of boards of any thickness or of several webs of paper may be carried on by a single continuous process, substantially as herein described.

Fourth, The arrangement of the several spouts, G E J, pipes, c m and j, valve, i², and self-acting feed gate, d, in combination with each other and with the several vats, substantially as and for the purpose herein specified.

Fifth, The saveall, composed of a vat, a cylinder mold, a concher and a scraper, combined and applied in connection with one or more paper-making machines, substantially as herein specified.

Sixth, The combination of press rolls, illustrated by M7 M7 M7, in Fig. 1, to obtain two pressures from three rolls, as herein described.

Seventh, The employment of calender rolls on the top of drying cylinders, substantially as herein described, to equalize the water in the board and make it of uniform dryness as it passes over the dryers, and partially effect the glazing and calendering process while the board is being dried.

Eighth, The cutting apparatus, X Z, operated by the means and in the manner herein set forth.

Ninth, The lay box, Z Z, constructed and operating in the manner and by the means herein described.

1,899—Straw Cutter.—H. K. Parsons (assignee by mesne assignments of Jacob H. Mumma), Harrisburg, Pa. Patented Jan. 26, 1859. Re-issued Sept. 6, 1859. Again March 29, 1864:

First, I claim broadly a knife for use in straw cutters so constructed that its cutting edge shall be on a line with its outer surface, instead of its inner surface—said edge being formed by bevelling or grinding the knife from its inner instead of its outer side; and this I claim whether the whole or a portion only of the body of said knife shall form the arc of a circle coincident with the axis around which it revolves in the operation of cutting.

Second, I claim a knife constructed as above described, and having two under beveled cutting edges—one at its front and the other at its near edge.

Third, I claim so constructing a knife for straw cutters, whether single or double edged, that its cutting edge shall continue to revolve in the same circle when partially worn or ground away as when new, and thus avoid the necessity of adjusting either the knives, the cylinder, or the cutting box, as herein set forth.

Fourth, I claim the reversible feed gear, in combination with double-edged knives, when arranged to operate as herein set forth.

Fifth, I claim the combination of the rubber springs, e, with the feed rollers, H H', when arranged and operating as herein set forth.

Sixth, I claim operating the roller, I, by means of the tappets, g, as and for the purpose set forth.

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Improved Shaft Coupling.

The old-fashioned method of connecting lines of shafting by uniting the several lengths with cast-iron couplings is expensive, clumsy and unreliable. The heads are frequently bored out of truth, have to be heavy to get strength, and in keying on are frequently forced out of line, so that the shafting is also thrown out when the two faces are bolted together. This coupling is a neater and more efficient device

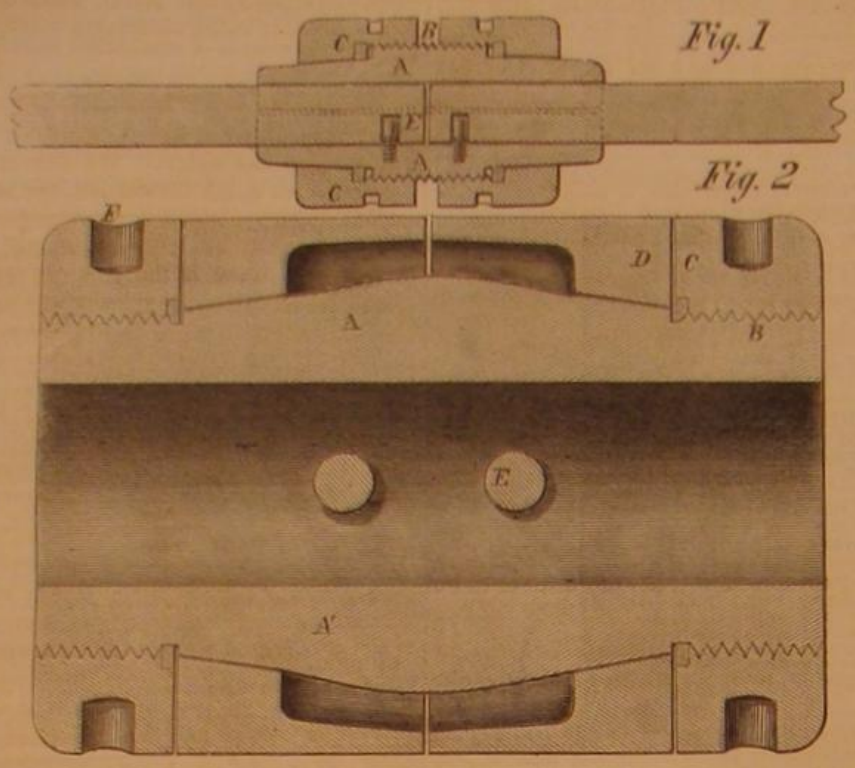


Fig. 1

Fig. 2

COLLINS'S SHAFT COUPLING.

for the purpose than the cast heads; it can also be put on or taken off in half the time, and allows lateral adjustment in the length of the line, all of which renders it useful to machinists and others erecting or running machinery.

In construction it consists of two halved couplings, A, in shape like the brasses in a journal box. These couplings have a thread, B, in the center, over which nuts, C—one on each end—work. The ends of the couplings are tapered, as are also the nuts inside, to correspond, so that when the nuts are drawn up the boxes or couplings are shut together.

Figs. 1 and 2 show two ways in which the arrangement is applied. In Fig. 2 there are center pieces, D, which are cast, if necessary, and forced together by the collar nuts. The pins, E, fit in holes drilled in the shaft so as to cause them to turn; they perform the same office as keys in the coupling, and the holes, F, are for the application of wrenches, should these holes for the pins get worn at any time it is a simple matter to renew them by turning the shaft partly around. This coupling is also much safer where shafting runs in close proximity to thoroughfares or where men are obliged to pass and repass; there are no projecting bolt heads to catch in belts that happen to run off or carry unfortunate individuals around the shafting when their shirt sleeves happen to touch; this often occurs with bolts.

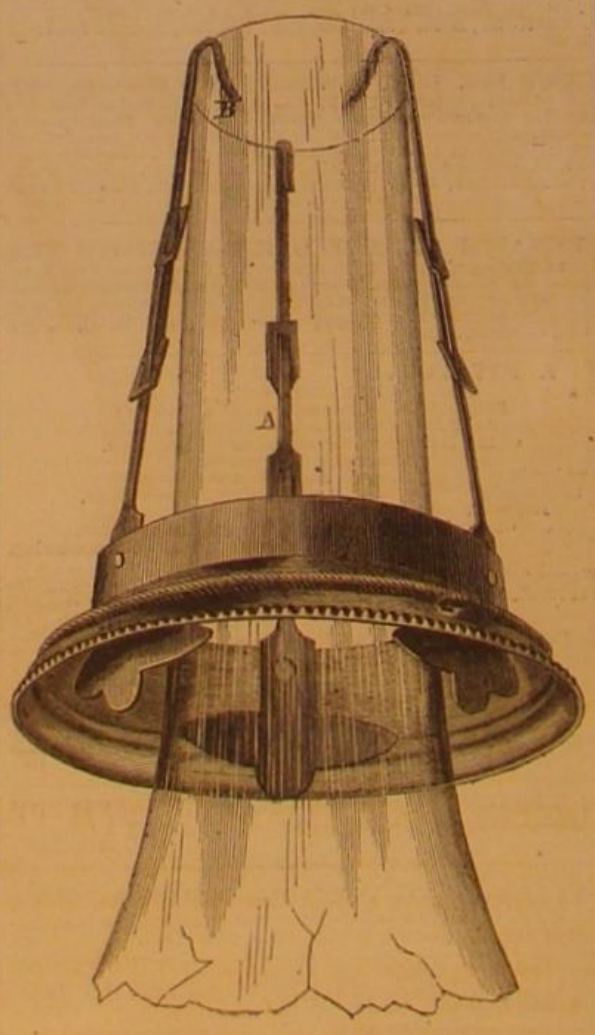
This arrangement was patented through the Scientific American Patent Agency, on the 20th of December, 1864, by James P. Collins, of Troy, N. Y., address him for further information at that place.

Flow of Solids under Pressure.

M. H. Tresca has communicated a paper on this subject to the French Academy, in which he details experiments to show that "solid bodies can, without change of condition, flow after the manner of liquids, if sufficient pressure is exerted upon them." His method consists in operating upon solids composed of separate pieces, the joints of which are known before the experiment begins, and so that their position after the trial indicates the amount and kind of displacement that has been produced. When a block composed of disks was placed in a cylinder and exposed to pressure on one of its bases, in some cases amounting to 100,000 kilogrammes, and allowed to flop through a round hole, concentric with the cylinder, it was found that the plane surfaces of the disks were modified so as to form surfaces of revolution in the jet, which were almost cylindrical, descending into it to greater or less distance, and ending in a cap turning its convexity toward the extremity of the jet. The tubes thus formed were perfectly continuous, and fitted one to each other, so that each line of junction was represented in slices cut at right angles to the axis of the jet. "These lines," says the writer, "show that all the molecules composing the primitive block came individually to take their place in the jet exactly as the molecules of a running liquid do." Mr. Tresca thinks that operations of this kind may explain certain geological cases of intrusion of one rock into another.—*Intellectual Observer.*

ZAHN'S KEROSENE LAMP SCREEN.

Those who use kerosene lamps know that very eat expense occurs from frequent breakage of



chimneys. This accident is especially liable to happen where the common shades are used. The difference in the temperature and conducting power between the metal top of the screen and the glass chimney breaks the latter very often. Sometimes persons forget to apply the shade until the lamp has been lighted for some time; contact with the cold metal of the screen, if it be put on at the time spoken of, is sure to crack the glass immediately. Screens of the ordinary kind are also fixed in one place, and no adjustment is possible, and the hot metal chars or burns the paper of the screen, so that the same soon drops off and requires renewal.

The screen top here shown is a great improvement on the ordinary kind. It can be adjusted, limitedly, so as to be at different hights; this is done by slipping the arms, A, up or down; these arms are like the clasps on spectacles, and operate by slipping in the same way. The hooks, B, by which the screen is suspended, are so small at the points of contact that no danger of breakage need be apprehended, while the liability of scorching, so common in the ordinary shades, is here entirely obviated; so also is the breaking of glasses from striking against the cooler metal. This screen top does not touch the glass at all, being suspended, as shown, so that it is clear all round. This arrangement was patented through the Scientific American Patent Agency on the 28th of December, 1864, by Henry Zahn, of New York city. For further information address him at 79 Chatham street. The entire patent is for sale.

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Scientific American.

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

Vol. XII.—No. 13. (NEW SERIES.)

NEW YORK, MARCH 25, 1865.

$3 PER ANNUM (IN ADVANCE.

Details of Locomotives to be Interchangeable.

Very great advantages would further accrue to railway companies if engines were so constructed that the principal parts could be interchangeable. An engine, when not in the repairing shop, is worth so much per day to a company, which must be lost while idle for repairs. Besides, on the principal lines of railway, a considerable reduction could be made in the staff of workmen required in the repairing shops, if the parts were made interchangeable. These parts should be principally the boiler, framing and the wheels, as each of these, not only being the principal parts themselves, have the remaining portions of the engine fitted to them. By constructing engines so that they could easily be taken asunder, and the faulty parts changed for duplicates, would only necessitate the detention of the engine for a few hours in the shop. But, taking the existing class of engines, the objection which here arises is, that the boiler, wheels, axles, and framing, are so essentially made part and parcel of each other that no one portion is distinct in itself without the other.—*London Mechanics' Magazine.*

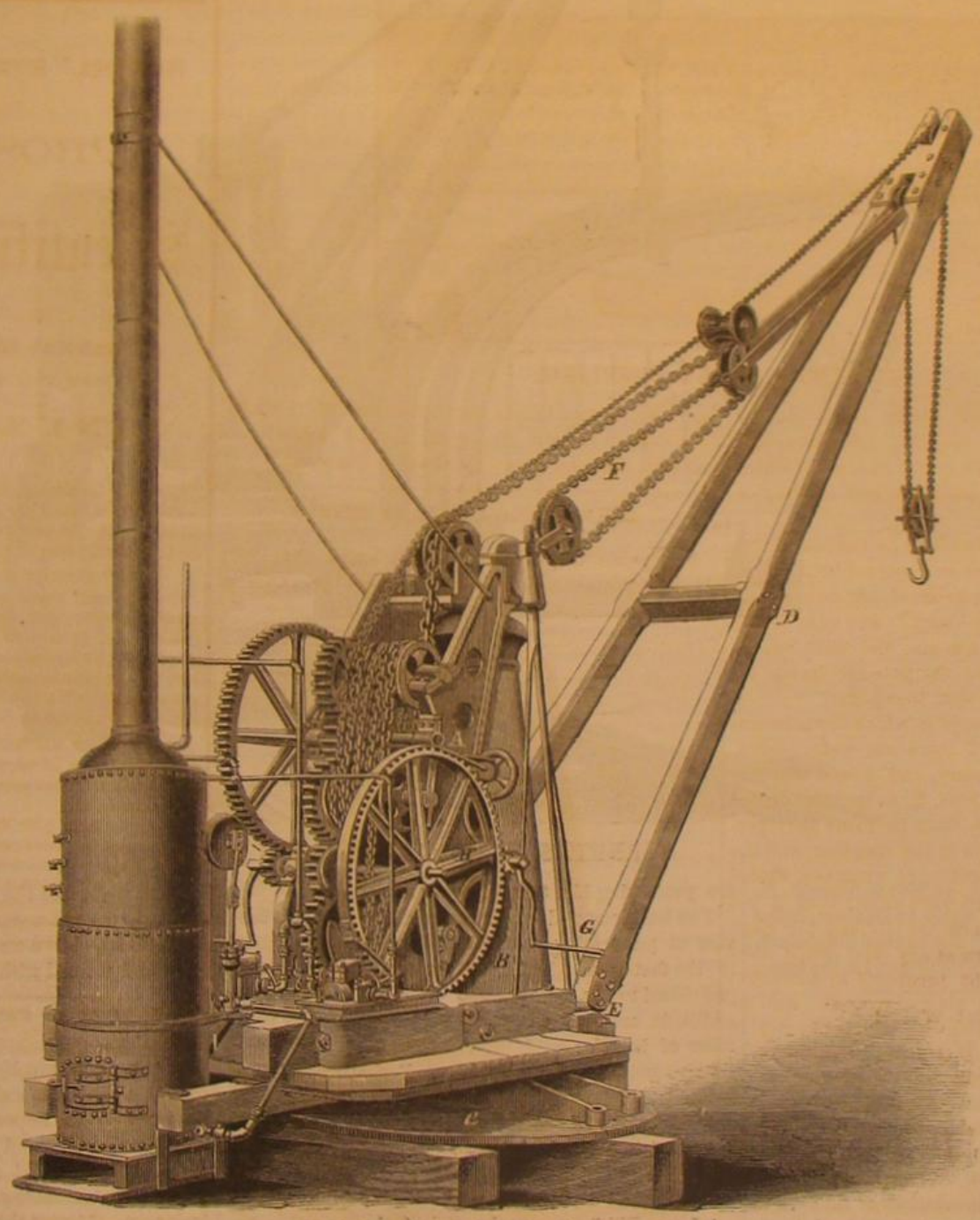
[It is stated that very many locomotives on military roads have been reconstructed in cases of exigency from half a dozen different ones. We have doubted this statement, as we also doubt whether locomotives ever could be made interchangeable, on account of the capricious and unequal wear of the brasses, peculiarities in the positions of the guides, lap of valves, length of eccentric rod to suit the same, and many other practical objections which would militate against such a system.—EDS.

American Tires for Locomotives.

The Boston *Railway Times* has an article on this subject from which we gather the information that our best American tires are better than those of foreign make. Seventy-two engines, whose tires had never been turned, averaged 34,588 miles each, and were still in good order; 190 engines averaged 38,135 miles up to the first turning. On 30 engines whose tires were worn out and removed, being mostly on heavy freight engines with 4 feet and 4½ feet wheels, the total mileage averaged 79,294 miles; 15 of these engines averaged 90,437 miles; 10 of them averaged 97,675 miles, and three of them averaged 125,572 miles.

Traveling Steam Crane.

A most complete and powerful derrick or crane, which is built at the Novelty Iron Works, New York city, by Benajah Burnett, is here illustrated. It is, as may be seen, entirely independent of horse power, being supplied with steam engines and boiler amply powerful to hoist all that the crane is capable of sustaining.



BURNETT'S TRAVELING AND STEAM CRANES.

The main support of the gearing is the framing, A, which is attached to the heavy column, B. The base of this column is at C, and the platform and all the gearing is arranged to swing around the column so as to carry the load and deposit it at any point within the radius of the boom, D. The head of the column, or the cap which revolves, runs on balls, so that the friction is reduced to the lowest point. The boom, C, is firmly jointed at the base, E, to the main framing, and the upper end or head, is lowered by running out the chains, F.

The hoisting gears are multiplied as 28 is to 1, so that the raising power of this crane is very grea for its size and weight. The dimensions of the engines shown in the illustration, are as follows:—The cylinders are oscillating three inches diameter and six inches stroke. The crane will raise the load twenty feet in the clear, and can reach twenty-five feet from the base. Engines of any desired size, with corresponding increase in the strength of the main structure can be built. Several of these machines are now in use in this city and in the West India Islands. At Matanzas, Cuba, there is one, and another in Nassau, and there are many others in different parts of the country. These cranes are made of varying capacities from 20,000 pounds to 200,000 pounds, and the weight of the smallest size is 7 tuns. When small loads are to be raised, or work is to be done for a short time only, there are winch handles, as at G, on which men can operate. By transferring the handle to the square on the large spur wheel, H, a light weight can be quickly raised, thus adapting this crane for the smallest as well as the heaviest work.

Burnett's Traveling Crane.

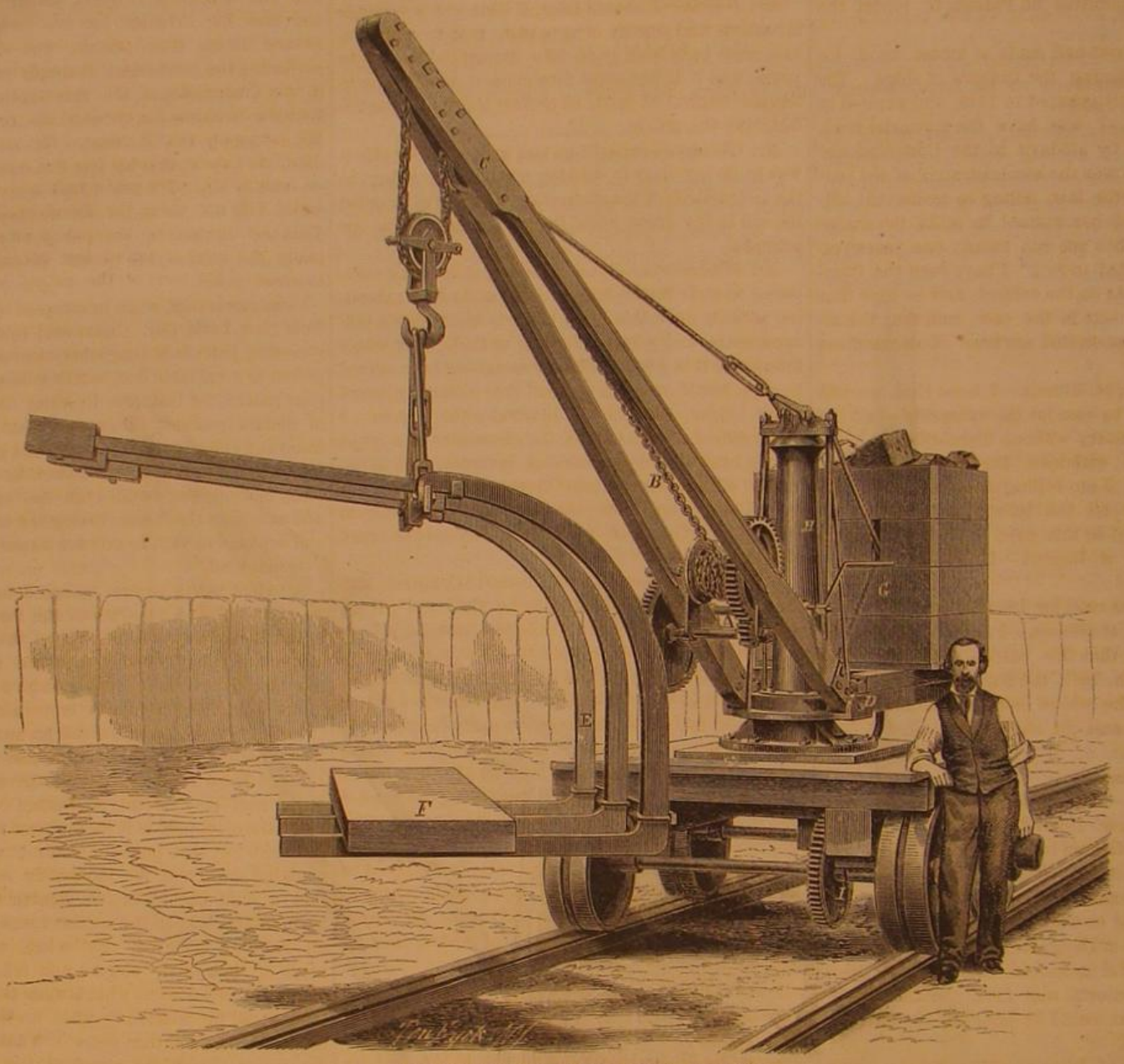
The machinery of this crane is very simple, and its chief recommendation is the facility with which goods can be removed from one place to another without dropping or depositing the load. The gearing, A, by which the weights are raised, is similar to that on ordinary cranes, and the hoisting chain, B, is led up over a boom, C, which is jointed at the bottom, D, so that it can be raised or lowered. The rigging, F, is composed of heavy iron bars, and is a fixture which was specially designed for handling the plates with which the frigates *Re D'Italia* and *Roanoke* were clad. One of the plates is represented lying on the rack.

The box, G, at the back, is used to counterbalance the weight to be lifted, and is supported by a strong platform springing from the base of the main column, H, which takes the strain of the lift. The boom swings around this column; the casting itself being bolted firmly to the platform of the car.

When this crane has been loaded and is ready to be transferred from the point where it is at work, to some other, the laborers apply themselves to handles, not shown in the engraving, which act on the gear, I, below the platform on the front axle. By means of

a small pinion meshing into this gear they are enabled to run the car and any weight which can be raised by the crane to any point on the track. The car wheels are made with double flanges so that they cannot possibly run off.

These cranes are in use in the West India islands, at Willet's Point, Novelty Iron Works, Continental Works, and C. H. Delamater's, and are adapted for railroad furnaces, mines, etc. Patented February 7, 1865, by Benajah T. Burnett, of Mount Vernon, N. Y. For further information apply to Davison, Stiles & Woolsey, Civil, Mining and Mechanical Engineers, 229 Broadway, who are the sole agents for the same.



BURNETT'S TRAVELING CRANE.

Life at the Oil Wells.

A writer in the New York *World*, who has just returned from Oil City, gives the following graphic and truthful sketch of life, men and manners there:—

Life in Oil City is fast and peculiar. Go into a bar-room, or a sitting-room, and you will find a conclave resembling no other ever assembled on the face of the earth. The representatives of millions of greenbacks and thousand of acres of oil land jostle in company with teamsters, stage-drivers, carpenters, workers at wells, penniless adventurers, adventurers with small capital, nabobs from afar, come to see what "all the row is about," speculators of every class, and democratic people generally. Oil is *the* great leveler. Your neighbor, no matter how wretchedly garbed or how detestably vulgar in his speech and manner, may be so far your superior in money's worth, that, in this community, where wealth is the only recognized aristocracy, he is held to be something more than a simple loafer. Men accustomed to the amenities of civilized society here descend to the plane of off-handed slang absolutely necessary to the establishment of pleasant and profitable intercourse. "Airs" are absolutely of no account whatever. A dignified bearing does not impress. The common courtesies of a business transaction may or may not be required. They will, of course, prevail between gentlemen here as everywhere. But they are not generally valued or depended upon. Men who find that, by the mere strength of their wits, they can make money here as well without a high and graceful bearing as with it, cease to respect it in others. The democratic principle adhered to in the oil business is, that all men are equal. The very trick and essence of money making is to make the man you bargain with believe that you are his inferior, and that you are permitting him to gouge you accordingly.

You have come down to look about you, with the view of purchasing some land. You casually allude to the fact loud. Lo! from the mouth of a greasy individual in the corner, who from his appearance, might, in ordinary circles, be held a coal-heaver or a roller of barrels:

"I've got a few acres up here. Perhaps you'd like to look at it?"

"How many?"

"'Bout two hundred."

"What price?"

"Thousand dollars an acre."

"I say, Bill," (up speaks one of the company to another man in a pair of worn-out boots and a frayed overcoat,) "how much did you git for that there hundred acres?"

"Sixty thousan'."

"Whew! did they look at it?"

"No!"

The oil conversation once started, soon gets into a jumble.

Not until Oil City is left behind does the full magnitude and bewilderment of the oil mining region dawn upon the traveler. The developments along the Alleghany are simply nothing to it. A perplexing maze of derricks is woven thickly along both sides of the stream, from the banks to the bases of the hills. Engine-houses, shanties, offices, tanks, groceries, taverns, embryo villages, give the whole valley an air of activity such as surrounds the machine-shops and manufactories of large cities. Smoke and steam arise; the clanking of machinery and the puffing of engines sound near and far. Sleighs and wagons fill the roads, and are drawn up beside the different wells, where the process of filling and shipping the barrels is going on. Men on horseback and men on foot—hundreds of them throng the crooked ways or linger beside the derricks. Knots of spectators gather to witness the yield of the large wells, or to discuss the prospects of new ones going down. The new wells and the old are easily distinguishable from each other at a glance, the derricks of the former being freshly hewn and white, those of the latter brown and stained with oil.

How to Count Rain Drops.

The Paris correspondent of the *Chemical News* states that M. Herve Mangon proposes to count the drops in a shower of rain in a very simple way. For this purpose he impregnates a paper screen with sulphate of iron, and faces it with a mixture of very finely-powdered nutgall and gum sandarac. Drops of water falling on this screen will make a black spot. If now the screen be placed on a drum which makes a complete revolution in twenty-four hours, successively exposing parts of the screen to the rain, the duration of the shower and the number of drops will be clearly indicated by the black spots; and the time, the space of paper exposed at each moment, and the area covered by the shower being known, the rest becomes a simple arithmetical operation. The apparatus can also be arranged to show the direction of the fall, and also, it is said, to determine the weight of the drops.

The New Haven clock company made 226,835 movements last year, 20,000 of the number being sent to England to be put into English cases and sold to Britons.

The Whipple File Company at Ballard Vale, Mass., make about one thousand dozen files per day by machinery.

DEBATE ON PATENT EXTENSIONS.

The SCIENTIFIC AMERICAN has very freely discussed the subject of patent Extension by special act of Congress, and as it is a matter of considerable public interest we transfer to our columns the debate that sprung up in the House of Representatives just before the close of the last session, on the application of Delia Jacobs for the renewal of a patent for dressing treenails. Mr. Chanler of New York, who was directed by the Committee on Patents to report the bill, said :—

A treenail is a boat-nail made of locust wood, for the purpose of fastening the timbers of ships. The patent was originally granted in 1849, and expired in 1856. If required, I will have the memorial read. She failed to show by affidavit to the Commissioner of Patents that she was the administratrix of the patentee, and, under the law, failing to make that affidavit, the Commissioner refused to make the extension. The patent has not run twenty-one years yet, to which it is entitled to run. I have seen the Commissioner of Patents on the subject, and he says that he remembers the facts in the case, and that the allegations of the memorialist are true. I demand the previous question.

Mr. Washburne, of Illinois.—I hope that we will not be called upon to vote for the extension of all the patents in the country without discussion.

Mr. Chanler.—I withdraw the demand for the previous question. I am willing to answer any question, or to furnish all the information desired by gentlemen in regard to this case.

Mr. Washburne, of Illinois.—Let the memorial be read.

The memorial was read for information.

Mr. Washburne, of Illinois.—I think I understand from the memorial that this case is about this: this patent was issued in 1849, the party to whom it was issued died, and the widow sold out all her right, title, and interest, and got about a thousand dollars for it.

Mr. Chanler.—No, sir.

Mr. Wadsworth.—Seventeen hundred dollars net.

Mr. Washburne, of Illinois.—Seventeen hundred dollars net, the gentleman from Kentucky says. No application was made for a renewal of the patent, and now the widow comes here, apparently with the collusion of the party to whom the patent was assigned, to speculate out of Congress by getting a renewal.

Mr. Chanler.—The memorial sets forth that an application for a renewal was filed, and that everything was done that could be done by the party to secure an extension.

Mr. Washburne, of Illinois.—Why did they wait eight years? Now they come here and say the invention is of great value, and ask us to impose a tax upon our constituents and place the avails in the hands of the assignee. I am opposed to this class kind of legislation. Let us legislate on such matters by a general law and not by these special acts.

And again, according to the statement of the gentleman from New York he has seen the Commissioner of Patents on this matter, who has prejudged it, and if we pass this bill the patent will be renewed anyhow.

Mr. Jenckes.—This is a bill to correct an error in the office of the Commissioner of Patents. The proper evidence was on file, but it was overlooked by the Commissioner of Patents in his decision on the case; and without the action of Congress this petitioner will be without remedy.

Mr. Dawes.—I would inquire of the gentleman from New York whether the patent is still in force.

Mr. Chanler.—No, sir.

Mr. Dawes.—How long since it expired?

Mr. Chanler—In 1863.

Mr. Dawes.—I understand the patent expired in 1856, and I would inquire of the gentleman, what has been the condition of the manufacture of the article since that time? Have not parties, availing themselves of the freedom of this invention from a patent, gone into the manufacture of the article?

Mr. Chanler.—I know nothing in reference to that matter. I only know this case as presented in the memorial. I have no knowledge of the manufacture or of the trade in this article.

Mr. Dawes.—I would inquire if this bill in any way protects those who may have gone into the manufacture of the article recently, and since the patent expired?

Mr. Chanler.—I am not aware that it does.

Mr. Dawes.—I do not know what the facts are, but men may have invested their property in the manufacture of this article, free and open to everybody; and does the gentleman think it right to spring a patent upon them now?

Mr. Chanler.—I should think it was not right, and it was not my object to do that.

Mr. Dawes.—I should infer, if this was a valuable invention and worthy of a patent, that its manufacture must have been gone into during the last eight years; and if it has gone into general use, the gentleman ought, at least, to protect those now manufacturing the article.

Mr. Chanler.—It might be well to do so. My object was to do my duty in making a report according to the instructions of the committee; and I have reported the bill in the form usual in such cases. It can be amended.

Mr. Wadsworth.—I feel some regret in being compelled to state my objection to this system of extending patents upon this little bill. It is a widow's bill, apparently, and a very little bill at that. Her whole interest in it is $300, which her assignees have agreed to give her if we shall extend the monopoly seven years longer. But the bill illustrates the system. I am prepared now to exhibit the generosity of a great people toward any meritorious inventor, and to the family of any meritorious inventor, who have not reaped a reward from an invention important to mankind, sufficient to place them beyond the reach of want.

Let the meritorious inventor come to Congress, and show a proper exceptional case for his relief. But I will in no instance vote to extend a monopoly over thirty million people simply to fill the pockets of vendors and assignees and traders who have reaped the benefits of that invention. In nine cases out of ten, as in this case, the persons really interested in the extension of the patent are the assignees of the patentee; those persons who have had in their hands and reaped the benefit of the patent during the greater part of the fourteen years for which these monopolies run, while the inventor and his family have received comparatively nothing. These assignees appeal to the sympathies of members of Congress in order to procure an extension of the monopoly for seven years, and in the sacred name of widow and orphan.

Now, it is with the profoundest regret that I have seen the members of this House so generally indifferent to this thing. I am prepared to concede that the inventor ought to have a monopoly in the first instance, for some sufficient, fixed term; let it be so. But I do most cordially indorse the policy of the act of 1861, which declared that hereafter patents should be granted for seventeen years, and that there should be no extension of such patents. That is a sound policy, and now will this Congress break down the policy estabished by the act of 1861? I am very sorry that the Committee on Patents do not look at it in that way. I am sorry they do not discourage these applications, and do not propose to confine the action of Congress to the policy of 1861, denying severely the extension of patents in all cases.

Mr. Chanler.—Is the gentleman opposed to granting patents, and if not, for how long would he have them granted?

Mr. Wadsworth.—For fourteen years, under the old law; for seventeen years, under the act of 1861.

Mr. Chanler.—This patent has run only fourteen years, and the party, under the old law, is entitled to an extension of seven years. But by no fault of his the application was delayed too long. This is not an application to extend a patent beyond the time allowed by the law. It simply allows the lawful extension of the patent, which failed through the omission on the part of the paid attorney to do his duty. And the argument of the gentleman from Kentucky [Mr. WADSWORTH] amounts to this: that for the purpose of making an argument, which covers thirty-one million people, he insists that a just law shall not be carried out.

Mr. Wadsworth.—I differ with the gentleman about the law. We have no statute, and never had a statute, which, as a matter of right, gives an extension for seven years. We have simply a statute which confers on the Commissioner of Patents a discretion to extend a patent for seven years, when it shall be shown, among other things, that the inventor has not reaped a sufficient reward for his invention, by no fault of his own, during the fourteen years for which it was originally granted.

Mr. Chanler. This is exactly such a case.

Mr. Wadsworth.—The Commissioner is to extend the patent when it shall appear, among other things, that the invention is novel, useful and important, and that the inventor has not derived a sufficient reward for his time, talents, and expenditures, in perfecting the invention. It simply vests a discretion in the Commissioner, the presumption being always that the inventor has received his reward, and that his monopoly should cease. He must make out a case, and show that he has not received it, and by no fault of his. The act of 1861 is a step in advance, which I do not think the House should recede from. That act renounced the policy of extension, and made the term of the patent seventeen instead of fourteen years.

I was remarking, when interrupted by the gentleman from New York, [Mr. CHANLER,] that this policy of renewing patents is altogether vicious. Suppose the patent is a valuable one, worth millions. The Goodyear patent, for instance, in which there are millions of dollars involved. It opens a door to every sort of fraud and rascality to allow such vast private interests to haunt the rooms of the Patent Office or cumber the lobby of Congress, invade even the rooms of members, and subsidize the press, taking the names of widow and orphans in vain to procure a new lease of power over mankind.

A patent worth several million dollars can fight its way through the Department and through Congress in the face of the vital interests of the public; and as a general thing nobody wants an extension of a patent unless it is in such common use as to lay under contribution millions of people. The greater the utility of the invention the greater the slavery to which the monopoly subjects the mass of the people. I do not know but that, in the progress of invention, some man may invent something which, if he be allowed a monopoly of it for fourteen years even, may give him for that period a controlling power over mankind too great for the public safety. Suppose that a man should invent something that would wonderfully cheapen the means of subsistence beyond all hitherto achieved, that would put within the reach of everybody elegant and refined but cheap means of subsistence, what a vast power over mankind could be wielded by that inventor, under his monopoly, for fourteen years! What desperate and dangerous expedients aimed at the administrative officers and the legislative body in such cases does this thoughtless policy of extensions invite!

As is most frequently the case, the inventor, exalted or lost in the rapture of invention, becomes the victim of some scheming trader, who reaps the millions the invention produces. At the end of the term for which the patent was granted, an application is made for an extension. The poverty of the inventor, contrasted with the benefactions his genius has added to the sum of good, is pleaded before the Department and before Congress. An extension is granted and that extension inures to the benefit, not of the inventor or his widow or children, but of some person or persons who have already grown fat, by turning into commodity the necessities of mankind. The principle is wrong. It is the most wasteful and oppressive of modes for removing the poverty of the inventor. To give his widow a pittance we put mankind into circumscription, and levy millions from their necessities. Rather let us double the pittance and set free the business of mankind.

The extension of the patent in this case will probably give to the widow of the inventor about three hundred dollars. Now sir, if this invention is meritorious, and a proper remuneration for it has never been received by the inventor, but his widow and children are in poverty, let us vote the widow $1,000 and liberate from restriction the ship-building of this country. I think it much better that we should do this than grant an extension of the patent, from which the widow would derive $300, while the profits of the extension levied off the people of the country, to a large amount perhaps will go into the hands of some, it may be, mercenary assignee. In no case

would I grant an extension of a patent after the expiration of the term of fourteen years. Yet to the benefactor of the race, or his family, destitute, notwithstanding the blessings his devotion and genius had dispensed, I would manifest, by a fitting testimonial from the Treasury, the gratitude of the people.

Mr. Jenckes.—Mr. Speaker, I wish to say a few words in reply to the position taken by the gentleman from Kentucky, [Mr. WADSWORTH.] He has, as I understand, stated distinctly in his last remarks that, under no circumstances would he agree that a patent should be extended after the expiration of the original term of fourteen years. Yet he admits that there may be made an invention for the value of which to the community the inventor cannot be remunerated by the use of that invention for fifty years.

Now, sir, let me submit a case, for which I ask the consideration of the gentleman from Kentucky, and all who are to act upon this question, and who may be called upon to act on the proposed amendment to the patent laws. Suppose that a valuable invention is patented; that at the expiration of the original term of fourteen years the inventor makes application for a renewal of the patent, under the laws that existed prior to 1861; that he makes out a perfectly just case for extension, showing that he has failed to receive proper remuneration for his invention. There are cases in which the inventor is obliged to part with his interest in the invention during the original term for a very small consideration. There may be, and there are, as we know, cases in which the inventor is unable to introduce an invention during the original term, and even during the extended term. There may be cases in which the inventor has been defrauded out of his patent for the original term. Yet he may be unable to make out at the Patent Office a case entitling him to an extension, under the law of 1836.

Gentlemen will remember that under that law the application for an extension must be made during the original term. Frequently applications have been made very near the expiration of the original term. There was, too, a very stringent provision in reference to the time within which the decision of the Commissioner should be made.

The case here presented is this: a perfect case was made before the Commissioner of Patents, the only officer under this Government having the right to grant an extension of patents. He overlooked a portion of the evidence actually on file. He has since certified that if he had had knowledge of the existence of that evidence his decision would have been different. The fact that he overlooked it is presumptive evidence that his action worked injustice. In the present state of the law there is no power, no officer under the Government, who can correct a mistake of that kind. It comes here just as a motion for a new trial would come before a court. We are the court of correction for this kind of errors. We ought to have another and a different kind, I agree, but we are that court as the law stands.

Mr. Dawes.—Mr. Speaker, I desire to put a case to the gentleman from Rhode Island to ascertain the precise position which the Commissioner of Patents takes on this point. Suppose a man parts with his property in a patent voluntarily for a consideration less than it has proved to be worth, either because he did not himself comprehend its true value, or from necessity he was compelled to part with it for a small sum, and that his assignees, deriving title from his voluntary act, have made immense fortunes out of it, I ask whether he stands in any other position than any other man who parts with his property for a less sum than that property is worth. I ask whether the Commissioner on Patents proposes to extend to the original patentee the further use and monopoly of his patent upon the ground that the patentee himself has been unable to realize a remuneration sufficient to him compared with the vast benefits to the Government, while the assignees, by his voluntary act, have reaped a rich demand.

Mr. Chanler.—I must renew the demand for the previous question.

Mr. Jenckes.—I wish to say that the question of the gentleman from Massachusetts is based on a misapprehension of the law under which a patent can be extended.

Mr. Chanler.—I renew the demand for the previous question.

Mr. Morrill moved that the bill be laid on the table.

The House divided; and there were—ayes 58, noes 38. So the bill was laid on the table.

SELF-ACTING APPARATUS FOR STEERING SHIPS.

BY J. P. JOULE, F. R. S.

[From the Mechanics' Magazine.]

At a meeting of the Institution of Engineers in Scotland, held on the 18th ult., the following paper on the above subject was read:—

Some investigations in which I have been recently engaged have led me to the construction of magnetic needles having considerably greater directive power than those in common use. It has occurred to me that it might be possiole to apply the power, thus increased, to the purpose of the automatical steering of ships. My idea is, to suspend a large compound system of needles or magnetic bars in the way first described by Professor Thomson, viz., by threads or fine wires attached above and below the system. By means of an electro-magnet relay, it would be possible to start a powerful machine in connection with the tiller whenever the ship deviates from a prescribed course.

Suppose a system to be composed of a thousand 4-inch bar magnets, each ¼ of an inch in diameter, arranged in a vertical column, say 5 in breadth and 200 in hight. According to a rough estimate I have made of the directive force of such a system, I find it to be equal, at one inch from the axis of revolution, to 300 grains, when at right angles to the magnetic meridian. This corresponds to 31 grains at 6° deflection, and 5 grains at 1°. Five grains would be amply sufficient to overcome any resistance to motion offered by a mercury commutator, and 30 grains would be more than sufficient with a properly constructed solid metallic commutator. I would have a bent wire affixed to the lower end of the system of magnetic bars, one extremity of which should be immersed in a central cup of mercury, and the other should dip in one or the other of two concentric semicircular troughs of mercury exterior to the central cup. I would place the central cup in connection with one of the poles of a voltaic battery. The other pole must be in connection with a branched conductor leading to two electro-magnets. The free wires of these electro-magnets should be put in connection with the semicircular troughs. By this arrangement it is obvious that accordingly as the wire carried by the magnetic system is immersed in the one or the other of the semicircular troughs, one or the other of the electro-magnets will be excited. An armature should be placed between the two electro-magnets, so as to reciprocate between them whenever the wire passes from one semicircular trough to the other. In so doing, I would have the armature suitably connected by levers, etc., to operate on easily acting valves (throttle valves for instance) placed in steam pipes proceeding from a steam boiler to opposite ends of a cylinder. A similar arrangement might be made for working the exit valves. The piston of this cylinder should be connected with the tiller in such sort that whenever the ship turns to the right, the helm will be put to port, so as to bring her back to her course.

It is obvious that if the dipping bent wire is in the direction of the magnetic axis of the compound system of magnets, and the division between the semicircular troughs is in the direction of the ship's length, the ship will be kept directed to the magnetic north. By turning the commutator in the direction of the hands of a clock, the ship will at once change to a course the same number of degrees west of north. The use of such an apparatus as I have described would of course be limited to very extraordinary circumstances. In general practice it will be impossible advantageously to displace the intellectually guided hand of the steersman, whose art consists in a great part in anticipating the motion of the ship, and, in heavy seas, in directing the ship so as to encounter them with safety.

In the discussion which followed, Professor Rankine said that from Dr. Joule's description of this contrivance it appeared to be practicable, and that it would work when executed. The shifting of the tiller by the action of the steam applied to a piston was a practice already known. The new part of this invention was the self-acting method of operating upon the valve, which regulates the admission of the steam to the cylinder. Now, although Dr. Joule had said that it keeps the vessel in a particular course in calm weather, but would require the assistance of a helmsman in rough weather, yet he believed it would turn out to act just as a skillful steersman did. The steersman in crossing a wave allows the ship to fall off a little, and then brings her up again; and that was what he thought this contrivance would do—it would allow the bow of the ship to fall off a little at one time, and bring it up at another, and would always correct the deviation. He thought that in practice it would be found to do everything that a skilful helmsman does in crossing the swell of the Atlantic. The fact was, that he had a better opinion of its practicability than Dr. Joule himself seemed to have.

Dr. Joule remarked that a great improvement might be made in the compasses of ships. In coming from Liverpool that morning by steamer, he observed the mate "tapping" the compass to get it to work. Now, he had no confidence in a compass that required tapping. He thought there was no plan equal to that Professor Thomson had introduced, having the instrument fixed at the top and bottom to a filament. With regard to the combined magnets, it was simply using a pile of bars or magnets, so as to increase the power. The bars might be circular, or flat, or otherwise; and as to the number, suppose there were five to begin with, four inches long, and half an inch asunder, they could be piled up so as to give a directive power many times as great as that of one magnet. The oscillation was nearly the same as when only using one, although the power was increased. The magnets could be continued up to any hight desired. The oscillation would be at the same speed as a light bar; but there would be power to set in motion a relay, which, communicating with the valves, would let off and on the steam.

Professor Thomson said he felt much interested in the degree of separation of the bars. In his endeavors to control the pendulum of St. George's Church clock by an electric current from the Observatory, he adopted the plan of forming a magnet of a number of bars of watchmaker's rod steel, but he did not find the directive power increased in proportion to the number of the bars; for instance, he found that a magnet composed of 69 bars did not give more than about 12 times the power of a single bar. It would be supposed that 100 bars would have 100 times the directive force of a single bar, but he found that when placed close together they demagnetized each other temporarily to a large degree, and recovered their previous magnetic strengths when separated. It thus appeared that the power depended on the distance they were placed apart, so that if they were placed on the principle adopted by Dr. Joule the power might be increased five or six fold. The advantage of separating the bars even a small distance was great; and, if circumstances permitted that they could be separated widely then the power was still further increased.

Mr. J. W. Lawrie asked how it would do to separate them two or four inches.

Dr. Joule said that depended on the length of the bars. His bars were four inches long, and separated half an inch.

The President asked how, with the method of suspension described, the magnets could be kept in a vertical plane when the ship rolled?

Dr. Joule said that he had no doubt that difficulty might be got over.

Mr. Lawrie said that if the suspending filaments were long it would be impossible to keep them quite straight. There would be a sag upon them.

The following note is appended by Dr. J. P. Joule:—I find on trial that a much smaller number of magnets than that I have given is able to work a mercurial commutator. Fifteen 4-inch bars would be amply sufficient to overcome the adhesiveness of the mercury to the wires dipping into it when the deflection is one degree. A similar observation applies to the metallic commutator. Professor Thomson, however, has shown me a far more delicate mode than either of the above. In this plan a single bar magnet is suspended by a fine platinum wire. To one arm of the magnet a platinum wire is attached vertically. Two horizontal parallel fixed wires are placed

on either side of the suspended one. Whenever either of the fixed wires is, by the motion of the ship, brought into contact with the wire carried by the magnet, a current passes to it from the suspending wire. This current excites an electro-magnet relay, by which another current is thrown upon an electro-magnet powerful enough to work the valves of the steam cylinder. Experiments conducted in the Physical Laboratory of the University are quite conclusive as to the practicability of this plan, and demonstrate the possibility of directing a ship by the agency of a needle much less powerful than that of an ordinary compass.

CULTIVATION AND USE OF THE TEASEL.

BY Z. MOSES, MARCELLUS, NEW YORK.

Outside of the eastern states, it is presumed that a large number of farmers are unaware of the existence of the article, although it is used in the manufacture of all woolen cloth, from the coarsest army blanket to the finest broadcloth.

The writer having been engaged for a number of years in growing and dealing in this truly valuable product, believes that a few words relating to its culture and use would not be uninteresting to the reader of the agricultural reports.

Until the last fifteen years the factories were mostly supplied with teasels imported from England and France. At present the American teasel, of better quality than the English variety, nearly supplies the market. The first teasels grown in Onondago county, New York, were raised about thirty years since by an Englishman; and at present, it is believed, they are but little cultivated in this country outside of Onondaga, Madison, and Wayne counties, New York, and some portions of the New England States.

The wild teasel found at our roadsides in certain localities is of foreign derivation, and by some botanists is thought to be the original of the cultivated teasel; but it differs from it in this respect, that the points of the burs are straight and flexible, and are useless to the manufacturer, while the plant itself is a great annoyance to the careful farmer who would have his premises in a neat condition.

The teasel of commerce is a European plant greatly improved by cultivation. It is biennial; has a fleshy root which branches and tapers; an erect, furrowed, and prickly stem, branching near the top, five or six feet high; entire leaves springing on the margin and surface, those on the stem opposite and joined at the base, and generally filled with water. Scales, recurved at the apex, surround each of the florets, which are aggregated on burs from 1½ to 4 inches long; when the flowers have faded, these receptacles, having dried and hardened, and possessing elasticity, give the mature heads the value for which the plant is cultivated. The harder and more elastic the heads, the better the quality of the teasel; hence the farmer should select a stiff, strong soil, which is found to be most desirable for the purpose. Good wheat land is generally good teasel land.

Teasels are liable to be winter-killed in extreme cold weather unless protected by a covering of snow. From present appearances, it seems probable that in the State of New York one-third of the teasel plants were killed during the past winter from this cause. When the plants are very small they are sometimes in danger of drying or burning up from extreme hot weather. Continued warm wet weather is unfavorable to this crop in July, after the blossoms have set, softening and rusting the burs.

The seed is planted from April 25 to May 20 in drills 3½ feet apart, and covered by rolling or brushing. They are cultivated and hoed for the first time about June 10, and should be kept free from weeds during the season. The first year they spread out near the ground, similar to a bull thistle. (Teasels were formerly called "fuller's thistles.")

The second year they are hoed once during the month of May, and thinned from eight to twelve inches apart; where the plants have been winter-killed, the spaces are sometimes filled by careful transplanting. The plant rapidly shoots up and soon attains a hight of from five to six feet, branching out in different directions, bristling with teasels, which blossom and ripen from the first to the last of August; those at the top of the stalk, and the largest, are called "kings," and are cut first; the "middlings," or "mediums," grow on the end of the branches, and are cut next; the "smalls" at the sides of the main branches are cut last.

The cutting may be done by men and boys, gathering into baskets, using small hooked knives. Stout clothing and long leather gloves should be worn. An expert man will cut ten or twelve thousand per day of the first and second cuttings.

The crop must be carefully assorted and cured in barns or sheds by spreading them on rails, and should be frequently handled with large wooden forks to prevent heating, and also to clean them from seed, which falls out easily; they are then packed in boxes four feet square at the end and ten feet long.

Before using, the spurs and stems are clipped with shears; this can be done with boys' labor at an expense of about 20 cents per thousand. The manufacturers then set them in rows on the periphery of a large broad wheel, which is made to revolve at a high speed, and in such a manner as to bring them in contact with the surface of the cloth which passes over rollers in an opposite direction.

Many substitutes have been contrived of wires and springs, but nothing has been found which possesses the peculiar qualities of the teasel for raising the nap on woolen fabrics, the teasel points breaking off when meeting with knots or irregularities in the cloth which the metallic cards would tear out. It would almost seem as if nature had created this otherwise useless plant for this express purpose. The beautiful symmetry and regularity of the points on the teasel heads, and their wonderful elasticity, seem to mock at the skill of man.

"For art may err, but nature cannot miss."

"King" teasels are used on heavy coarse cloths for overcoating and blankets; "medium," or middlings, are used the most, and on any of our medium grades of woolen cloth; and the "smalls" are used on the fine pant stuffs, doeskin, shawls, etc.

The following table shows the labor expended per acre in raising an average crop of teasels:

	Days horse labor.	Days man labor.
Repairing ground and sowing	2½	1½
Cultivating and hoeing first year	1	7
Cultivating and hoeing second year	1	3
Harvesting an average crop	1	14
Assorting, handling and boxing		1
Total number of days per acre	5½	26½

An average crop is 130,000 per acre, of 10 lbs. per thousand; instances are known where 225,000 have been raised on an acre.

A few years ago 75 cents or $1 per thousand was thought to be a very good price; now, owing to the greatly increased manufacture and consumption of army cloths, and the increased price of the imported article from the increase on gold exchange and the high tariff, the American teasel brings triple the price it formerly did.

As will be observed from the foregoing table, the crop is an expensive one, but at the present high prices it pays exceedingly well. The demand, however, must always be uncertain and limited, depending almost wholly upon the condition of woolen manufactures in this country.

It is to be regretted that no reliable statistics can be found either of the amounts of teasel consumed, imported, or grown in this country.—*Rep. Agr. Dept.*

THE STEAM BOILER ASSURANCE COMPANY.

[From the London Engineer.]

Mr. Longbridge, the Chief Engineer to the Manchester Steam Boiler Assurance Company, has just laid his report for the year 1864 before the Directors. The following extracts will be found interesting and instructive:—

The total number of inspections made by the officers of the company in the course of the year was 23,849, of which 776 were internal, and 2,321 thorough examinations. Although the latter considerably exceed those of any former year, they yet fall short of what is desirable, on account of the comparatively few opportunities afforded; the owners of boilers being, in general, unwilling to allow any stoppage of their machinery for this purpose. The opportunities for thorough examination are, therefore, mostly limited to annual holidays, and the occasional stoppage of works from accidental causes.

The principal defects reported were as follows:—Fracture of plates and angle iron, 484; corrosion of do., 861; safety valves out of order or overloaded, 507; pressure gages out of order, 297, water gages, do., 364.

FRACTURES.

The dangerous defects under this head which frequently occur on the under sides of boilers, near the middle, have been before described; but there are one or two points in reference thereto on which it may be well to say a few words. I have explained that, in the case of boilers with internal furnaces, such fractures are attributable to unequal expansion, and may generally be prevented by so arranging the external flues that products of combustion, after leaving the internal flues, pass first along the under side of the boiler toward the front, and thence return by the sides to the main flue and chimney; also, that the insertion of vertical or diagonal water tubes in the internal flues, by facilitating circulation of the water, are conducive to the same end. That explosion does not more frequently take place when such fractures occur is evidently owing to the internal flues acting as stays or tie rods, and thus relieving the plates of the shell of a portion of the longitudinal strain. With plain cylindrical boilers, however, having no longitudinal stays, the risk of explosion under such circumstances is much greater, and it not unfrequently happens that boilers of this construction explode at the ordinary working pressure, without any previous symptom of defect. In many instances such fractures result from the objectionable practice of running off the water for cleaning before the adjacent brick work has had time to cool. The consequent overheating of the lower plates causes elongation of the boiler on the under side, which then becomes convex in the longitudinal direction. On the cooling of the brick work contraction and another change of form takes place, and the severe straining to which the plates are subjected, by the alternate expansion and contraction, ultimately produces fracture. When such boilers are suspended by bolts and nuts from cross beams or girders, as is common in the North of England, it has been observed, under the conditions mentioned, that the expansion of the boiler on the under side has raised the ends, lifting the nuts by which they had previously been suspended from one-half an inch to three-fourths of an inch above the girders.

Moreover, when repairing such boilers, too little attention is generally paid to the accurate fitting of the plates, and the importance of retaining the cylindrical form. Where holes do not correspond "drifting" is resorted to, and on completion of the repairs the boiler is often weaker than before, the plates being strained almost to the limit of their strength. This accounts for so many boilers of this construction having exploded shortly after having undergone repairs.

CORROSION.

It will be observed that defects under this head are much the most numerous. Many of the boilers inspected have been found in a most dangerous condition, and there can be little doubt that, but for the timely detection of these defects by the officers of the company, the number of explosions must have been considerably increased. The three principal causes of corrosion are these—defective workmanship, dampness of the seating, and acids in the water; the remedies for which are self-evident, and need not, therefore, be repeated.

SAFETY VALVES.

Thirty-one boilers were found working in great danger, owing to the safety valves being entirely inoperative. In many other cases the valves were greatly overloaded, and I must again draw attention to the very prevalent, but most objectionable practice of attaching extra weights to safety-valve levers. For example, I may mention one instance where, in addition to a large weight of 89 pounds attached to the lever of the valve, there were also a piece of 4-inch water pipe, a lump of cast-iron, and a pedestal belonging to the engine, weighing altogether 42 pounds. To another, beside the proper weight, were attached a cast-iron ball, a piece of 4-inch pipe, the flange of another pipe and a piece of wrought iron.

EXPLOSIONS.

The number of explosions, and the consequent loss of life in the past year have been less than in the preceding. In 1863 fifty-one explosions, causing the loss of ninety lives, came under my notice; in 1864 forty-three explosions, with a loss of seventy-four lives.

The following table, though probably not comprising every boiler explosion that occurred, may be accepted as approximately correct:—

	No. of Explosions.	No. of Lives.
Iron-works and foundery	9	32
Coal and other mines	9	11
Locomotive	6	4
Agricultural engine	2	1
Steamboat	1	7
Corn mill	2	6
Saw-mill	2	1
Flax mill	1	1
Silk mill	1	1
Bleach works	1	7
Chemical works	1	0
Cement works, flint mill, brickyard	3	0
House	3	3
Boilers for other purposes	2	0
Total	43	74

As in previous years, it will be observved that iron-works and mines still maintain an unenviable pre-eminence for boiler explosions and destruction of life, but in cotton mills not a single explosion has been recorded for the year 1864.

GUIDE BOOK TO THE OIL REGIONS.

The American News Company has published a guide book to the oil regions in the form of a pamphlet of 95 pages, written by J. H. A. Bone. The author displays a thorough familiarity with all the oil districts, and has produced a work invaluable to all who intend to visit them, and interesting to many others. The following extracts will give a good idea of the contents:

The existence of oil in the valley of Oil Creek, in Venango County, Pennsylvania, was known for very many years. The Indians, from time immemorial, resorted to the valley at stated seasons to gather the oil for medical purposes; and the work of procuring it was prefaced and concluded with dances and other ceremonies. The oil bubbled up in mid stream in many places, and was obtained by throwing a blanket on the water, and, after it became saturated, squeezing the oil into the vessels prepared to receive it. The early settlers also used it as a medicine in cases of rheumatism, and it was frequently sold in druggists' shops for the same purpose, under the name of "Seneca Oil." An article in the "Massachusetts Magazine" for July 1791, describes the oil springs in what was even then known as Oil Creek and says that the American troops, in their marching that way, halted at the spring, collected the oil, and bathed their joints with it. This gave them great relief; and freed them immediately from the rheumatic complaints with which many of them were affected. The troops also drank freely of the waters, which operated as a gentle purge.

About twelve years ago some attention was directed in different parts of the world to the subject of petroleum, or rock oil, and search was made for it in various directions. Among other places Oil Creek became the object of attention, and a company was formed to procure oil from the oil spring, the existence of which had become known to a large number of persons. Nothing was done, however, until in 1858, Col. Drake, of New Haven, Connecticut, visited the valley, and set about sinking a well on Watson's Flats, about a mile and a half below Titusville. The first well was unsuccessful, and another was sunk. This was a success. The drill struck an oil cavity at a depth of seventy-one feet, and on the tools being withdrawn, the oil rose to within five inches of the surface. It was pumped off, and yielded at first four hundred, and afterwards a thousand gallons of oil per day.

As may be imagined, the excitement in the valley was very great. Every one that held land in the vicinity of the Drake well made preparations for sinking wells on his own account, or leased to others a right to sink wells, reserving to himself a royalty of from one-eighth to one quarter the oil. Derricks were hastily put up, and "spring poles" fixed, all of the early wells being sunk by hand. Some of the wells were successful, but by far the larger portion obtained no oil at all, or in such small quantities as to be unremunerative. The demand was small, the use to which the oil was put being as yet very limited. Still, several of the adventurers were making fair wages, when the discovery of flowing wells revolutionized matters. Pumping oil at the rate of five to twenty barrels a day was a discouraging process when, at another well, the oil was running spontaneously as many hundreds as the others were pumping single barrels. The glut of the market, caused by the flowing wells, and the consequent depression in prices, rendered the continuance in operation of the pumping wells a losing speculation, and nearly all of them were abandoned. The lessees fled in despair, in many instances leaving their machinery behind them, and not stopping to surrender their leases. Some of the abandoned wells have since been successfully worked, and more would be, but from the impossibility of getting at the holders of the old leases, and the fear to commence operations lest, at an unseasonable moment, the lessees should return.

The first flowing well ever struck was on the McElhinney or Funk farm. Funk was a poor man when the well was sunk. It was struck June, 1861, and commenced flowing, to the astonishment of all the oil borers in the neighborhood, at the rate of two hundred and fifty barrels a day. Such a prodigal supply of grease upset all calculations, but it was confidently predicted that the supply would soon cease. It was an "Oil Creek humbug," and those who had no direct interest in the well looked day after day to see the stream stop. But, like the old woman who sat down by the river side to let the water run itself out that she might cross dryshod, they waited in vain. The oil continued flowing with but little variation for fifteen months, and then stopped, but not before Funk became a very rich man.

But, long before the Funk had given out, the wonder in regard to it was overshadowed by a new sensation. Down on the Tarr Farm the Phillips Well burst forth with a stream of two thousand barrels daily. Not to be outdone by the territory down the Creek, the McElhinney tract "saw" the Tarr Farm, and "went it a thousand better." The Empire Well, close to the Funk, suddenly burst forth with its three thousand barrels daily, a figure subsequent flowing wells vainly endeavored to equal.

Chinese Chronology.

The Chinese mode of computing time differs from ours mainly because they have never adopted our system of calendar months; theirs are the lunar months; indeed they say, first moon, second moon, and so on. In order that their years may correspond nearly with the revolutions of the seasons, they are accustomed to put in an intercalary month when necessary, and this they do by repeating one of the twelve months; and this year they are to have two fifth months. This accounts for the shifting about of their New Year's day, making it some years earlier than others. They also date letters and business documents by the year of their reigning Emperor, but that year is not measured from the day he began to reign, for if the Emperor ascended the throne in the last month of the year, what remains of that twelvemonth is reckoned his 1st year, and the 1st day of the 1st month of the new year begins the second year of his reign. So in reckoning the ages of children; a child born on the last day of the old year is called 2 years old on the morrow, or New Year's day. The Chinese also reckon by cycles of 60 years each, which cycles were established in the 61st year of the Emperor Hwang-ti B. C. 2637, so that we are now entering the 2d year of the 76th cycle. Each of the 60 years has a particular designation, and this present year is called "Yut Chau," The Chinese also keep account of dynasties. They are now in the "Tai Tring" or "Great Pure" Dynasty, and in the 222d year of it, so that the date of this evening's Bulletin, if fully written out, would be: In the year Yut Chau, (2d year of the 77th cycle,) the 222d of the Great Pure Dynasty, 4th year of the Emperor Tung Chi, First Moon, Third day.—*San Francisco Bulletin.*

Sixty thousand persons in England are dependent on locomotives for their existence, either as makers, drivers or stokers. The locomotives in England had increased from 5,801 in 1860, to 6,398 in 1862, and in about the same proportion since, while the export of English locomotives is steadily increasing.

The *chevaliers d' industrie* of the lower sort in London have invented a new scheme. When a butcher's man has left a house, they enter it soon after with a tray of meat, and telling the servant that the wrong joint has been left, carry it off and never bring a substitute.

Correspondence

Circumference of the Ellipse.

[For the Scientific American.]

Several branches of mechanics and engineering experience the want of a correct mode of finding the circumference of an ellipse. The rules by the books give an approximation to truth only when the difference in the two diameters is small; and the most correct is by the formula:—$\sqrt{4D^2+d^2}+1\cdot11$.

The error in this rule increases with the elongation of the ellipse, and the true test for correctness is to apply it to both extremes of the ellipse, viz:—a circle having two equal diameters and a line with only one diameter. The rule now presented is circuitous but exact. *It gives the diameter of a circle of which the circumference is equal to that of the ellipse.* Rule:—Multiply the decimal ·13662* by the difference of diameters. Let the diameters take the form and office of a vulgar fraction; subtract what the fraction demands from the above product; repeat the process with the remainder; to this last remainder add the mean of the two diameters for diameter of required circle.

Example.

Diameters of ellipse	1	
Decimal		·13662
Difference of diameter		3
		·40986
Subtract	¼	·10246
		·30740
Subtract	¼	·07685
		·23055
Add mean diameter		2·5
Diameter of circle		2·73055
Circumference of ellipse		8·576
Circumference by the formula		9·153
Test for circle diameters:—	1	
Decimal		·13662
Mean of diameter		1·
Circumference of circle		3·1416
Circumference by formula		3·1395
Test for line diameters:—	0	
Decimal		·13662
Mul. by difference of diameters		·13662
Add mean of diameter		·5
Diameter of circle		·63662
Circumference (sides) of line		2.
Circumference (sides) by formula		2·22

Cincinnati, March, 1865. F. W. B.

*More accurately, ·136197697.

Chimney Built Without a Scaffold.

We saw—says the *Shoe and Leather Reporter*—something new at the patent leather manufactory of Messrs. J. H. & T. W. Davidson, at Newark, N. J., recently. They are erecting a new chimney, which will be something over 100 feet high above the level of the ground, and it is being erected without scaffolding; to do away with the necessity for which they have inserted at given spaces bars of iron, which form a complete ladder in the interior of the chimney. The chimney is constructed with an outer and an inner wall, thereby giving an opportunity for a more rapid escapement of heat, and preventing the cracking of the wall so liable in the old mode of construction. The bars of iron and the two walls have given all the facilities required in its construction, and all that will be needed at any time for repairs.

Pyroligneous Acid in Chimneys.

Messrs. Editors:—Your correspondent, D. W. E., of Racine, Wis., complains of the pyroligneous acid which with "moisture condenses and runs down the chimney." He does not say what evil he suffers from it, but I presume it runs along the pipe to the stove, leaking at each joint, making bad work with carpets, producing an intolerable odor, rapidly corroding the pipe, etc.

If this be the difficulty for which he asks a remedy,

I can suggest one. Let him elevate the stove so that the fluid shall run toward the chimney and drop into it. The ashes which always accumulate in the bottom will furnish alkali enough to neutralize the acid, and his chimney will not be rapidly injured.

Vernon, N. J., March 2, 1865. C. A., M. D.

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:—

Photographic Locket.—This beautiful invention consists in producing a new ornament which combines with that character also an elegant souvenir. It is a miniature in gold of a photographic album, with leaves for pictures of friends, so made that each of the golden leaves receives two ferrotypes or other pictures, the number of leaves being varied with the size of the locket. The specimens we have seen contain places for eight miniatures, and are gotten up with great taste, and are chased and engraved with elegant designs. They form graceful "charms" to be worn by ladies and gentlemen. E. N. Foote, of No. 208 Broadway, New York city, is the inventor. The inventor had great difficulties to contend with in order to realize the usefulness of an album, having leaves opening like those of a book, in an article made of gold or other precious metal, and he has triumphed over these difficulties in a way that reflects great credit on his skill and ingenuity. This ornament will be popular both on account of its elegant design and its useful character, since one, with the aid of the photographic artist, can have with him always, in this elegant locket, the faces of his dear kindred and friends.

Condensing and Separating Oils and Gases.—This invention consists in certain improvements in apparatus for condensing and separating oils, liquids and uncondensible gases, in the process of distillation. The modes heretofore in use are liable to serious difficulties from the frequent choking of the condensing pipes or tubes, by the products combined with the heavy oils, such as paraffine and naphthaline, which, when brought suddenly in contact with a cool or refrigerating surface, are apt to solidify, fill up the pipes and obstruct the free passage of the vapors through the condenser, which frequently leads to the bursting of the still, and all its other dangerous results. The old mode of condensation, where the worms or pipes are immersed in tanks of water, are not suited for the condensation of hydro-carbon oils, on account of the difficulty of regulating the temperature of the refrigerating medium in the tanks. With the best attention the old modes are slow in operation and are attended with danger and inconvenience from the escape of uncondensed and permanent gases with the oils and liquids through the discharging end of the condensing worm or pipes.

These are some of the defects of the modes hitherto followed in distilling hydro-carbons. This invention has for its object to remove and to condense the vapors of distillation in a more perfect manner, and to separate the oils and liquids in such a way as to prevent the escape of gaseous matter therewith. Also to prevent the escape of uncondensed and permanent gases from the tail end of the condenser, which have heretofore passed off with the condensed liquid, whereby serious accidents have occurred from their presence in the atmosphere of the apartments where the operations are carried on; moreover, their odor is very offensive, and their inspiration injurious to health. W. G. W. Jaeger, of Baltimore, Md., is the inventor.

Machine for Printing Yarn.—This invention relates to certain improvements for printing what is known by the trade as "zephyr worsted." Such yarn presents a variegated appearance, alternately gray and black or any other desirable colors, one of which is the ground, on which the other is produced by printing. The operation of printing is usually effected by means of blocks, one of which is flat, so as to support the yarn, whereas the other is corrugated and arranged so that if its projecting points are supplied with the desired color and pressed down on the yarn, said color is transferred to one side of the yarn leaving the other side plain. It is obvious that by this method of printing, the desired effect is only partially obtained, and said defect is remedied by this present invention, which consists in printing the yarn simultaneously on both sides by running it through between the fluted rollers, which are supported with the requisite quantity of color by means of ink rollers or color rollers similar to those used in ordinary machines. E. J. Stephens and Hiram A. Green, Pawtucket, R. I., are the inventors.

Combination Pocket-knife and Fork.—This invention consists in combining a knife and a fork with a handle in such a manner that the knife and fork, when not required for use, may be folded or closed within the handle, kept firmly in contact and carried in the pocket with the same convenience as an ordinary pocket-knife, and when required for use, the knife and fork portions rendered capable of being readily detached so that they may be used in the same way as if they were made separately and had no connection with each other. The object of the invention is to obtain a combination of a pocket-knife and fork which will admit of the two parts being readily connected together and secured firmly in a connected state, and at the same time admit of being readily disconnected when required. T. B. Thorpe, of New York city, is the inventor.

Brick Machine.—This invention relates to a new and improved machine for pressing and molding brick and of that class in which the clay is pressed directly into the mold from the mud mill and a reciprocating mold carriage employed.

The invention consists, first, in the employment or use of an elastic pressure arm or blade attached to the lever part of the rotary shaft in the mud mill and arranged in such a manner that it will yield or give to hard foreign substances in the mud mill, such as stones, sticks, etc., and be prevented from being injured or broken.

The invention consists, second, in a novel manner of operating the molds or feeding the same to the place to be filled, whereby abundant time is allowed for the insertion of the mold and the operator or attendant enabled to feed the molds to the press as rapidly as the latter can fill them. John George, Jackson, Mich., is the inventor.

RECENT ENGLISH PATENTS.

Bossert's Combined Album and Musical Box.—The specification of this invention describes an album (especially for photographs) combined with a musical box, in such a manner that on opening the book-cover the music will begin playing, and continue to play until the book be closed, or otherwise. For this purpose a cord or similar connection is attached at one end to a hinged portion of the cover, and at the other to a pin or stud sliding in a slotted bar in the musical box, which is fitted in a recess or chamber contrived at the back of the cover or case containing the album. When this part of the cover is opened the cord works the pin, causes it to act on a lever having a stop at one end, and thereby releases a wheel on the axis of the barrel, and allows the box to play a tune. When the cover is closed the cord will be released, and permit the lever to be brought back by a spring, and the stop drops into the wheel and checks it. The book slides in grooves in the bottom of the cover.

Duffy's Umbrella and Parasol Hand Spring.—The specification of this patent describes the application and construction of a substitute for the wire now used for retaining and releasing the runners or travelers of umbrellas, parasols and sun-shades. This contrivance consists of a lever working in a recess in the stick or handle, in which is fitted a spring. The lever is formed with a projection, and furnished with a stud or thumb piece. When the lever is pressed inward the projection clears a slot in the runner, and allows its being slidden in the desired direction. But when the pressure is removed from the lever, the spring, being relieved, forces the projection outward, and allows it to pass though the slot in the runner, and to retain it.

Instruments for Indicating the Density of the Water used in Steam Boilers.—This invention consists in constructing those instruments in such a manner that they combine within themselves chambers or compartments, each having distinct or separate use or function, namely, a funnel-shaped piece or pieces, into which the water is allowed to fall by virtue of its gravity, whereby the steam is liberated as separated from the water, and ebullition in the instrument is prevented. Induction or supply tubes leading from the funnel-shaped piece or pieces into the bottom of a main tube, such tube being for the purpose of containing the hydrometer and thermometer, and eduction or overflow tubes by which the water overflowing from the main tube is received, and can thence be led away to the bilge or to any place convenient. In constructing such instruments the chambers or compartments may be combined in such manner that they shall form compartments of one vessel with a top or cover uniting the whole; or they may be separate compartments or tubes placed at a convenient distance apart, the necessary connection or communication being still maintained between them.

MISCELLANEOUS SUMMARY.

Diet of the French Workman.—He is up at early dawn. In fact every body rises soon abroad. There is more business done before ten o'clock in Paris than there is in London before eleven. There are two places where breakfast may be had—the *cremerie* and the soup shop. Some excellent coffee, with milk, cost less than ¼d, and the bread with butter 1d. For dinner the soup will cost 1½d; the plate of meat 2d; half a bottle of wholesome wine 4d, or a quarter of a bottle 2d, or a pint of beer or milk 2d, and all of really good quality. In many places they give soup, a piece of mutton or *beef a la mode*, bread, and half a bottle of wine for 60 centimes, or about 11 cents of our money.

New Anæsthetics.—Dr. Genges has addressed a note to the French Academy, giving an account of some interesting experiments in trying new agents for diminishing sensibility. He has ascertained that a purified kerosaline, obtained from common petroleum, when vaporized by means of heat, will be found a most valuable anæsthetic. But he especially commends, as safer than chloroform, Bromhydric ether, which is not only less inflammable than ordinary ethers, but possesses a most agreeable odor.

To keep Maple Sirup.—The Ohio *Farmer* says:—The best way to keep the sirup from losing flavor is to seal it up hot in cans, the same as fruit is sealed in the fall. At this time of year many of the fruit cans are empty and can be used for this purpose. Put up in this way maple sirup will keep for years, and retain that nice flavor it has when first made, but which is lost in a few months if kept in ordinary jugs or casks.

Weak Vision in the Aged.—In the case of aged persons whose sight is becoming enfeebled, and requires the aid of convex glasses great advantage is derived, supposing no nervous lesion to exist, from painting every evening the eye-lids and brow with laudanum, and allowing this to remain all night. So says Prof. Nascar, of Naples.

Coal under the Sea—Coal has been gathered up on the beach at Phippsburg, Me., for many years, and Professor Brackett, of Bowdoin College, thinks that a coal mine extends along the coast from Rhode Island to Nova Scotia, but that the bed of the coal is too far out at sea to be worked. The waves cast blocks of it upon the beach from time to time.

The "Transactions of the American Institute," which was noticed in the Scientific American some weeks ago, is not published for general circulation but for the members of the Association; a limited supply only is issued for the exclusive use of the parties designated.

A Loud Crow.—At the last meeting of the Polytechnic Association, in a discussion on the effect of topography on the sound of bells, Mr. Meyer, of Switzerland, stated that he had heard a cock crow at Wasser, across Lake Geneva—a distance of nine miles.

It is said that the first well in the Pennsylvania oil region was sunk in 1859. On the 28th day of August in that year the first vein of oil was struck at a depth of sixty-nine feet four inches from the surface.

The yield of maple sugar and maple molasses in the Northern States is 31,000,000 gallons annually.

Mr. J. H. Hatton of St. Joseph, Missouri, wishes to procure machinery for making stone ink bottles.

Improved Spring Bed.

"Blest be the man who invented sleep," said Sancho Panza, the squire of the doughty knight of La Mancha, and blest be the man who invented spring beds says every weary and pain racked mortal who reposes on one for the first time.

Common beds are impositions on good nature. They look plump, inviting, and seem to say "here is rest," but when one's body is submitted to them they sink into hollows they rise in ridges and form seams of the most exasperating character in the very spots where none should exist. Spring beds are not given to such vices. Wherever an individual lies he is straightway supported, and from his neck to his heels the yielding couch beneath him falls into rounded curves that bear him up as the sea does a cork.

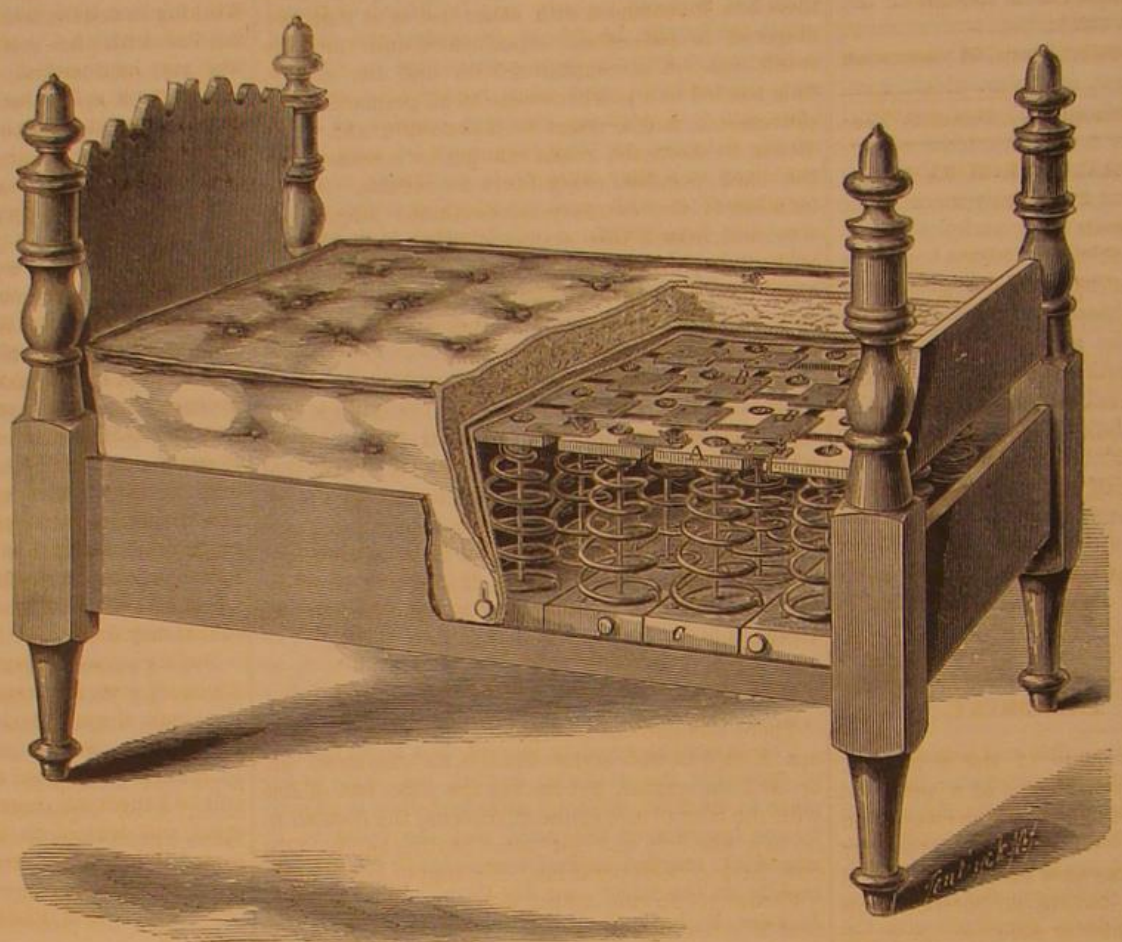
The bed here shown is a very excellent one. It is constructed differently from others of its class, and is so contrived as to afford a soft and luxurious support to the body in any position.

In principle the bed is much the same as others with the exception that each spring has an independent cap or top, A, which is, in turn, secured to its neighbor by flexible straps, B; these latter can be made of rubber or leather, as desired. At the bottom the springs of one section are all attached to a long slat, O. These fit in the bed frame, as all others do. From being made in sections great convenience in transportation is found, for it can be packed in a small compass, and thus save much of the expense for freight; it is also less likely to be injured than where the whole is in one piece. This bed can be used in connection with any ordinary mattress, but the one shown in the engraving is specially designed for it, and incloses all parts, so that dust, dirt and flock are kept out of the interior. When necessary to be cleaned each section can be readily taken out and washed without injury; this is very convenient where *insects* abound.

In this invention a difficulty which has always existed in the construction of spring beds and upholstery has been overcome. It has always been necessary to use the double cone or hour-glass spring to distribute the upward pressure over the entire surface of the chair or bed, in consequence of the shape of this spring—small in the middle and large at the ends—it is weak for its size and weight, and very liable to get bent over, having but little power of itself to maintain an erect position. The inventor of this new bed says that by the use of his cone caps, which work as toggle joints in the top of the springs, and with their flexible connections he is enabled to use the single cone spring, which having a regular angle from the bottom to the top, stands erect under great pressure, and is decidedly less liable to crush down under heavy weight; being untrammeled, except by the guide cones and connecting cords, it is left free to spring up and rise to a perpendicular position when the weight is removed. The cone caps all being securely connected to each other and to each of the springs by cords running down through them, make each serve as a brace to the other, thus forming a complete elastic and durable spring bed.

State rights for sale. Patented through the Scientific American Patent Agency on the 28th of February, 1865.

For further information address the inventor, G. W. Mitchell, at this office; a model can be seen at Lovejoy's Hotel, New York, where he will remain until April 15th, after which date at St. Louis, Mo.



MITCHELL'S SPRING BED.

Implement for Destroying Cannon.

Since the use of cannon in warfare, there never has been a want of opportunities where they could not have been destroyed if necessary to the success of military operations. Cannon have been made temporarily unserviceable by spiking the vent, wedging shot in the bore, breaking off the trunnions, and in similar ways. With the implement here illustrated cannon can be quickly and effectually destroyed at no greater expense than the cost of a shell. At the commencement of the war, when our forces abandoned the Gosport Navy Yard the two or three thousand guns there would never have been used against us, if we had possessed this spiker.

The construction of it is as follows: the main portion, A, consists of wrought iron; this is turned true and grooved on three sides to receive the serrated slides, B. These slides are held in place by the wire, C, slipped over them, and by being fitted in tapering grooves, will accommodate themselves to wide ranges of caliber. The springs, D, give, as the spiker is pushed in butt first or with the teeth pointing toward the muzzle. These teeth have a sharp rake or angle outwardly, so that the least attempt to pull the instrument out causes them to cut into the bore and jam fast. The tapering form of the plug, A, also serves to wedge the cutters out so that it sticks tighter with every attempt to dislodge it.

Fig. 1

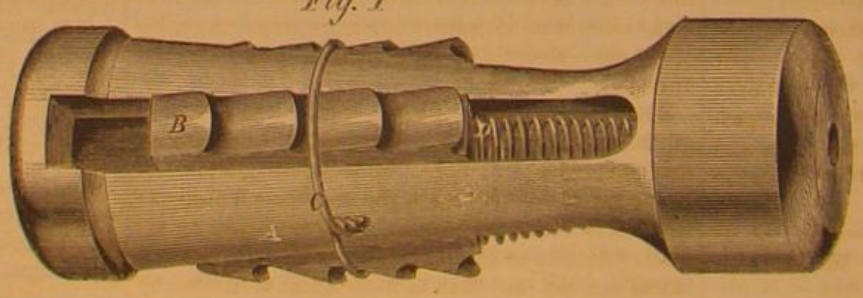


Fig. 2

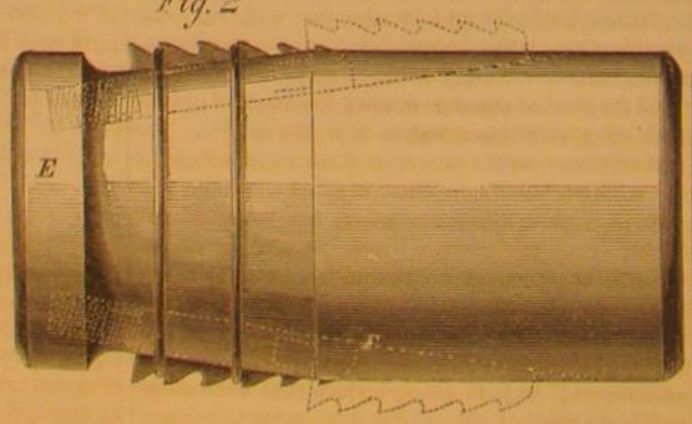


Fig. 3

BONZANO'S IMPLEMENT FOR DESTROYING CANNON.

Figs. 2 and 3 represent a spiker for guns of large caliber; parts on the side are cut away so as to make it lighter and easily handled by one man, and the forward end, E, is of hardened steel so that it cannot be cut or drilled out; the dotted lines, F, show the position of the cutters when the temporary wire is broken and they are pushed back. These spikers can be kept ready for use in the caissons. This invention was first successfully tested by Capt. Gibbs, U.S.A., at Fort Wayne, Mich., and subsequently at the Washington Navy Yard by Admiral Dahlgren. At the last trial the spiker was inserted in a 6·4-inch gun, a bag of 8 lbs. of powder was previously put in the gun.

The explosion moved the spiker 2¼ inches forward, where it lodged. The charge going out at the vent and past the spiker. The gun was subsequently removed to the machine-shop at the navy yard, where all attempts to remove the spiker from its position failed.

The inventor desires to sell the whole patent for the United States, and also invites propositions from responsible parties to introduce this invention abroad. Steps have been taken to secure Letters Patent for this invention in all foreign countries. Patents for it were obtained through the Scientific American Patent Agency, on the 24th of March, 1863. For further information address the patentee, Alonzo Bonzano, Detroit, Mich.

Nothing more forcibly illustrates the superior condition and solid structure of the English railways than the speed of some of the mail trains. The night mail from Euston Square station, London, to Perth, in Scotland, performs the journey—451 miles—in 11½ hours, or at the rate of 40 miles an hour, including stoppages. The mail between New York and Washington—229 miles—goes through in from 11 to 12 hours, being about half the speed of the English mails.

It is evident that neither speed nor safety can be expected upon our railroads until they are rebuilt in a solid and enduring manner; many of the accidents occurring being the result of their bad condition.

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NEW YORK, SATURDAY, MARCH 25, 1865.

Contents:

(Illustrations are indicated by an asterisk.)

Details of Locomotives to be interchangeable..... 191
American Tires for Locomotives..... 191
*Burnett's Traveling and Steam Cranes..... 191
Life at the Oil Wells..... 192
How to Count Rain Drops..... 192
Debate on Patent Extensions. 193
Self-acting Apparatus for Steering Ships..... 194
Cultivation and Use of the Teasel..... 195
The Steam Boiler Assurance Company..... 195
Guide Book to the Oil Regions 196
Chinese Chronology..... 196
Circumference of the Ellipse. 196
Chimney Built without a Scaffold..... 196
Pyroligneods Acid in Chimneys 196
Recent American Patents..... 197
Recent English Patents..... 197
Miscellaneous Summary..... 197
*Mitchell's Spring Beds..... 198
*Bonzano's Implement for Destroying Cannon..... 198
Patent Law Amendment..... 199
Two Causes of the Numerous Railroad Disasters..... 199
Abuse of Machinery..... 199
Travel Beneficial to Workmen 199
Gas from Petroleum..... 199
Charges against the Commissioner of Patents..... 200
Farmers' Club..... 200
Revivification of Animal Charcoal..... 200
Prospective Demand for Corn 200
Flattering a Photograph..... 200
Our Shipping..... 200
Improvement in Blasting..... 200
Patent Claims...200, 201, 202, 203
Notes and Queries..... 204
*Hinman's Arrangement for Storing Hay..... 206
Healing Power in Various Nations..... 206
"A 1"..... 206
How to Catch Curculios..... 206

PATENT LAW AMENDMENT.

On page 87, current volume of the SCIENTIFIC AMERICAN, we discussed the merits of a proposed amendment to the Patent Laws which was then pending before Congress. We are happy to state that the bill in question has now become a law. It provides that any person having an interest in an invention, whether as inventor or assignee, for which a patent was ordered to issue, upon payment of the final fee of $20, but who has failed to make payment as provided in the Act of March 3, 1863, *shall have the right to renew his application* for a patent for his invention, provided such application be made within two years after the date of the allowance of the original application.

This section will afford great relief to hundreds of inventors who have failed to pay the $20 within six months, and it is important that they should be prompt in availing themselves of its provisions.

The rule of the Commissioner of Patents, as applied to such cases, has not yet been issued, but we presume it will be so arranged that the applicant will need only to pay the first installment of the patent fee—$15—using the same model, drawings and specification, whereupon the Commissioner will cause Letters Patent to be issued.

TWO CAUSES OF THE NUMEROUS RAILROAD DISASTERS.

Polly Britain, a simple old woman living in a retired part of the country, once remarked:—"Very few people ever rode on railroads without being killed." If the railway accidents continue to multiply as they have during the last few months, this statement may be made by intelligent men.

These accidents are all the result of mismanagement on the part of the directors. If a competent and efficient superintendent be employed, and if he be supplied with sufficient funds to keep the track and rolling stock in repair, no accident will ever occur. There are long roads in the country that have been in operation more than thirty years without ever killing or injuring a passenger. The employment of an incompetent superintendent is certainly the fault of the directors: and, strange as it may seem, this has been done for the sake of saving a portion of the salary required to secure a capable man. This is surely the worst of all places for the practice of economy.

But as the character of our directors has not suddenly changed, there must be some special cause or causes for the great increase of railway accidents at the present time. Among the most important of these causes we suggest two—one political or social, and the other mechanical.

Among all the manifestations of the wide-spread and disastrous effects of an alteration of the currency, there is none more curious, as there is none more melancholy, than this increase in railway accidents. The rise in prices resulting from the augmentation of the currency has doubled the cost of repairs, and there is a universal belief that this inflation of the currency will be but temporary. Railway directors, therefore, in common with other bodies of men, are disposed to put off all expenditures until the same result can be accomplished with half the money. This has led to a postponement of all permanent improvements, and a resort to make-shifts and expedients to keep the roads running for a season with the least possible expenditure for repairs. As the inflation of the currency has continued longer than was anticipated, this system of using the railways without repairing them has been persevered in till both the track and the rolling stock have been worn to a wretched condition, and the natural result is this frightful succession of disasters.

Many of the railroad accidents have been produced by broken rails, and this we are told by a large iron manufacturer is mainly due to the extensive use for a few years back of cold short iron. It is said that this difficulty can be effectually remedied by the introduction of a small proportion of either coppery ore or Franklinite into the iron for rails. Competent directors would see that this danger was avoided, as well as that of running the roads when out of repair.

ABUSE OF MACHINERY.

There was once an individual in the wilds of Western Michigan who styled himself an engineer. He erected an engine, but finding the slides out of line with the bore of the cylinder, directed the fireman to go to a foundery and get some parting sand. This duty having been performed, the engine driver said: "Throw it on the slides, John; grind her down; that 'll fetch her!" and similar exclamations expressive of satisfaction. What our abrading friend desired to obtain was a smooth surface in line with the piston, and though his method of proceeding was, to speak mildly, open to criticism, his motive was correct and proper.

A workman educated in these modern days of progress sets the principal parts which are to work together in line, so that no disturbance arises from improper deviations.

While we can scarcely find men so ignorant as to throw sand on the slides of an engine, we discover many daily who are apparently unaware of the value of a good, smooth working surface in machines of any kind.

Since the labor of getting up these surfaces is very great, common sense, if not economy, would teach that the neglect of them is attended by injurious results; yet it cannot escape the professional observer that valve seats are not so often destroyed by excessive friction as by criminal carelessness; that cylinders are not so often scratched and destroyed by want of oil as by stupidity in packing them; that bearings do not heat on account of misproportion, but through lack of oil and attention, and that what we often hear when engines stop—"the packing is blown out," "the crank-pin brasses are broken," "the binder of the pillow block is cracked"—is, in most cases, palpable evidence of remissness.

Familiarity with danger begets indifference to it. So, constant employment about a steam engine, to men of moderate moral development and limited conscientiousness, does tend sometimes to make them careless. The proof of this is found in the constant occurrence of minor accidents which delay vessels and trains, add very much to the cost of repairs, and not unfrequently end in fearful catastrophes. It is therefore certain that while there are always many incidental disasters liable to happen to fabrics, and to material of all kinds under the strain imposed on it, in a steam engine, a great deal can be done to avert them by careful supervision and daily inspection. If eternal vigilance be the price of liberty, it is also the price of safety about steam boilers or in the construction of machinery of all kinds.

TRAVEL BENEFICIAL TO WORKMEN.

We have always thought that our workmen might imitate one practice of their German brethren with advantage. On attaining his majority the German operative is obliged to travel through certain parts of the country and learn the different processes and methods of practicing his art before he can settle down and follow his calling on his own account. The tendency of this rule, which is imperative, is to improve and enlarge the ideas of the mechanic. Working in one town continually, the artisan becomes familiar with the methods there practiced, and, whether good or bad, he is acquainted with these only. He is apt to become a man of one idea, and to think that the mechanical world is bounded by the limits of his own factory. It is unnecessary to remind the thinking reader that such a course is directly opposed to progress.

To become thoroughly imbued with a sense of the importance of travel as a means of developing and educating the mechanic, one has only to observe the different modes of doing the same piece of work practiced in different places. For instance, one man has a bed plate to plane; he roughs it off; takes half a dozen cuts where one would suffice, and dallies with the work, when an energetic business-like way of going at it would have done the same thing in half the time. New tools, new uses for old tools, new processes, materials and designs are only found by traveling about among other mechanics, and by getting acquainted with what is transpiring in the world of art outside of the sphere in which an individual may dwell.

Rolling stones gather no moss, says the adage, but we do n't want any moss. Moss is a vegetable growth, the result of quiet seclusion, and a rooted adhesion to one spot. So are prejudices and notions, and if by rolling, mechanical stones can get rid of moss they will be benefitted thereby. He who keeps his eyes open, and travels to learn, not to go from pillar to post, will see the value of these suggestions.

GAS FROM PETROLEUM.

Much thought is being devoted to designing portable apparatus for making gas from petroleum, in order that isolated manufactories and even dwellings throughout the country may be supplied with the luxury of this clean and beautiful light. The general plan is to introduce a small stream of the oil into a little cast-iron retort that is kept at a red heat, generally by a fire of anthracite coal. The only purification to which the gas is subjected is simply to pass it through water, when it is taken directly to the receiver and thence to the burners.

It is supposed that the several hydrocarbons constituting petroleum undergo destructive distillation at the high temperature of the retort, and are converted into permanent gases. This is doubtless the case with a portion of them, but it is probable that others are simply evaporated, and these if in the same conditions would be again condensed to oil. Those of the most complex constitution would be the first to be decomposed. For instance, suppose the series begins with a hydrocarbon which is formed by the combination of 3 atoms of hydrogen with 5 of carbon, H_3 C_5, and that it advances by the addition of 2 atoms of hydrogen and 2 of carbon, in accordance with the law of other hydrocarbon series. Then we should have a series constituted thus:

H_3 C_5
H_5 C_7
H_7 C_9
H_9 C_{11}
H_{11} C_{13}

continuing perhaps up to H_{57} C_{59}. As the atom of carbon weighs six times as much as the atom of hydrogen, the simplest hydrocarbon of the series contains the largest proportion of carbon, still in all series of hydrocarbons yet examined, the simplest elements are the highest and most volatile, the density increasing and the boiling point falling regularly with the complexity, and the most complex being solids.

As it is a law of chemical compounds that the most complex, those containing the largest number of atoms, are most easily decomposed, if a quantity of petroleum were subjected to a temperature that would break up a part only of the hydrocarbons of

which it is composed, those first to be decomposed would be the most dense. These would be formed into simpler, and therefore lighter and more volatile hydrocarbons, some of them perhaps into incondensible gases.

The volatility of the mass might perhaps be farther augmented by the power of these gaseous hydrocarbons to dissolve, and hold in the form of vapor some of the heavier liquids or solids. Still, the difficulty to be apprehended in all varieties of apparatus for making gas from petroleum is a condensation in the pipes of liquid hydrocarbons which have been merely evaporated in the retort.

It is quite possible that this difficulty may be entirely overcome, when we shall have a gas from petroleum giving perhaps four or five times as much light as the ordinary coal gas, and a light of a very superior quality.

CHARGES AGAINST THE COMMISSIONER OF PATENTS.

We sometime since received a four-page pamphlet headed "Fraud and corruption in the Patent Office," addressed to the House of Representatives by one Andrew Whitelay, in which he makes twenty-five distinct charges against the Commissioner of Patents and the Chief Clerk.

A committee of the House, of which Mr. Higby, of California, was chairman, was appointed to investigate these charges. The Committee unanimously report that none of them were sustained.

We thought at the time we received the bill of charges, that the petitioner had too heavily loaded his piece. The Commissioner has escaped without harm, while Whitelay is slightly injured by the recoil of his own gun.

FARMERS' CLUB.

The Farmers' Club held its regular weekly meeting at its Room at the Cooper Institute, on Tuesday afternoon, March 14th, the President, N. C. Ely, Esq., in the chair.

BLACKBERRY WINE.

S. P. Nichols, of New York, presented a bottle of blackberry wine, stating that it is recommended by physicians in place of port. It was made from Lawton blackberries raised in New Jersey, and the crop made into wine yielded at the rate of $600 to the acre.

The President pronounced it a very rich wine with a heavy body.

Mr. Nichols said that it was made by adding two quarts of juice, two quarts of water, and three pounds of sugar.

CURRANT WINE.

R. G. Pardee remarked that the best wine that he ever saw was made from currants, three pounds of sugar being mixed with one gallon of juice without any addition of water. This wine, after it was three years old, was pronounced by judges of the greatest experience and intelligence, superior to any Maderia or other imported wine ever presented in this market.

Dr. Ward said that he makes two or three barrels of currant wine every year, and he finds it very variable in quality. He usually mixes with one quart of juice, two quarts of water and three pounds of sugar. He has experimented to reduce the proportion of sugar to the smallest quantity necessary to prevent acetous fermentation. Much depends on the ripeness of the fruit, and the promptness with which the juice is expressed after the fruit is gathered, as acetous fermentation will commence in the fruit before the juice is expressed, if it is allowed to lie many hours. Some of the very best wine that he ever saw was made by mixing one quart of juice with two quarts of water and two pounds of sugar.

TO INCREASE THE CROP OF MELONS.

Solon Robinson read a letter from a man saying that he finds it impossible to get his Hubbard squash vines to produce more than one squash at a hill, though he had tried pinching off the laterals and other plans.

Mr. Pardee replied that his course was very simple and plain. He has merely to pinch off the leader at a few inches from the hill and let the laterals grow. This is the proper treatment also for melon vines.

Revivification of Animal Charcoal.

Mr. H. Medlock writes the appended letter to the *Chemical News:*—

"Every tun of raw sugar refined in England contains from 7 to 10 lbs. of lime, the remains of that which has been used in the country of production to neutralize the acids of the cane-juice. It is this lime which chokes up the pores of the animal charcoal, and renders it inefficacious as a decolorizer. The removal of this lime from the spent charcoal has hitherto been to the refiner an insurmountable difficulty, but a Mr. Beanes, who has had more than twenty-five years' experience in the sugar plantations of Cuba, has, for some years past, devoted his chemical and scientific knowledge to the solution of the problem. How far he has succeeded in removing the lime and carbonate of lime, without attacking the phosphate, and so injuring the structure of the charcoal, is best proved by the fact that the largest sugar refinery in New York—that of Messrs. Havemeyer and Elder, have been using the process for six months, and they effect not only a saving of 100 per cent of charcoal, but they get a larger produce of sugar, and of a finer quality."

Prospective Demand for Corn.

An exchange says:—The farmers of this country should put in all the corn that they possibly can the coming spring. Large preparations are being made, in Buffalo, by parties who own the discovery of making sugar from corn, to manufacture a large quantity of sugar the coming year, and which will draw as largely on corn and divert it from its usual channels as to increase the demand and price of that staple. Add to this, the new discovery of making paper from corn husks and leaves, and that all of these articles that can be raised will find ready sale at any railroad depot, and it seems to us the corn crops will be looked to with more favor in the future, than in the past.

Flattering a Photograph.

A method has been recently suggested for softening the effect of photographic pictures, and removing the too faithful harshness with which they render some faces; or, in other words, of introducing a little flattery into photographic portraits. According to the *Photographic News*, M. Mathey suggests the following method:—"The plan is to have a lace curtain stretched on a wooden frame placed between the camera and the sitter; the further the curtain is from the model, and consequently the nearer it is to the lens, the softer the features appear; the threads of the lace give the grain of a chalk drawing or engraving, and the defects of the model are modified and softened down."

Our Shipping.

Notwithstanding the extensive transfer of our vessels to foreign flags to prevent them from falling into the hands of the rebel pirates, the decline in the amount of our shipping since the war commenced is surprisingly small. On page 258, Vol. II. (New Series) SCIENTIFIC AMERICAN, we publish a table of the tunnage of our shipping for each year from 1815 to 1859; the following statement of the tunnage for each year since 1859 is from the report of the Secretary of the Treasury:

	Steam Tunnage.	Total Tunnage.
1860	867,937	5,353,868
1861	877,204	5,539,813
1862	710,463	5,112,165
1863	572,970	5,126,081
1864	960,335	4,986,401

Improvement in Blasting.

Le Genie Industriel says that a plan, invented by M. Troreillet, has been presented to the *Societe d'Encouragement*, for increasing many fold the force of a blast in rocks with very small addition of labor in drilling. It is simply to enlarge the hole at the bottom by means of steel chisels, black diamonds, or in the case of limestone rocks by means of sulphuric or hydrochloric acid.

THE telegraphic line between Calcutta and Bagdad, just opened, by means of its connection with the telegraph between Bagdad and Constantinople, opens up direct communication between India and all parts of Europe.

THE expense of collecting internal revenue in this country is about two per cent, being some nine per cent less than the expense of collecting revenue in England.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING MARCH 14, 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.

46,765.—Radiator for Stoves.—Wm. P. Adams & Henry A. Adams, Norwich, Conn.:

We claim the two drums, A A', and pipes, C D E E and B, combined and arranged in connection with the damper, F, and applied to a stove to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved heat radiator to be applied to stoves for the purpose of radiating the heat into the apartment and which now escapes into the chimney or flue.]

46,766.—Churn.—Hiram Allan, Jr., Wallingford, Conn.:

I claim the combination of flukes, a and c, with beaters, B and C, when constructed and arranged substantially as herein set forth so as to revolve in either the same or opposite directions.

46,767.—Method of Coating Glass with Platinum.—Louis Paul Angenard, New York City:

I claim the improved method or process of preparing and applying a solution of platina, as herein before substantially described, as a coating for the surface of glass or other articles for making mirrors and articles of use and ornament, as an improvement on my patent of the 31st January, 1865, for a like purpose.

46,768.—Plow.—John B. Atwater, Chicago, Ill.:

I claim, First, The combination of one or more rotating augers with one or more turn plows and an adjustable swinging frame, B, substantially as described.

Second, The employment of rotating augers upon a frame, B, that carries the plow, A A', and which is hinged at its rear arched ends to the rear supporting axle, D, and suspended near its front end from the beam, C, substantially as described.

Third, Arranging the augers in a line with and over the points of the plows when both augers and plows are sustained beneath and by a vibrating frame, substantially as described.

46,769.—Carbonic Acid Engine.—Nelson H. Barbour, Auburn, N. Y.:

I claim the application of the expansive force of the vapor or gas derived from the evaporation of liquified carbonic acid and other gases, and retaining the whole or a considerable part of the expanded gas to be again liquified for subsequent use, when the same is done through devices and by a power and machinery independent of or in addition to that connected with its own expansive force, substantially in the manner shown and described.

46,770.—Burner for Carbureted Air.—John A. Bassett, Salem, Mass.:

I claim the combination of the burner, A, with a carbureting apparatus used to produce an illuminating gas in the manner specified—the whole operating together for the purpose substantially as set forth.

46,771.—Apparatus for Carbureting Air.—John A. Bassett, Salem, Mass.:

I claim, First, The general arrangement of the apparatus, consisting of the several parts as shown and specified.

Second, The carburation of air or gases by the use of the concentric perforated cylinders with the fibrous covering, and partially immersed in the hydro-carbon liquid maintained at a uniform hight, substantially as shown and described.

Third, The automatic regulation of the quantity of air to be admitted to the carbureter by means of the valve connected with and operated by the holder through the lever and cord or their equivalents, when used for this purpose, as shown and specified.

46,772.—Buttons.—Philander H. Benedict, Syracuse, N. Y.:

I claim a button constructed with the parts, a b c d e f and g, substantially as described.

46,773.—Apparatus for Preventing Water Pipes from Bursting.—John Bevan, New-York City:

I claim, First, The elastic or flexible compressible water-tight ball, E, placed within a suitable chamber, D, provided in a water pipe, substantially as and for the purpose herein specified.

Second, The closed elastic or flexible compressible water-proof tube, B, placed directly within and extending any suitable distance along the passage of a water pipe, A, substantially as and for the purpose herein set forth.

46,774.—Preparation of Cloth and Vegetable Fiber for Bleaching.—George W. Billings, New-York City. Ante-dated Feb. 27, 1865:

I claim subjecting the fabric to a fermenting operation previous to bleaching, substantially as and for the purposes specified.

46,775.—Lamp for Heating Curling Irons, etc.—David T. Burrell, Bridgewater, Mass.:

I claim, First, An apparatus for heating irons, etc., operating automatically, substantially as described and for the purposes specified.

Second, The arrangement and combination of the main and small wicks, c c and e e, and extinguisher, g g, actuated so as to be raised and lowered by placing the iron or other implement upon or removing it from the apparatus, substantially as described.

46,776.—Horse Rake.—George E. Burt, Harvard, Mass.:

First, I claim the combination of the seat, J, with the arms, F F, and a rake constructed and arranged substantially in the manner specified, so that the weight of the operator will assist in operating the rake, substantially as described and for the purpose set forth.

Second, The arrangement and combination of the arms, D, the gripe, x, and cylinder, v, constructed substantially as described for the purposes set forth.

46,777.—Method of Consolidating Coal Dust, Peat, etc.—Waldron J. Cheyney, Wallingford, Pa., and E. T. Dieterichs, Philadelphia, Pa.:

We claim consolidating particles of coal, peat, and similar substances, by mixing with the same an aqueous solution of silica, and drying and compressing the same, substantially as specified.

46,778.—Governor.—Davie A. Clary, Pittsfield, Mass.:

First, I claim communicating to the clutches, acted upon by a revolving clutch, a movement endwise, substantially as specified, so that said clutches will separate from the revolving clutch so soon as an adjustment of the cut-off, valve, or other regulating mechanism, has been effected as specified.

Second, I claim the gears, m m o, and clutches, h q r, in combination with a yoke, l, moving endwise in substantially the manner and for the purposes set forth.

Third, I claim communicating to the yoke, l, an endwise movement by means of the nut and screw, actuated substantially as specified.

46,779.—Money Safe.—Benjamin Cole, Brooklyn, N. Y.:
First, I claim the application to a money safe of a reciprocating beam, E, or other equivalent device, carrying on one end a penny or other coin or device, and operating in combination with the receiving spout, B, and with one or more supplementary openings, C, in the manner and for the purpose substantially as set forth
Second, In combination with a money safe, I claim the registering apparatus, F, constructed substantially as described, so as to be operated by the act of introducing money in the manner and for the purposes specified.

46,780.—File-cutting Machines.—Moses G. Crane, Boston, Mass.:
I claim the manufacture of curvilinear surfaced files with teeth which have the direction of screw threads, when these are thrown up as burrs from the surface of the file blanks and continuously and spirally around the same to substantially a uniform distance therefrom.
Also, in a file-cutting machine, the combination and arrangement of mechanism substantially as described.
Also, the employment in connection with a file blank cutter of a gage in such manner as to regulate the depth of the cut by contact with the uncut surface of the blank, and so as not to interfere with the burr or tooth raised by the cut, substantially as and for the purpose described.
Also, making such gage adjustable with respect to the edge of the cutter, substantially as and for the purpose specified.

46,781.—Sugar-cane Press.—J. C. Crismar, Omaha City, Nebraska Territory:
I claim the rising and falling frame, C, in connection with the press box, composed of two parts, I H, in combination with the fixed or stationary plunger, J, and shaft or windlass, F, all arranged to operate substantially as and for the purpose herein set forth.
[This invention relates to a new and improved arrangement of the press box and plunger whereby the contents of the press box, after being subjected to the requisite pressure, may be emptied of the cheese or refuse with the greatest facility.]

46,782.—Boxes for Hats and Bonnets.—Oliver A. Dailey, Washington, D. C.:
I claim as a new article of manufacture a box for hats or bonnets, constructed with arched ribs or strips, as herein described.

46,783.—Blacking Box.—J. H. Doughty, New York City:
First, I claim the employment of an elevator or driver, C, in combination with a receptacle for holding blacking, substantially as and for the purpose set forth.
Second, The well, B, applied to a blacking box, A, and provided with an elevator, C, substantially as and for the purpose set forth.
Third, The pedestal, D, in combination with the box, A, well, B, and elevator, C, constructed and operating substantially as and for the purpose described.
[This invention consists in a blacking box provided with a chamber or well in which a plunger or elevator moves in such a manner that when said well is filled with blacking by the action of the plunger or elevator a sufficient supply of blacking for present use can be forced up above the bottom of the box at any moment, and thereby the outside of the box is kept clean, the brush is saved, and the blacking is prevented from becoming hard and dry.]

46,784.—Running Gear of Railroad Cars.—Spencer B. Driggs, New York City:
First, I claim a compound flexible car truck composed, substantially as herein described, of a main truck and one or more flexibly attached guide trucks, the wheels of the main truck supporting the weight or the greater portion thereof, and the wheels of the guide truck or trucks serving to keep those of the main truck parallel with the track, as herein set forth.
Second, Supporting the connected ends of two railway cars upon one flexible truck having supporting wheels and guide wheels, substantially as herein specified.
Third, The arrangement of a single supporting axle and pair of wheels and a vertical coupling pin for connecting two cars, with the axis of the said pin in the same plane with the axis of the wheels and midway between the two wheels, substantially as herein described.
Fourth, The connection of the ends of two railway cars with each other and with one supporting truck by means of one pin, substantially as herein set forth.
Fifth, Suspending the ends of two connected railway cars from one truck by means of chains, links, wire ropes, or other flexible connections attached to the cars at the extremities of the sides thereof, substantially as herein described.
Sixth, The connection of the supporting truck and guide truck or trucks of what I term a flexible truck for railway cars by means of springs, by which a portion of the weight received by the main truck is transferred to the guide truck or trucks substantially as herein specified.
Seventh, In combination with a truck for supporting the ends of two railway cars, I claim rollers, h h', attached to the car bodies, and receiving between them the transoms of the truck, substantially as herein described.

46,785.—Hay and Cotton Press.—Benjamin F. Dunning, Galesburg, Ill.:
First, I claim the wedge, I, falling between followers, C C, substantially in the manner and for the purposes specified.
Second, Applying the pressure to the hay etc., in successive sheets, when the sheets are fed in automatically, by means of a falling weight or its equivalent substantially as specified.
Third, The combination and arrangement of wheel, N, swivel-lever, Q, dog, x, thimble, R, and shaft, O, substantially in the manner and for the purposes described.
Fourth, The combination and arrangement of cap, K, dog, t, ratchet lever, L, and levers, S T and U, substantially in the manner and for the purposes specified.
Fifth, The feed rollers, E, and knives, i i, constructed, arranged and operating substantially in the manner, and for the purposes specified.
Sixth, The triggers, J J, when so constructed and arranged as to release the wedge, so soon as it shall have given one revolution to the feed rollers, substantially in the manner and for the purposes specified.

46,786.—Machine for Heading Dentists' Pins.—Wm. A. Duffy and Jethro J. Griffith, Philadelphia, Pa.:
I claim the combination of the double cam, E, the levers, F and O, with their adjustable auxiliary levers and friction rollers (or the described or other equivalents for the adjustable parts) the sliding piece, N, and jaws, M M', in the manner and for the purpose substantially as described.

46,787.—Time Indicator for Railroad Trains.—J. C. S. Fitzpatrick, Kalamazoo, Mich.:
I claim, first, A time table consisting of a series of dials with movable hands, having one such dial for every train so that the indicators for each train designated shall be permanent and not require adjustment except when changes are made in the time of starting as herein above set forth.
Second, In combination with a time reporter arranged as above specified, I further claim the employment of a cipher in the manner above described to indicate the suspensions of running of a train.

46,788.—Miniature Locket.—E. N. Foote, New England Village, Mass.:
I claim, first, The photographic locket, A, constructed and operated substantially as above described.
Second, I also claim securing the covers of the locket to the extensions, a a, respectively of the part, D, of its back, substantially as above described.
Third, I also claim making the inner plate, E, of the back of the locket, convex and rigid and hanging the leaves, I, thereto at different elevations on its convexity, substantially as and for the purpose above described.

46,789.—Quartz Crusher.—Perry G. Gardiner, New York City:
First, I claim the manner of combining and arranging a stationary mortar or kettle, of a partly spherical interior form, with a spherical concentrical ball operated by a diagonal shaft, d, connected with a vertical driving shaft by the arm, F, and the forked joint and bush, g g', operating in the manner and for the purposes described.
Second, I claim the combination and arranging the vertical hollow shaft, E, with the ball and basin or mortar, D C, whereby the ores to be pulverized are carried down continuously, without intervals for charging or discharging, and so as to distribute the falling ores equally on all sides of the ball and basin.
Third, I claim the peculiar form and structure, in two equal parts, of the cover or lid, K, by which it can be placed over the kettle without disturbing the operating parts, and made to revolve with the shaft, and arranged upon the trough, I, as described.
Fourth, I claim the form and arrangement of the movable trough, I, having its sides of unequal hight, and its trough perforated, and adapted and adjusted to the rim of the basin below and the revolving lid above, one to be used with or without water, as described.

46,790.—Hemming Gage for Sewing Machines.—William Gaskill, Cincinnati, Ohio:
I claim, first, The adjustable perforated and shouldered tongue, D, adapted to rise and fall with the pressure foot of a sewing machine, in combination with the adjustable shouldered plate, A, for the purpose of accurately gaging and neatly flattening the hem at the point and in the act of stitching as set forth.
Second, I claim the parts, A a B C c c' c'' D d E F f f' and F', combined and cooperating in the manner stated.

46,791.—Automatic Ratchet and Pawl.—Obed Gilder, Kinsman, Ohio:
I claim the pivot, C, the lever or break bar, E, and break roller, F, when the same are constructed as described in the aforesaid combination for the purposes set forth.

46,792.—Blacksmith's Forge.—J. H. Gould, Cincinnati, Ohio:
I claim, first, The combination with a forge of the sprinkling apparatus, O, connected with a water tank, g, or its equivalent arranged and operated substantially as and for the purpose described.
Second, I also claim the combination of the sprinkling apparatus, O, with the escape pipe of a water-back or water-tweer of a forge arranged and operated substantially as and for the purpose above set forth.

46,793.—Rendering Apparatus.—Carroll E. Gray, New York City:
I claim, first, Rendering fatty matter under pressure generated in the digester containing the fat by the direct application of heat thereto.
Second, the combination of the digestor with a heating chamber or furnace for the purpose of generating steam therein to render the fatty substance contained in the tank, substantially in the manner described.
Third, The combination of the receiver, H, with steam generating digester so arranged in connection with said digester as to receive the melted fat therefrom, and so that the heat of the furnace used to generate the steam in the digester is accessible thereto, for the supplemental operation of refining.
Fourth, I claim refining and purifying the rendered fat in a reservoir arranged in connection with the digester and filled with a coil of pipe so arranged in said reservoir and connected to said digester as to receive the steam therefrom and return the condensed water thereto substantially in the manner described.
Fifth, I claim deodorizing the gases generated in rendering the fat or driven off in refining and purifying it by passing said gases through a deodorizing chamber substantially in the manner described.

46,794.—Apparatus for Deodorizing Petroleum, Benzole, etc.—Joel Green, Rochester, N. Y.:
I claim the process of removing the existing gas of petroleum, benzole, naptha and other hydrocarbon liquids in vacuo, by means of the receiver, A, tank, B, and pump, C, arranged and operating substantially as and for the purpose herein set forth.
I also claim forming the tank in two compartments, D D', separated by the partitions, E G, and slide, H, provided respectively with the holes and perforations, h h' i, the whole arranged, combined and operating substantially as and for the purpose herein specified.
I also claim the agitator, K, in combination with the vacuum tank, B, receiver, A, and exhaust pump, C, arranged and operating substantially as herein specified.

46,795.—Hydrostatic Engine.—Thomas Hansbrow and B. B. Redding, Sacramento, Cal.:
We claim, first, The application of cushions to the cylinder of a water pressure engine, substantially as and for the purpose set forth.
Second, The air valves, e, applied in combination with the air cylinders, I, and main cylinder, A, in the manner and for the purpose substantially as set forth.
Third, The vibratory beam, M, in combination with the rod, m, adjustable tappets, b, valves, F K, and ports, a a' b b', in the cylinder, A, all constructed and operating in the manner and for the purpose substantially as specified.
[This invention consists in the application of air cushions to the cylinders of a water pressure engine in such a manner that the water pressing against the piston is prevented from acting as a solid and the engine is enabled to turn the centers as rapidly and as readily as it would with steam, gas or other elastic agent, and furthermore at the moment of the change of the position of the valves the water which has just performed its work in the cylinders, is expelled by the compressed air, before it can be followed by the piston on the stroke. Suitable valves connecting with the cylinder and opening inward, serve to admit a fresh supply of air and to prevent the possibility of the forming of a vacuum behind the piston. An air vessel connecting with the cylinder of this water pressure engine prevents the shock which otherwise would be produced every time the valves are on the center.]

46,796.—Harness Snap.—Horace Harris, Newark, N. J. Ante-dated March 1, 1865:
I claim the mode herein described of preparing the back end of the spring, D, to be attached to the hook, E, substantially in the manner specified.

46,797.—Pruning Hook.—Leonard M. Harris, Mattawan, Mich.:
I claim, first, The use of a hook, b, which is secured rigidly to its shaft, a, in combination with a knife, c, which slides upon the shaft, a, and is moved upward in the act of cutting, substantially as described.
Second, The movable crescent shaped knife, c, formed on a slide, d, in combination with the hook, b, which is secured rigidly to its haft, substantially as described.

46,798.—Hand Loom.—John G. and Henry T. Henderson, Salem, Iowa:
We claim, first, So arranging a flexible strap, that as the lay comes forward, it will be drawn alternately from one side of the picker staff to the other, and as the lay goes back will throw the picker staff around and throw the shuttle back and forth and required substantially as described.
Second, The combination of the shaft, f f, ratchet, g, and its pawl rod, r, pins, i i, treadles, h h, and stop, u, for the purpose of elevating the upper shed as the lay comes forward and retaining it until the shuttle is thrown and the depressers, b b, placed on the swords for the purpose of taking the remaining treadles down as the lay goes backward substantially as described.

46,799.—Fence.—Elias Hollinger, New Haven, Ind.:
I claim the braces, B B', applied singly to the ends and centers of the pannels and secured by means of tanks, A A', battens, a a', slots, c c', keys, d d', and pins, e e', all arranged as herein specified.
[This invention relates to a new and improved fence of that class which are capable of being readily put up and taken down and are commonly termed portable fences. The invention consists in a novel manner of bracing the pannels and connecting the same together, whereby the fence may be firmly supported in position, readily put up and taken down and constructed at small cost.]

46,800.—Steam Engine.—Charles W. Isbell, New York City:
I claim, first, The two sector shaped cylinders, A A', arranged side by side in corresponding positions on opposite sides of a central plane in which is arranged the axis of a crank shaft common to both, and with their vibrating pistons connected with a common crank on the side shaft substantially as herein specified.
Second, In combination with the within described arrangement of two sector shaped cylinders, vibrating pistons and crank shaft, I claim the interposed induction chamber common to both cylinders substantially as herein described.

46,801.—Globe for Fishes.—Alfred Ivors, New York City:
I claim, First, The supply pipe, g, and escape pipe, f, constructed as specified, in combination with the overflow pipe, h, passing away from the pipe, f, and rising to the hight of the water in said globe or vessel, as and for the purposes set forth.
Second, I claim the pan, c, and pipe, d, fitted as specified, in combination with the globe or vessel to contain fishes, for the purposes and as specified.
Third, I claim a globe or other vessel arranged substantially as specified so that the water may be maintained at a given hight or caused to flow over the outside of said vessel as set forth.

46,802.—Stove Lantern.—David L. Jaques, Hudson, Mich.:
I claim the whole device substantially as set forth.

46,803.—Railroad Chair.—J. H. Jones, Ironton, Ohio:
I claim constructing the chair of two longitudinal parts, B B', one of which, B, extends up to the under side of the upper parts or threads, d, of the rails, A A, and the other B', extending up to the upper surfaces of the rails, both parts being provided with bases, a, and so formed as to grasp the lower parts of the rails, in combination with the clamps, C, and bolts, D, all arranged substantially as and for the purpose herein set forth.
[This invention relates to a new and improved chair for securing railroad rails to cross ties, and has for its object the securing of the ends of the rails in such a manner as to prevent them from rising and projecting up under the weight of the cars as the latter pass over them, and thereby avoid the hammering and battering of the ends of the rails, which is attended with great expense in keeping the rails in repair.]

46,804.—Method of Preparing Colors from Analine.—Xavier Karcheski, Bellville, N. J.:
I claim the application of gellatinous or fatty solution, vegetable or animal, such as starch, tannic acid, milk or glue, etc., in preparing paints from analine.

46,805.—Shanking Machine.—Wm. H. Kimball, Lynn, Mass.:
I claim the combination of the feed rolls, angular knife and guide, when arranged to operate together, substantially as set forth.

46,806.—Concentrating Table for Ore.—Guido Kustel, Dayton, Nevada:
I claim, first, The construction and use of a concentrating table, moving horizontally, and capable of having its inclination varied, when arranged in the manner and for the purpose substantially as described.
Second, I claim a horizontal moving concentrating table, in combination with the feeding pipes or openings, m m' and m'', and the water tanks, P P' and P'', as well as the water pipe, n3, or their equivalent, the whole being arranged and operated in the manner and for the purpose substantially as specified.

46,807.—Rudder.—Nicholas D. Le Pelley, Cleveland, Ohio:
I claim a rudder, constructed with two or more blades, having water passages between them and valves, all arranged to operate in the manner substantially as and for the purpose set forth.

46,808.—Joints for Pipes.—W. R. Maffit, Wilkesbarre, Pa.:
I claim connecting pipes in the manner and by the means described.
[The object of this invention is to supersede the old method for making joints in pipes, by the use of a wooden ring prepared by proper machinery, out of one solid piece, if the ring is small, or out of a number of sections or staves when the ring is large, and applied to the spiggot end of the pipe in such a manner that by the expansion or swelling of the wood in the bell a tight joint is produced; and, furthermore, the compressibility of the wood allows the pipe to assume an angular position, or a position deviating from a right line, without producing leakage; or, if desired, the inner surface of the wooden ring may be more or less convex, to give the pipes a still better chance to assume an angular position.]

46,809.—Mode of Obtaining Extracts.—Benjamin G. Martin, Philadelphia, Pa.:
I claim, first, Separating the particles of a material of which a decoction is to be made by introducing into a body of the said material a current or currents of air, for the purpose specified.
Second, The perforated casing, E, with its jacket, E1, combined with the tub, A, and operating substantially as and for the purpose specified.
Third, The condensing casing or cover, F, combined with a mash tub, A, substantially as and for the purpose set forth.
Fourth, The fermenting vat, I, with its false bottom, k, and pipes, m m, or their equivalents.

46,810.—Churn Dasher.—David McCurdy, Ottawa, Ohio:
I claim the cap, C, of an inverted funnel shape, or an approximate form, when used in combination with a dasher provided with inclined openings, a b, as and for the purpose specified.
[This invention consists in having the dasher perforated with a series of oblique holes, a certain number of which incline from the under surface of the dasher upward toward the dasher staff, the remaining holes inclining in a reverse direction, to wit: from the under surface of the dasher upward and outward toward the holes of the churn.]

46,811.—Windlass.—Wm. C. McGill, Cincinnati, Ohio:
I claim, first, The divider, D d, formed and adapted to operate substantially as set forth.
Second, In the described combination, the grooved drum or barrel, A a, and divider, D d, as and for the purpose specified.
Third, The combination of the divider, D d, and check pawl, E, substantially as set forth.

46,812.—Extension Ladder.—Warren Morehead, Parkersburg, West Va.:
I claim the combination of the triangular ladder, A, the sliding ladder, B, the guides, k, k, and the latch, E, constructed, arranged and operating in the manner specified.

46,813.—Drilling Machine.—Joel Moulton, Boston, Mass.:
I claim, first, Constructing the cutting surface of the drill, with teeth arranged with regard to it, and each other, as described, and for the purpose specified.
Second, The arrangement of devices for giving an intermittent rotary motion to the drill, operating as hereinabove described.
Third, Combining with the drilling mechanism a pumping apparatus, operated by the head of the drill shaft itself, as described.
Fourth, I claim giving the intermittent rotary motion to the drill shaft, u u, by devices inside of the tube or stock, c, as the latter is alternately lifted and depressed, "the drill shaft rising and falling within the stock."

46,814.—Horse Hay-fork.—M. D. Myers, Ilion, N. Y.:
I claim placing the spring bolt, G, or its equivalent, within the crotch, D, as and for the purpose specified.

46,815.—Drill.—Charles L. Noe, Bergen Point, N. J.:
I claim the tool or tool stock, A, in combination with the sinker bar or hammer, C, and its interior arrangement of parts, b b, and c c, operating substantially as and for the purpose herein described.

46,816.—Row Lock.—Joseph W. Norcross, Middletown, Conn.:
I claim, first, Pivoting a row lock to a plate, A, by means of a horizontally turning joint, in such manner as to obviate the necessity of cutting away the gunnel rail to apply the row lock, substantially as described.
Second, The use of wings or shutters, in combination with a row lock, and the wash stroke of a boat, substantially as described.
Third, Forming the wings, F, upon the horns of the row lock, substantially as described.
Fourth, Applying the spring, e e, directly to and beneath the plate A, of the row lock, substantially as described.

46,817.—Soap.—Daniel F. Packer, Redding, Conn.:
I claim a soap made and compounded substantially as above described.

[This invention consists in a new and useful improvement in the composition of a soap for cleansing purposes, and which can be used with advantage in the laundry, and for all other domestic purposes, and also in factories where goods are to be cleaned on a large scale, and which can also be used in removing stains from wood and other surfaces, which are painted or varnished, without at all affecting the paint. It is intended to be used for general purposes, but particularly for removing grease spots, cleaning paint, etc, and the specimen we tried answered its purpose perfectly.]

46,818.—Tube for Caves in Oil or other Wells.—John A. Patterson, Statelick, Pa.:
I claim the adjustable tube, A, elastic bands, B B, in combination with the springs, S S S, in the manner and for the purpose set forth.
Also, The follower or staves, 1 2 3 4, in combination with the tapered pin and collar, in the manner and for the purpose set forth.

46,819.—Lamp,—John M. Perkin and Mark H. House, Cleveland, Ohio:
We claim the wheel, A, and segment, B, when arranged as specified, or their equivalent.

46,820.—Machine for Cutting Tobacco.—Louis Planer, New York City:
I claim the combination of the slotted crank, T, the connecting rod, X, feed wheel, M, nut, T, feed lever, N, reversible paul, P, fixed screw and piston rod, I, with its piston head, H, tobacco box, A, and cutter, B, arranged and operating substantially as and for the purposes herein described.

46,821.—Grain Drill.—Bernard Regan, Miamisburg, Ohio:
I claim the provision in the seed box, A, of a scalloped or winged feed wheel, B, having collars, D D, occupying recesses, a, in the ends of the seed box, so as to be flush with the inner surfaces thereof, substantially as and for the purpose set forth.

46,822.—Vise.—Joseph Renshaw Michigan City, Ind.:
I claim the adjustable vise chop above described, consisting of the rocking plate and the steel clamp or holder, f, in combination with the bead, j, of the back jaw of the vise, substantially as above set forth.

[This invention consists of a movable chop, to be attached to the back jaw of a vise, by means of which any piece of work whose sides are tapering may be clamped therein with the utmost facility.]

46,823.—Journal Box.—Matthias J. Rice and W. H. Millen, Boston, Mass.:
We claim the combination of the oil reservoir, c, movable bearing, b, and oil passages, k, arranged with respect to each other substantially as specified.

46,824.—Oil Ejector.—Henry Searl, Rochester, N. Y.:
I claim, first, The arrangement of the receiving chamber, G, in an oil well or other deep well, when said chamber is connected with the surface or mouth of the well by means of the steam pipe, H, and the eduction pipe, J, and when said receiving chamber is supplied with the induction valve, T, and the eduction pipe, J, is supplied with a suitable valve, S, all substantially in the manner and for the purpose herein set forth, but not intended to be understood as making any specific claim to the induction valve, T, in said pumping apparatus.
Second, The arrangement of the cocks, M N O P and Q, in combination with the pipes, H L and J, all operating in the manner and for the purpose substantially as herein described and represented.

46,825.—Steam Trap.—John C. Shackleton and George Shackleton, Lawrence, Mass.:
We claim, first, The bottom of steam traps of unequal hight, so as to admit of a well at one end and a water discharge valve therein, so that the said valve shall remain immersed in the water of condensation while it is closed, substantially as described.
Second, We also claim the combination and arrangement of the air valve in the trap with the rod, H, and spring, j, and causing the same to be operated by the expansion of the rod, H, and by the spring, j, substantially as above described.
Third, We also claim the arrangement of the water discharge pipe, F, in combination with the guide tube, g, for guiding the valve, E, and the float, C, substantially as above described.
Fourth, We also claim the arrangement of the water discharge valve below the place of the float, substantially as above described.

[This improvement in steam traps consists in part in the form of that part of the box in which the water discharge valve is placed, the arrangement being such as to keep that valve under water. There are also novelties in other parts of the trap.]

46,826.—Preparing Chewing Tobacco.—Henry D. Smith, New York City:
I claim a tobacco pellet or chew made out of tobacco incased and compressed between tobacco leaves or their equivalent, as a new article of manufacture.

46,827.—Instrument for Training the Muscles in Writing.—Edwin G. Squires, Lima, N. Y.:
I claim, first, The combination of the form, consisting of the rods, F G H and S, the spring thimbles, X X, the roller, P, and the balls, R R, Fig. 1, with the grooved plate, B, Fig. 1, and stile, c c, Fig. 1, all operating in the manner and for the purpose substantially as herein described and represented.
Second, The combination of bars, D H and G G and K K, Fig. 2, with the plates, L and C, Fig. 2, the cog wheels, M and N, Fig 2, and the dials, C and D, Fig. 1, all operating in the manner and for the purpose substantially as herein described and represented.
Third, The hinged plate, f, and point, P, Fig. 3, in combination with the wires, E E and T T, Fig. 3, to form a stile, substantially as herein described and represented.

46,828.—Magazine Fire-arm.—Edward Stabler, Sundy Springs, Md.:
I claim, first, Limiting or arresting the movement of the carrier block of a magazine gun at any desired point, for the purpose of converting the arm into a single loader, substantially as described.
Second, I claim the stop, b, or its equivalent, in combination with the carrier block of a magazine fire-arm, operating as and for the purpose herein set forth.

46,829.—Machine for Printing Yarn.—Edward J. Stephens and Hiram E. Green, Pawtucket, R. I.:
I claim the fluted rollers, B B', in combination with color rollers, J J', and distributing rollers, L L', or their equivalents, constructed and operating substantially as herein set forth, for the purpose of printing yarn simultaneously on both sides.

46,830.—Harvester.—Gustavus Stone and Joseph P. Bullock, Beloit, Wis.:
We claim, first, The curved arms, G J, bell crank lever, F b, and links, C H, constructed as herein described, in combination with the caster wheels, K L M N, crank shaft, F I, and bar, C, all arranged and employed in the manner and for the purposes specified.
Second, In combination with the above we further claim the lever, P, notched bar, Q, shaft, T, provided with the crank, k, and connecting rods, O U, all arranged in connection with the main frame, A, and cutter or finger bar, C, to operate as and for the purpose specified.

[This invention relates to a new and improved means for adjusting the cutter or finger bar; that is to say, raising and lowering the same, so that grass may be cut at any desired length, and the cutter or finger bar also temporarily raised, so that it may pass over obstructions which may lie in its path.]

46,831.—Apparatus for Railroad Car.—James B. Talmadge, Winsted, Conn.:
I claim, first, Producing a current and circulation of air in a railroad car, by means of a fan wheel or blower, driven by a wind wheel on the outside, in the manner and for the purpose substantially as set forth.
Second, The self-adjusting apparatus, consisting of the upper box, B, and its wind wheel, its doors and vanes, and of the lower box, D, with its fan, constructed and combined substantially as above described.
Third, I also claim the method, substantially as above described, of constructing and operating the doors of the circular box, O, and the vanes, which are connected thereto, so that they are automatic in their action.

[This invention consists in applying a wind wheel to the outside of a railroad car, so that it will be made to rotate by the motion of the car through the air, and in communicating motion from it to a fan wheel inside the car, and thus induce a circulation of the air in the car.]

46,832.—Combined Knife and Fork.—T. B. Thorpe, New York City:
I claim a combined pocket knife and fork, provided with separate parts or handles, A B, having respectively hook projections, E, and slots, F, at their inner sides, in combination with notches, c, in the fork plate, a, so arranged when the fork is closed to fit over or receive the hook projections, F, and prevent the casual detachment of the parts, substantially as described.

46,833.—Sawing Machine.—Edsell Totman, Columbus, Pa.:
I claim the sawing machine hereinbefore described, consisting of the frame, A, shaft, C, pulleys, N P, swinging frame, Q, crank wheel, H, pitman, I, and saws, R L, constructed and arranged as specified.]

[This invention consists in combining a reciprocating and a circular saw, in such a manner that a sawing machine may be obtained for sawing either large or small logs, and the machine easily changed, so as to be used in either capacity, as may be desired. The invention is designed for sawing logs, transversely with the grain, such as are commonly termed cross-cut sawing machines.]

46,834.—Wagon Brake.—F. L. Tripp, Prescott, Wis.:
I claim the bar, F, and shoe or brake levers, G G, connected with the rod, I, in combination with the pawls, J, and ratchets, K, all arranged and applied to the wagon, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved wagon brake, of that class which are commonly termed self-acting, and it consists in having the parts arranged in such a manner that the wheels, when the wagon is backed, will be automatically relieved from the brake, the latter at the same time operating perfectly when the wagon is descending an eminence.]

46,835.—Machine for Crushing Sugar Cane.—Don Carlos Turner, Madison, Wis.:
First, I claim the stirrup, L, suspended from the fixed bearing of the upper roller, and sustaining the lower rollers in place in the act of pressing, and allowing them a free motion, and so arranged as to bind the rollers together, so as to confine the strain principally to the middle of the frame, substantially as herein set forth.
Second, In combination with the stirrup, L, I also claim the yoke, K, and rollers, C D and B, substantially as and for the purposes specified.
Third, In combination with the yoke, K, provided with the rounded bearings, d d, and with the rollers, C B D, the boxes, I I, provided with transverse grooves, c c, resting on said bearings of the yoke, the whole so arranged that the yoke is allowed to vibrate to open or close the rollers, and so that either one end or the other of the lower rollers may be depressed more than the opposite end, to allow any inequality to pass through, substantially as herein set forth.
Fourth, The spring, s, and block, h, in combination with the yoke, K, and rollers, C B D, arranged and operating substantially as described.

46,836.—Skate.—Thomas Van Wagoner, Newark, N. J.:
I claim the combination of the screw, g, and nut, h, with the bars, C D, arms, c c d d, slots, a, and claws, i i i, constructed as described, and employed for securing the skate at the front and heel, simultaneously, as explained.

46,837.—Manufacture of Felted Fabrics.—Enoch Waite, South Natick, Mass.:
I claim the improved felt fabric, made of a backing and two sheets of felt, cemented together and arranged, substantially as specified.

46,838.—Differential Lever.—George I. Washburn, Worcester, Mass.:
I claim so constructing a combined lever, A A', that it may, by the projection of its parts, form a state of equilibrium, be made to communicate a reciprocating motion to a plunger or other mechanical appliance.

46,839.—Straw Cutter.—John R. Whittemore, Chicopee Falls, Mass.:
I claim, first, The combination of the knife, C, mouthpiece, B, shaft, E, bolt, a, keg, c, and piece, F, when constructed, arranged and operating substantially as described.
Second, Securing the mouthpiece, B, to the hopper, A, by the pieces, D D D, as described.

46,840.—Button.—J. F. Wild, New York City:
I claim the disks, D E, and shank, B, for fastening buttons, substantially as herein shown and described.
I also claim the use of the disk, C, in combination with the above parts, substantially as and for the purpose herein shown and described.

[The object of this invention is to attach buttons to cloth in a very quick and firm manner, without sewing; also, to facilitate the removal of the buttons from the cloth. The improvement is applicable to almost every variety of material of which buttons are made.]

46,841.—Furnace for Finishing Steel Iron.—W. Dewees Wood, McKeesport, Pa.:
I claim constructing the heating chamber with a perforated cover and floor, so arranged relatively to the fire chamber and flues, so that the fire and heated air shall enter the chamber through these openings in the cover and floor, at various points above and below the level of the sheets of iron placed therein, substantially as and for the purposes hereinbefore described.
Also in combination with the perforated floor of the heating chamber, the rails, t t, raised above the level of the floor for supporting the sheets of iron.

46,842.—Fastening Railroad Rails.—Alfred Arnold (assignor to himself, H. B. Stanton and D. C. Eaton), North Englewood, N. J.:
I claim a screw with a head suitably adapted to railroad rails, to hold the rails firmly to their ties or sleepers, and which has but one point in its revolution to free the rails and admit of their removal, substantially as herein described and for the purposes herein specified.

46,843.—Saw-grinding Machine.—John G. Baker (assignor by mesne assignment to Henry Disston), Philadelphia, Pa.:
I claim the disk wheel, C, and casing, B, adapted to the reception and retention of the saw blades, in combination with a grindstone, to which a lateral vibrating motion is imparted through the medium of the devices herein described, or the equivalents to the same, for the purpose specified.

46,844.—Well-boring Apparatus.—Chas. E. Foster, Philadelphia, Pa., assignor to Rock Drill Mining and Manufacturing Company of Pennsylvania:
I claim, first, The drill or cutter, G, combined with the tubes, B, and operating substantially as described.
Second, The casing, A, and tube, B, in combination with the casing, C, its cutter, rod and valve, the whole being constructed and operating substantially as and for the purpose specified.

46,845.—Brick Machine.—John George, (assignor to himself and Henry Hague), Jackson, Mich.:
I claim, first, The elastic or yielding blade or arm, G, attached to the rotary shaft, F, substantially as and for the purpose herein set forth.
Second, The frame or carriage, J, operated by the cam, C, on the shaft, F, and the weight, L, attached to the frame or carriage, substantially as and for the purpose specified.
Third, The friction rollers, e, applied to the frame or carriage, J, and fitted in guides, K, substantially as and for the purpose set forth.

46,846.—Screw-cutting Machines.—Stephen W. Goodyear (assignor to Charles Parker), Meriden, Conn.:
I claim, First, The combination of the rotating grooved cylinder with a fixed covering plate which bears horizontally upon the shanks of the blanks but endwise against their heads, and with a movable covering plate, for the purposes and in the manner substantially as described, thus forming a conveying tool.
Second, I claim the combination of the cylinder with the movable jaw, forming together a vise, in which the blank may be rigidly held for such operations as nicking, or a journal in which the blank may be rotated for threading, etc., thus forming a holding tool.
Third, I claim the combination of a cylinder, such substantially as is herein described, as having its fixed and movable covering plates with the curved feeding slide trough, whereby without the use of the usual system of grippers, etc., the blank may be conveyed to the place where it is to be operated on, as set forth.

46,847.—Manure.—Wm. D. Hall (assignor to the Quinnipiack Company), Hamden, Conn.:
I claim preparing concentrated artificial manure from lobster refuse by dessication and pulverization, substantially as herein described.

46,848.—Circular Knitting Machine.—Thomas Hawthorne (assignor to Dudson Hawthorne & Bros.), Philadelphia, Pa.:
We claim, First, The radially arranged levers, C, to each of which is permanently secured a self-acting needle, c, in combination with the annular plate, D, its zig-zag edge, and the presser wheels, I, the whole being arranged and operating as set forth.
Second, The combination of the said vibrating levers and self-acting needles with a serrated presser wheel and the said annular plate with its zig-zag edge for the purpose specified.

46,849.—Well-boring Apparatus, etc.—Henry Howson, Philadelphia, Pa., assignor to the Rock-drill Manufacturing and Mining Company, Pa.:
I claim the use, substantially in the manner described, of cams or eccentrics in combination with the arresting devices herein described, or the equivalents to the same, for controlling the downward velocity and force of well-boring rods.

46,850.—Apparatus for Operating Torpedoes, etc.—John L. Lay, Buffalo, N. Y., assignor to himself and W. W. W. Wood, Philadelphia, Pa., assignors to Donald McKay, East Boston, Mass.:
I claim, First, The pipe, C, arranged to receive and to act as a guide for the shell in combination with a stem or rod for pushing the shell through the said pipe, all substantially as set forth.
Second, The plate or socket, D, and straps, E, secured to the vessel and arranged for the reception and retention of the end of the pipe, C, substantially as described.
Third, The internal pipe, I, adapted to the reception of the operating bar, K, and arranged for attachment to and withdrawal from the pipe, C, substantially as described for the purpose specified.

46,851.—Picket Boat and Apparatus for Discharging Torpedoes.—Wm. W. W. Wood, Philadelphia, Pa., and John L. Lay, U. S. Navy, assignors to Donald McKay, East Boston, Mass.:
We claim, First, the spar, D, connected to a boot and controlled by tackle, substantially as described, in combination with the within described socket or its equivalent, for carrying and retaining a submarine shell or torpedo.
Second, The socket composed of the tube, d, its chamber, e, and plate, I, the whole being constructed and arranged for the reception of the torpedo substantially as set forth.
Third, The projection, K, of torpedo passing through an opening in the plate, I, and the retaining and releasing pin, m, and lanyard, t, the whole being arranged and operating substantially as described.
Fourth, The arms, n, cords, n', of the socket and lanyard, p, arranged in respect to the projection, f, of the torpedo, substantially as and for the purpose set forth.

46,852.—Apparatus for Carrying and Exploding Submarine Torpedoes.—Wm. W. W. Wood and John L. Lay, Buffalo, N. Y., assignors to Donald McKay, East Boston, Mass.:
We claim, First, The spar, B, sleeve, C, and its shaft, D, constructed and applied to a vessel substantially as and for the purpose herein set forth.
Second, The guide, d, chains or ropes, G and F, in combination with the said spar, B, and movable sleeve, C, the whole being arranged and operating substantially as described.

46,853.—Apparatus for Operating Submarine Shells or Torpedoes.—Wm. W. W. Wood, Philadelphia, Pa., and John L. Lay, Buffalo, N. Y., assignors to Donald McKay, East Boston, Mass.:
We claim, First, The combination of the operating bar, H, the internal sliding rod, 12, and the jaws herein described, or other equivalent retaining or releasing devices, the whole being arranged and operating substantially as described for the purpose specified.
Second, The packing, 13, secured to the internal rod, 12, and fitting to the interior of the operating rod, 13, as and for the purpose set forth.
Third, The casing, 14, arranged on the end of the operating bar, H, for the reception of the shell, 15, as and for the purpose herein set forth.
Fourth, The combination, substantially as described, of the operating bar, H, with a cord, 23, so arranged and so connected with the shell and with appliances for igniting the charge in the same that the bar as it approaches the limit of its inward movement shall be the cause of exploding the shell.
Fifth, The chamber, 22, combined with the casing, 14, and arranged for the reception of the discharging cord, 23, as set forth.
Sixth, The two driving shafts, F and F', with their chain bands, the chains, Q and G, and the operating bar, H, the whole being constructed, arranged and operating substantially as set forth.
Seventh, The click wheel, L', operated from one of the driving shafts, and arranged to control the clutches on the said shafts, as set forth.
Eighth, The sliding blocks, I and V', caused to traverse in guides by the aid of screws, substantially in the manner and for the purpose described.
Ninth, The sleeve, T, adapted to the operating bar, H, and combined with the mechanism herein described, or the equivalent to the same, whereby the said sleeve can be turned in a vertical or horizontal plane, as herein set forth.
Tenth, The said sleeve, T, in combination with the slides and guides and operating screws herein described, or the equivalent to the same, whereby the said sleeve can be moved to and fro horizontally.
Eleventh, The adjustable stop of the steam cylinder, in combination with the sleeve, T, and the system of levers, chains and pulleys herein described, or the equivalent to the same, whereby the said sleeve can be raised and lowered and its downward motion limited, as set forth.
Twelfth, The combination of the said movable sleeve, T, the operating bar, H, and ball and socket joint, the whole being constructed and arranged for joint action substantially as set forth.
Thirteenth, The combination of the said sleeve, T, its friction rollers, V V, and the operating bar, the whole being arranged and operating substantially as and for the purpose described.
Fourteenth, The arresting plate, 2, in combination with the operating bar, H, and its internal rod, 12, the said plate being arranged to operate in conjunction with the appliances herein described, or the equivalents to the same, substantially as and for the purpose herein set forth

46,854.—Auger.—E. C. Gillette, Richfield, British Columbia:
I claim the cam sleeve, C, in combination with the slotted shaft, C, and with the flat notched shank, D, of the auger, constructed and operating in the manner and for the purpose substantially as set forth.

[This invention consists in the application of a standard in combination with an auger in such a manner that said standard will guide and support the auger while boring, and that the greater part of the twists usually given to augers for that purpose can be dispensed with; further, in the use of a graduated shaft in combination with the auger and standard in such a manner that the depth of the hole can be observed at any moment without taking the augur out; finally, in the application of a cam sheer in combination with a slot in the lower end of the shaft and with a flat notched shank of the auger in such a manner that the auger can be readily fastened to or unfastened from the shaft whenever it may be desired.]

46,855.—Manufacture of Cigars, Cigarettes, etc.—Lazarus Morgenthan, Baden:

I claim as a new article of manufacture the fichtennadle cigars above described, the tobacco being partially filled with preparations derived from shoots of the pine tree, substantially in the manner and with the effect herein set forth.

I also claim the fichtennadle preparations herein described adapted for use in the manufacture of cigars in the manner and for the purposes herein set forth.

46,856.—Method of Lubricating Machinery.—Pierre Etienne Proust, Paris, France:

I claim the method, substantially as herein described, of lubricating journals, consisting of the simultaneous application of water and grease, as set forth.

46,857.—Machine for Pulling Flax.—Anson Burchard, Livingstonville, N. Y.:

I claim a frame mounted on wheels which form a fulcrum for the frame to vibrate on, which frame is armed with a series of stationary teeth in combination with a series of traversing teeth arranged to operate substantially as described for the purpose set forth.

And in combination with the devices above claimed I claim the clearing pan for removing the flax from between the teeth after it is pulled.

46,858.—Lock.—William B. Dodds (assignor to himself and Neil Macneale), Cincinnati, Ohio:

I claim, first, The method of operating and detaining the bolt by means of the dog pivoted thereto, the bit of the dog engaging the detent stump when the bolt is thrown substantially as described and represented.

Second, The method of operating and adjusting the disc tumblers by the application to each of a disc or annular armed plate provided with a pin, which latter projects through the hole in its appropriate tumbler and engages with the arm of the annular plate appertaining to the tumbler next in series substantially as described.

Third, The washer interposed between the tumblers in the series and prevented from rotating by the tooth which engages in the slot in the socket substantially as and for the purpose described.

46,859.—Molder's Table.—Jacob Lebrau, Cincinnati, Ohio:

I claim the rolling or tipping table for molders' flasks constructed and operating substantially as and for the purposes set forth.

46,860.—Elastic Packing for the Exterior of Pumps in Deep Oil Wells.—Joel Moulton, Boston, Mass.:

I claim the packing elastic material one or more made to embrace the exterior of the tube and having a flaring flange or cup as described adapted to expand into the inequalities and crevices of the shaft or well under the pressure of the superincumbent water and its or their own elasticity substantially as described.

46,861.—Burner for Gas Stoves.—Edmund Osmond, Cincinnati, Ohio:

I claim the heating gas burner formed of the tapering or contracted tube, B C, applied to the service nozzle, a, in the manner set forth.

46,862.—Faucets.—Joseph Nottingham Smith, Jersey City, N. J.:

I claim closing the faucet by a valve or stopper shutting upward in its orifice substantially as and for the purpose herein specified.

I also claim the inclosing spout or discharge tube, D, arranged and applied substantially as and for the purpose herein set forth.

I also claim the combination of the handle, G, with or without a spring, o, in combination with the slotted ears, H H, of the discharge tube, D, substantially as and for the purpose herein described.

I also claim the vent aperture, i, in combination with the valve, c, and discharge tube, D, for the purpose specified.

46,863.—Machine for Raking and Loading Hay.—Joseph Nottingham Smith, Jersey City, N. J.:

I claim pivoting the draught hooks, I I, to the rear of the elevator frame, so as to produce the necessary length of the draught line to insure freedom of motion, as set forth.

I also claim the swinging frame, L, with its lever, K, whereby the draught hooks may be detached from the wagon or cart, and the elevator is retained and supported in its upward position after being detached, substantially as and for the purpose herein specified.

I also claim the construction and arrangement of the side rake teeth, Q R S, substantially as and for the purpose herein specified.

I also claim the combination of the inwardly gathering side rake teeth, Q R S, and the elevating teeth, P P, constructed and arranged substantially as and for the purpose herein set forth.

I also claim the arrangement of the rake, so as to be drawn flat on the ground, by the freely-vibrating or double-pivoted draught bars, N N, drawing the rake teeth by the rear ends thereof, substantially as herein set forth.

I also claim the concavely curved under surfaces of the rake teeth, together with the projecting heels, u u, behind their pivot shaft, n, for the purpose set forth.

I also claim constructing the elevator with its rake heads, e e e, inside of and its teeth, f f f, projecting through the endless apron, D, substantially as and for the purposes herein specified.

46,864.—Closing Bottles.—Robert Robinson, New York City:

I claim the valve or stopper, B, with the spring, C, attached to it, in connection with the conical neck, A, of the bottle, substantially as described.

I further claim the cap, D, provided with the frame or projection, E, or its equivalent, for pressing in the valve or stopper, B, and serving as a guide for the escaping liquid, substantially as described.

46,865.—Machine for Cutting Files.—Alfred Weed (assignor to himself and Lewis J. Bird), Boston, Mass.:

I claim, First, Supporting the blank by a roller so constructed and arranged as to be susceptible of a lateral movement or play, and so as to keep the top surface of the blank always horizontal and present its whole width to the chisel, as set forth.

Second, The combination of an elastic pad or bunter attached to the cutter arm with an adjustable stop, so operating together that while preventing variation in the force of the blow, as the file is being fed along, the depth of the cut may be regulated at pleasure, substantially as described.

Third, I claim the method herein described of holding and feeding the file blank by means of a feed mandrel or shaft carrying the one end of the blank in a central socket and a bed, or the equivalent thereof, for the support of the other end or of any part thereof intermediate between the two ends, in combination with a pressure pad or lever for holding the blank on the support, substantially as set forth.

Fourth, In combination with a feed mandrel or shaft holding one end of the file blank, I claim a roller bed and a pressure pad for supporting and holding the other end or any part thereof intermediate between the two ends.

Fifth, The construction and arrangement of the roller, u, shell, w, and ball shaft, v, as described.

46,866.—Breech-loading Fire-arm.—Isaac Sutvan (assignor to Barton H. Jenks), Bridesburg, Pa.:

I claim, First, The combination of a vibrating breech piece and a vibrating latch and hammer when said vibrating latch and hammer are both placed in a fork or recess in the movable breech piece.

Second, I claim the safety device or locking the latch brace by means of the projection or inclined planes on the top of the hammer acting on the under surface of the latch in its forward movement, thus securely locking the breech before the hammer can explode the cartridge.

Third, I claim the action of the latch upon the trigger and hammer when the breech is open preventing any forward movement of either before the breech is closed and relieving itself from the top of the trigger, substantially as described.

RE-ISSUES.

1,900.—Lamp.—Joshua E. Ambrose, Middletown, N. Y., assignor to Sarah E. Ambrose, Passaic, N. J. Patented April 23, 1861:

First, I claim the use or employment of the water chamber, C, communicating through a stoppered opening with the body or fountain, A, of the lamp, and arranged to operate substantially as and for the purpose set forth.

Second, The arrangements of the springs, k, shaft, g, and wheels, h, substantially as shown, for elevating and lowering the wick, as described.

Third, In combination with the cone, K, I claim the short tube, I, for the attachment of movable inner deflecting plates, for the purpose specified.

Fourth, I claim the plate, N, constructed as shown, and operating with the outer cone, K, for the purpose described.

Fifth, I claim providing the deflecting plates, L and M, with the flanches, as described, and combining either of them with the wick tube, F, for the purpose specified.

Sixth, I claim the use or employment of either of the deflecting plates, L and M, having flanches constructed as described, in combination with the wick tube, F, and tube, I, for the purpose set forth.

Seventh, I claim arranging and combining the cone, K, cap, J, and either of the deflecting plates, L and M, so that the base of the flame shall be brought between the two deflectors, for the purpose herein described.

Eighth, I claim making the slots of the deflecting plates, L and M, and of the cap, J, narrow, for the purpose described.

Ninth, In combination with the wick tube, F, and cone, K, I claim the use or employment of either of the deflecting plates, I and M, or cap, J, as shown, for the purpose specified.

1,901.—Loom.—Merrill A. Furbush, Philadelphia, Pa., and George Crompton, Worcester, Mass., assignees of Edward W. Brown, Fall River, Mass. Patented July 25, 1854:

We claim, first, The combination of the pattern chain, the pawls, and the reversible tappet shaft, or their equivalents, substantially as described.

Second, The tappet shaft, constructing and operating substantially as herein described, to turn about its axis, in either direction, or remain at rest, as desired, for the purpose specified.

Third, The reversible tappet shaft, or its equivalent, in combination with the pawls or their equivalents, constructed and arranged substantially as described and for the purpose specified.

1,902.—Condensing and Separating Oils and Gases.—Wm. G. W. Jaeger, Baltimore, Md. Patented June 28, 1859:

First, In apparatus for condensing oils and other liquids, I claim, in combination, an annular condensing chamber, through which the vapors of oils and other liquids are to pass as they come from the retort or still, a condensing surface surrounding such chamber, and a condensing surface surrounded by such chamber.

Second, I also claim the combination of a condenser with the conducting pipe, m, having an inclined bottom, substantially as described, whether the condenser be arranged within or without a refrigerating surface, or with both such surfaces, in the manner here shown.

Third, I also claim a trap at the discharge end of the worm or other pipe of a condensing apparatus, for trapping the uncondensed gases and preventing their escape from the end of the condenser, substantially as above described.

Fourth, I also claim placing a pipe or other opening back of the discharging end of the worm or condenser, for the delivery of uncondensed gases from the same, substantially as above described.

Fifth, I also claim the combination of a pipe or other opening back of the discharging end of the worm, with a trap, substantially as above described.

Sixth, I also claim a fan or other means for creating a suction, in combination with a pipe, x, opening into the worm or condenser, as shown, for taking off the gas therefrom, substantially as described.

Seventh, I also claim interposing a condenser between the retort and condensing worm, to secure the heavy oils before they reach the worm, substantially as described.

Eighth, I also claim the use of a fan or equivalent means for relieving the pressure of the vapors in a condensing apparatus and still, and facilitating their movements through such apparatus, substantially as described.

1,903.—Machine for Cutting Tobacco.—F. W. Ritterhoff, C. A. Colquitt and Wm. Mulchahey (assignees of Ritterhoff & Colquitt), New York City. Patented Feb. 23, 1864:

We claim, first, The lever catch, L, applied in combination with the spindle, M, of the follower, O, and with one or more eccentrics, G, substantially as and for the purpose set forth.

Second, The adjustable levers, H, in combination with the lever catch, L, eccentrics, G, and followers, O, constructed and operating substantially as and for the purpose specified.

Third, The tappets, J, in combination with the adjustable levers, H, lever catch, L, eccentrics, G, and follower, O, constructed and operating substantially as and for the purpose described.

Fourth, The movable nut, P, in combination with the spindle M, constructed and operating in the manner and for the purpose substantially as set forth.

DESIGNS.

2,037.—Stove Ornament.—Isaac De Zouche, Cincinnati, Ohio, assignor to Bridge, Beach & Co., St. Louis, Mo.

2,038.—Door Lock.—Burton Mallory, New Haven, Conn.

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-THIRD 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 *seventeen 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 the three last 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.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

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.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

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, &c., 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 F 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 VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted byCongress 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. 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.

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.

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 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.

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	$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

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 assignments 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.

Notes and Queries

W. B. H., of N. Y.—We find that the errors you mention in your rule for cutting screws, given on page 9?, current volume, were committed by you in your MS. It was very plainly written, as you state, and was revised with the greatest care. The errors were in the examples given, however, and not in the printed rules, so that they will have no effect on the several formulæ.

H. H., of Ind.—You ask us to tell you how to turn a piece of round iron perfectly square. We answer, put it in a planer; that is the quickest way to "turn" it square. You can make a rod any shape in a lathe if you have a rest properly made, and a "former" or pattern to move the rest in and out, but that is an operation which requires special tools. If you cannot understand the rules for change gears we are sorry; they seem simple to us. Try this one, for a compound or four-gear lathe. Guess at any three wheels you like; say the wheel and pinion on the stud and the driver on the spindle; then multiply the number of teeth in the driver on the spindle by the ratio of the lead screw to that you desire to cut, and again by the teeth in the wheel on the stud which meshes in the gear on the screw; divide the product by the stud wheel in contact with the first driver on the spindle, and that will give the number of teeth on the lead screw, or the last wheel driven.

W. L. B., of Mass.—We have no recollection of the water wheel which was to be driven by water forced by a steam engine, but it needs no knowledge of the result to answer your question. It did not "amount to anything." It would manifestly be more economical to apply the steam engine directly to the machinery, as there would be considerable loss of power in applying the water to a wheel.

W. L. B., of Cal.—Your plan for protecting iron ships from fouling, by means of copper sheathing, with gutta-percha between the iron and copper, we believe is not new. Should there be any metallic connection between the two metals the copper would be protected at the expense of the iron, which would be very rapidly corroded.

J. F., of N. Y.—To make water-proof cloth take two pounds four ounces of alum, and dissolve it in ten gallons of water; in like manner dissolve the same quantity of sugar of lead in a similar quantity of water, and mix the two together. The cloth is immersed for one hour in the solution, and stirred occasionally, when it is taken out, dried in the shade, washed in clean water, and dried again. This preparation enables the cloth to repel water like the feathers of a duck's back, and yet allows the perspiration to pass somewhat freely through it, which is not the case with gutta-percha or india-rubber cloth.

C. H. W., of Mass.—The temperature at which steam will condense in an air-tight vessel depends entirely upon the quantity of steam contained in the vessel; the greater the quantity the higher the temperature at which condensation will take place. Gmelin says that if all pressure, including that of their own atmospheres, were removed, all bodies would take the gaseous form at all temperatures, but Rankine says that the zero of gaseous tension is 493·2° Fah. below the freezing point of water

J. McD. and J. D. D., of N. Y., and E. W. G., of Mass.—We are not able to give you the information sought.

M. G. T., of Mich.—Address H. C. Baird, No. 406 Walnut street, Philadelphia, for Bourne's Catechism, which is the book you require.

J. E., of N. Y.—King's Notes on the Steam Engine.

N. C., of Pa.—You say that you are using a machine which is an infringement of a patent held by another party, as recently re-issued, but which was not an infringement of the original patent, and you inquire whether you are liable for such infringement. We answer unhesitatingly that you are liable for continuing the use of the machine after the re-issue, although it was put in operation before the re-issue. The re-issue goes back to the date of the original patent, and is granted upon the ground that the whole invention was intended to be covered by the original patent, but through accident or mistake the patentee omitted fully and properly to state and claim his full invention. In such case the law grants him a re-issue, whereby he corrects the mistakes, and it relates back to the date of the original patent; but the patentee cannot recover for any infringement committed before the date of the re-issue.

D. J. S., of N. Y.—The sewing-machine patent of Elias Howe, Jr., was issued Sept. 10, 1840, and was extended for seven years from Sept. 10, 1846. A second extension can only be obtained by a special act of Congress. Of this probability you can judge as well as ourselves.

R. D. B., of Md.—Zinc is the most susceptible metal to heat. Platinum is the least so.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

SPECIAL NOTICE TO INVENTORS.

The money receipts on account of patent business, which have heretofore been published in this column, and the notification of cases sent to the Patent Office, will for the present be discontinued. The receipt of specifications and money from inventors will be acknowledged promptly by mail.

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.

CHIEF QUARTERMASTER'S OFFICE,
No 1139 Girard street, Philadelphia Depot. March 9, 1865.

PROPOSALS FOR LEATHER.—SEALED PROPOSALS will be received at this office till THURSDAY, March 23, 1865, at 12 o'clock M., for delivering at the Schuylkill Arsenal:—
Wax upper leather, best quality, oak tanned, from slaughter hides, well finished and stuffed, to weigh not less than six and three-quarter (6¾) ounces to the square foot.
Sole leather, best quality, oak tanned, from Buenos Ayres or La Plata hides, to weigh not less than fourteen (14) pounds per side.
Welt leather, best quality, oak tanned, slaughter leather, to average about sixteen (16) pounds (original weight). Each side to weigh not less than fourteen (14) nor more than twenty (20) pounds, to be taken at the finished weight. Sample to be seen at this office.
All leather to be subject to measurement, weight and inspection at the Arsenal.
Bidders are requested to submit samples of the leather they propose to furnish, which must be of suitable quality and substance for making army boots and bootees.
Each proposal must state when the deliveries will commence, the quantity to be delivered each week, the price (*which should be written both in words and figures*), and conform to the terms of the advertisement, *a copy of which should accompany each proposal.*
Bids will be opened on Thursday, March 23, at 12 o'clock M., and bidders are requested to be present.
The right is reserved to reject any bid deemed unreasonable, and no bid from a defaulting contractor will be received.
Each bid must be guaranteed by two responsible persons whose signatures must be appended to the guaranty, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.
All proposals should be made out on the regular forms, which will be furnished on application at this office.
Indorse envelope "Proposal for (here state the kind) Leather," and address
Col. WILLIAM W. McKIM,
1 Chief Quartermaster, Philadelphia Depot.

CHIEF QUARTERMASTER'S OFFICE,
No. 1139 Girard street, Philadelphia Depot, March 15, 1865.

SEALED PROPOSALS will be received at this office till TUESDAY, March 28, 1865, at 12 o'clock M., for delivery at the Schuylkill Arsenal:—
¾ or 6-4 Blue Wool Flannel, indigo wool-dye, to weigh 5½ ounces to the yard, of ¾ width, for sack coats. Army Standard.
¾ Gray Twilled Flannel for Shirts, Army Standard.
Red, White, and Blue Bunting, Army Standard.
¾-inch Yellow Silk Lace, Army Standard.
½-inch Sky-blue Silk Lace. Army Standard.
½ inch Scarlet Lace, Army Standard.
W. Brown Thread, No. 35. Bidders to furnish sample.
Red Spool Cotton, No. 40. Bidders to furnish sample.
4-4 Black Silesia. Bidders to furnish sample.
Straw Wrapping Paper, 36x40, to weigh about 95 pounds per ream.
Parties offering goods should make separate proposals for each article offered, and must distinctly state in their bids when they will commence their deliveries, the quantity they propose to furnish each week, the price (*which should be written both in words and figures*), and conform to the terms of this advertisement, *a copy of which should accompany each proposal.*
Standard samples of the articles required may be seen at this office. Samples when submitted must be marked and numbered to correspond with the proposals; and the parties thereto must guarantee that the goods shall be in every respect equal to army standard, otherwise the proposals will not be considered.
Bids will be opened on Tuesday, March 28, 1865, at 12 o'clock M., and bidders are requested to be present.
Each bid must be guaranteed by two responsible persons, whose signatures must be appended to the guaranty, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.
All proposals should be made out on the regular forms, which will be furnished on application at this office.
The right is reserved to reject any bid deemed unreasonable, and no bid from a defaulting contractor will be received.
Indorse envelope, "Proposals for (here insert the name of the article offered)," and address
Colonel WILLIAM W. McKIM, Chief Quartermaster,
13 2t Philadelphia Depot.

PACKER'S PATENT ELECTRIC SOAP.—PREVIOUS to bringing this soap into market I thought it well to prepare the mind that something "new under the sun") has at last been discovered that will drive out of use many villainous compounds that destroy our clothes and injure the hands of the washerwomen; and it will be borne in mind the Electric Soap has neither salt, rosin, clay, ashes, soapstone, potash, or any other adulteration or substance that can shrink or injure the finest fabric, and yet, in the truest sense of the word, electric in removing grease, dirt, tobacco stains, printing ink, smoke, and the worst bilge-water stains, and imparting brilliancy to marble, glassware, plate jewelry, enameled paintings, paper and patent leather, immediately, and for cleaning floor tiles, has no equal, and yet again for the bath, and particularly for shampooing, the Electric Soap is a perfect luxury.
The parties about entering into the manufacture of the Electric Soap are among the most reliable in the city, sanguine and determined to give the public one of the purest, whitest and best soaps, and not the least of its many virtues will be its price, so that every body, and their neighbors, can test its superiority.
Prior to my application for a patent many competent judges put the Electric Soap to severe trials, and testified that it accomplished all I claimed, and considered it one of the most useful discoveries of the age.
Notice will be given in the leading papers, and otherwise, of the Electric Soap as soon as the company finish their works.
DANIEL F. PACKER,
(Care Loudback & Gilbert,)
1* No. 23 Park Row, N. Y.

ASSISTANT QUARTERMASTER'S OFFICE,
No. 451 EIGHTH AVENUE, NEW YORK. March 9, 1865.

CAVALRY AND ARTILLERY HORSES WANTED.—I will purchase in open market all horses that may be presented and pass inspection at the Government stables on Thirty-fifth street, near Tenth avenue, until further notice, as follows:—
Cavalry horses, 5 to 10 years old, 15 to 16 hands high.
Artillery horses, 6 to 10 years old, 15¾ hands high, and over 1,100 pounds, and dark color.
Price for cavalry horses, $165. Price for artillery horses, $180. Payable in such funds as may be furnished by the Government.
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STEAMSHIP OWNERS, ENGINE BUILDERS, MANUFACTURERS having engines of any description, will do well to examine Abbe's Universal Piston, with which any inexperienced person can expand the packing of cylinders 100 in. diameter in ten minutes. Patented June 7, 1864. Illustrated Vol. XI., No. 4, SCIENTIFIC AMERICAN. Send for circular. J. R. ABBE, Providence, R. I. 1*

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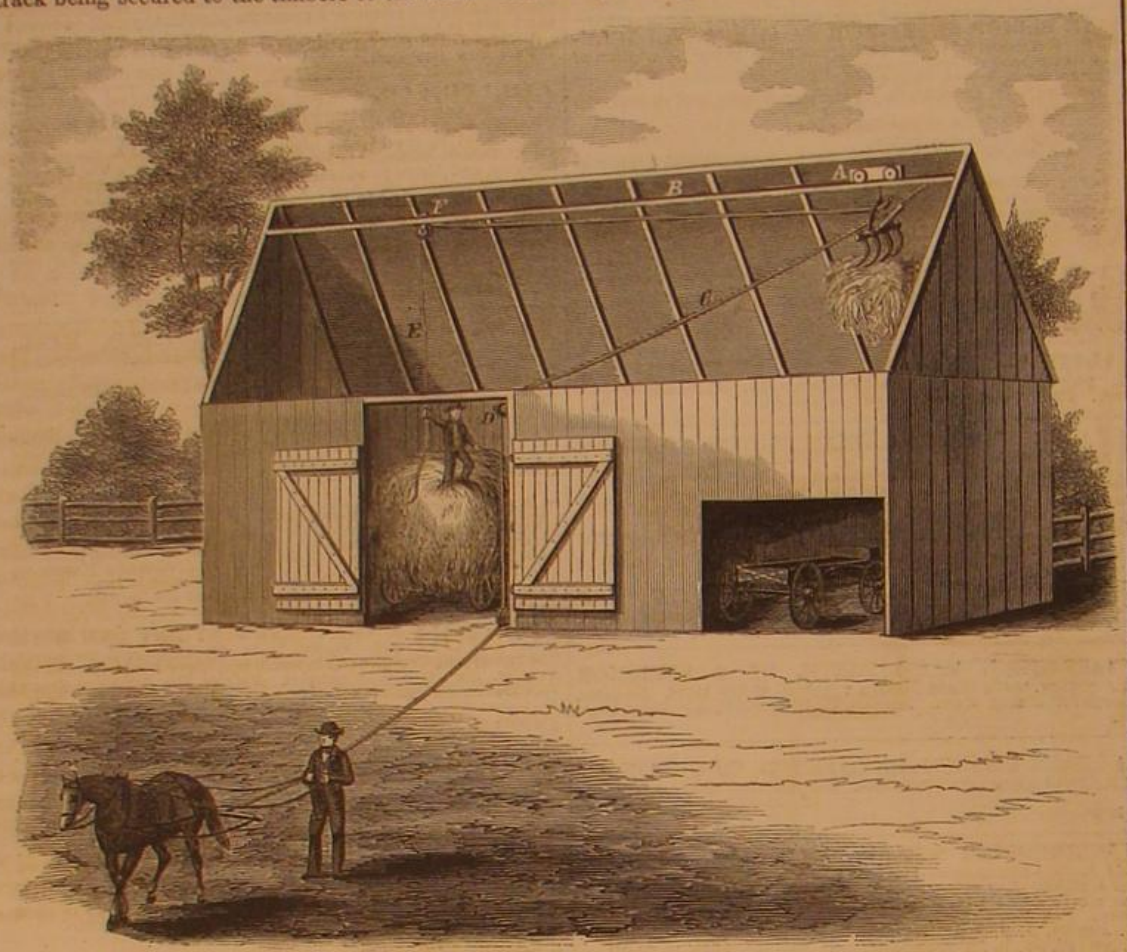

HINMAN'S ARRANGEMENT FOR STORING HAY.

hay fork is suspended from this car and so arranged as to be easily lowered and elevated. A rope, C, runs over pulleys, D, fixed at suitable points, and the team draws the car along the track. When it arrives at the proper point the man on the load trips the fork with the line, E, and drops the hay wherever he chooses. There is a slight inclination in the track so that the car returns of itself.

This obviates the necessity of waiting for a team to back up, for the car draws the slack of the rope up itself, and the horse can turn and walk to his place. The saving in time by this peculiar feature amounts to considerable in haying season when large wages are paid. The stop, F, can be set at any point and wherever the car hits it the fork descends, either over the "mow" or any other desired point.

This is a simple and easy working arrangement for the purpose, and is not liable to derangement. It is the invention of N. D. Hinman, of Pleasant Vale, Conn., and was patented through the Scientific American Patent Agency on the 29th of November, 1864. For further information address him as above.

Healing Power in Various Nations.

The great vital energy of savage, compared with civilized nations, is shown by the relatively greater healing power of nature possessed by the former. The experiments made in this respect extend to all races. Leigh mentions the case of an Australian, whose temporal bone had been fractured by a blow, and the temporal artery divided, and of another whose ulna and radius had been fractured in a terrible manner, that the first took part on the following day in some public meeting; and that, though worms appeared in the arm of the second, the recovery in both took place without any operation, or even dressing. Similar cases are to be found in Barrington and Dawson. Though but one in four recovers from the operations of extirpation of the genital organs which are performed on negroes, by the slave-dealers in East Sudan, many examples prove that nature's healing power is as great here as among other negroes. This extends also to the white races living in Africa; although Russegger points out that in the hot climate of tropical Africa, wounds heal very slowly in the European, especially during the rainy period. Others, however, maintain that in the tropics, *e. g.*, at Trinidad, wounds heal rapidly, even in Europeans. W. Earl ascribes the natural healing power among the Malays to their vegetable diet, which prevents violent inflammation. Petit reports a series of his own observations in Abyssinia, that those who are punished by having hands or feet cut off, as well as the children or adults who are emasculated, or have the whole genitals extirpated, do not generally die from the operation, although the wounds are entirely left to the healing power of nature. Parkyns relates similar instances. To the Moors, Cheniers ascribes that great innate healing power and insensibility to pain, which has been so often attributed to the native Americans.

"A 1"

The expression "A 1," applied popularly to everything of the first quality, is copied from the symbols of the British and Foreign shipping list of the Lloyds, A, designates the character of the hull of the vessel; the figure 1, the efficient state of her anchors, cables and stores; when these are insufficient, in quantity or in quality, the figure 2 is used. The character A is assigned to a new ship for a certain number of years, varying from four to twelve, according to the material and mode of building, but on condition of the vessel being statedly surveyed, to see that the efficiency is maintained. When a vessel had passed the age for the character A, but is still found fit for conveying perishable goods to all parts of the world, it is registered Æasterisk in red. Ships Æ in black form the third class, and consist of such as are still found, on survey, fit to carry perishable goods on shorter voyages. Classes E and I comprise ships sufficient to convey goods not liable to sea damage; the one class for voyages of any length, the other for shorter voyages.

How to catch Curculios.

Mrs H. Weir, of Johnsonville, New York, writes to the *Rural New Yorker* as follows:—

"In May last, we had occasion to use some lumber. It was laid down in the vicinity of the plum yard, and on taking up a piece of it one cold morning, we discovered a number of curculios huddled together on the under side. On examining other boards we found more, so we spread it out to see if we could catch more, and we continued to find more or less every day for two weeks. We caught in all one hundred and sixty-one. So I think if people would take a little pains they might destroy a great many such pests. These were caught before the plum trees were in flower. What is most singular is, that we never found a curculio on a piece of old lumber, although we put several pieces down to try them. They seemed to come out of the ground, as we could find them several times a day by turning over the boards."

Boilers under the English House of Parliament.—It is said, by an English paper, that there are twenty steam boilers under the floor of the House of Parliament, many working at high pressure and not tested as to their strength for years. It might create a deal of excitement, if some morning the reports of parliamentary proceedings in the papers were to wind up suddenly with, "Here the debate came to an end by the blowing up of all the members. A new ministry and opposition, with the requisite number of members to work both, will be inmediately required."

TO
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Vol. XII.—No. 14. (NEW SERIES.)

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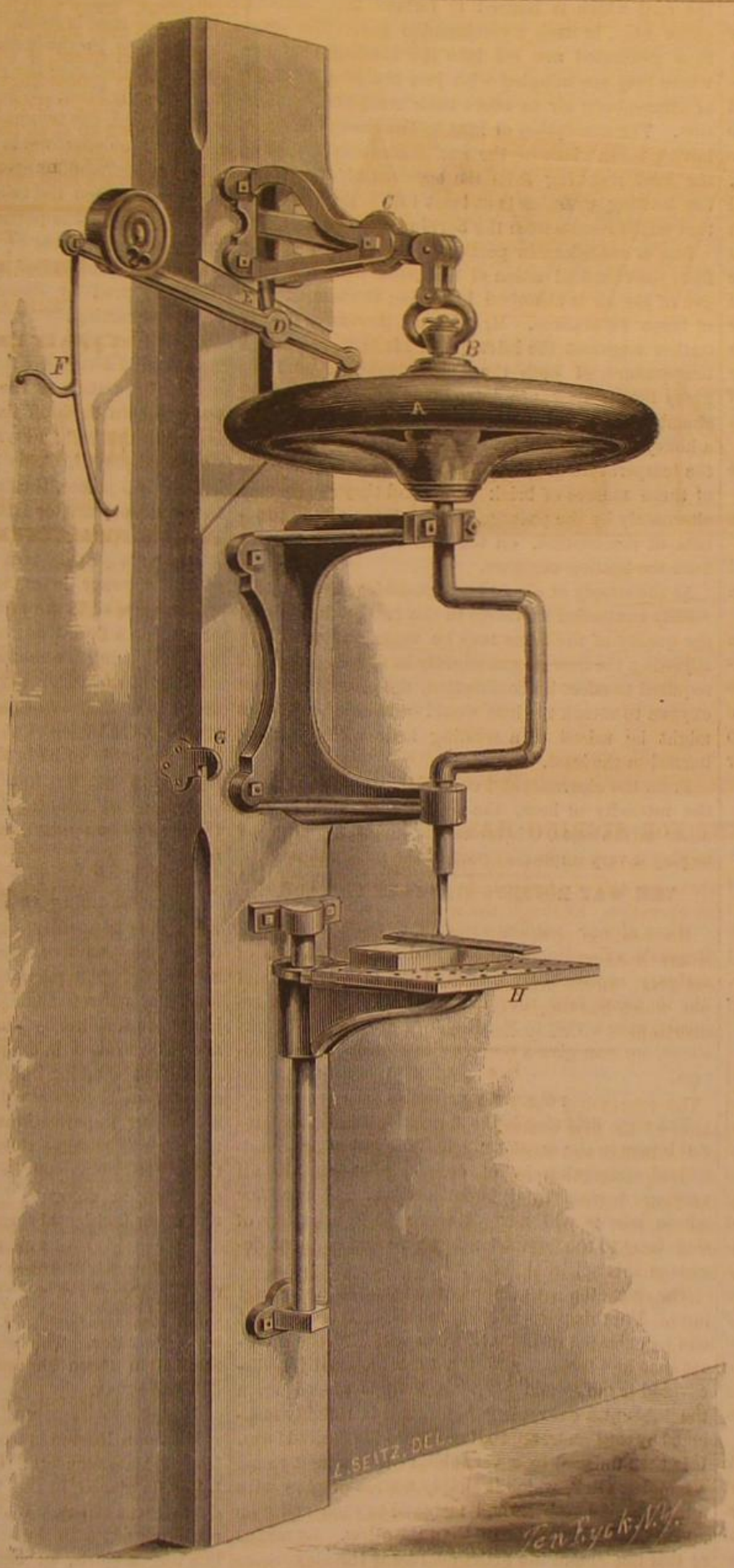
Hand Drill.

Small manufacturers—such as wagon and iron-railing makers, and workers of iron in general, have frequent occasion to drill holes in metal, and where steam or water power is used it is easy to apply it for the purpose. Sometimes, however, neither of the motors are available, and resort must be had to hand power.

The drill machine here illustrated is convenient for the purpose. It is provided with a balance wheel, A, as shown, which serves to steady the action of the drill, and also as a weight to feed it down. The upper end of the spindle is provided with a swivel joint, B, to which the lever, C, is connected; by working the second lever, D, which is attached to the first by a link, E, the brace and wheel may be elevated so as to put the work in place; there is also a hook, F, which fastens over a catch, G, on the post and keeps the wheel suspended while the work is adjusted. The table, H, is made to raise and lower to suit different kinds of work. This drill may be erected any where and is very easily turned by one man or a stout boy.



LYON'S SELF-FEEDING HAND DRILL.

Fig. 2 represents an attachment used for holding bars so that they can be drilled endwise for the reception of bolts or other pieces; either round or square bars can be held in it. Another advantage claimed in the drilling machine is that it has a gage connected with it, so that any number of holes can be drilled or countersunk to any depth, say from an eighth of an inch to 3 inches, and they will all be the same without spending any time to measure them. This is of great importance, as in many cases they require to drill almost through the plate; and as the drill will regulate this it is admitted by all who have used them to be of great importance.

This drilling machine is now used by gas companies, railroads, founderies, steam engine shops, scale makers, carriage makers, and in iron railing works; in all of these places they are much approved of and commended.

The machine was patented by Warren Lyon through the Scientific American Patent Agency on the 21st of January, 1865; for further information address Messrs. Lyon & Isaacs, No. 12 Pine street, New York, or at the factory, No. 9 Jane street, New York.

The Manufacture of Steel in Pittsburgh.

We make the following extracts from the *Oil News and Mining Chronicle*, of Pittsburgh:—

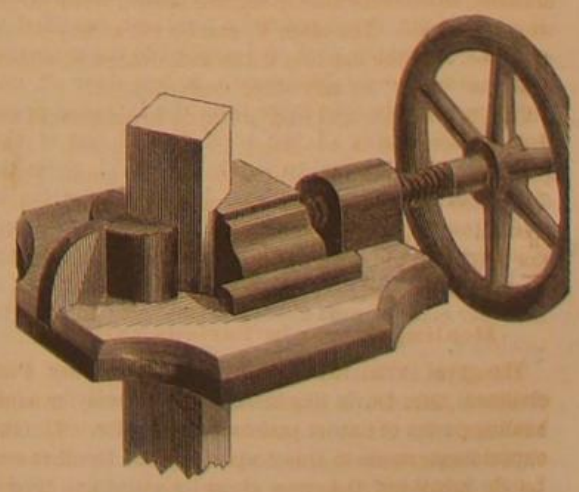
To a stranger visting our "smoky city," nothing in the way of sight seeing would be of greater interest than an inspection of any one of our large steel works. We were greatly interested as well as astonished. a few days ago, on visiting the "Black Diamond Steel Works," of Messrs. Park, Brother & Co., to find that the business of manufacturing cast-steel had made such strides in this, "the Birmingham of America," which is as well entitled to be called "The Sheffield of America."

The "Black Diamond Steel Works" are situated in the Ninth Ward, and bounded by the Allegheny River, and Butler, Smith, and Taylor streets. The works proper, consist of a "converting house," "melting room," "rolling mill," and "forge," of which, with the machinery and furnaces they contain, we propose to give a brief description. The process of manufacturing cast-steel at these works is the same as that adopted by the celebrated cast-steel manufacturers of Sheffield, England! The iron is first carefully "blowed" with charcoal, after which it is rolled into bars of the required size. These bars are then handed over to the "converters" who place them into the converting furnace (in each of which there are two "pots") with alternate layers of charcoal; when the pots are filled the tops are carefully sealed over with a tenacious red clay, and a fire then kindled in the furnace. This fire is kept up from seven to eight days, after which which the furnaces are allowed to cool down, and the "converters" enter the "pots" and take out the charge. The bars which have now been evenly carbonized or converted into "blister-steel," are broken into small pieces and sent to the melting room.

The converting house contains six large furnaces for converting or carbonizing iron, the capacity of each being twenty-five tuns per week or ten days. We now visit the melting house.

THE MELTING HOUSE.

In this building there are seventy-two furnaces or "melting holes," in each of which are placed two "pots" or "crucibles" filled with the broken pieces of carbonized iron as it comes from the "converting" house. Hard coke is used as fuel and as each "furnace" or melting hole has its separate stack or chimney, a strong draft is obtained, and consequently an immense heat created. After the "melter" decides that the "pots" or "crucibles" containing the steel



are ready to be drawn or "pulled out," the workman whose duty it is to do this being covered up with old cloths and pieces of old carpet saturated in water, takes hold of the pots with peculiar shaped tongs and lifts them out, handing them, intensely hot, to the "melter" who taking hold of them with his tongs, skillfully pours their contents into cast-iron molds.

INGOTS.

The steel is then in the shape called ingots, and

these are taken to the forge or to the rolling mill to be hammered or rolled. The capacity of the melting department is fifteen tuns daily, which will, ere long, be increased to twenty tuns.

In this building there is one fifty horse "Corliss" engine which is used to drive the helve hammers and the fans which give blast to the many furnaces used for the heating of the steel ingots. Fourteen steam hammers and four helve hammers are driving away making so much noise that no one when in the building need attempt to speak with any notion of being heard. Here the ingots are forged into finished bars, when they are taken to the "inspection house" for examination, before being sent to market.

The mill, one of the most complete, in this or any other country, contains costly machinery of the most improved description, which is driven by three ponderous vertical steam engines and one horizontal steam engine of the "Corliss patent." To give some idea of the power of these engines it is only necessary to state that one, the largest, is of 550 horse power, one of 225 horse power, one of 150 horse power, and the smallest of 50 horse power; the three largest have each two heavy fly-wheels, 25, 20, and 18 feet in diameter. Two "trains" of rod and sheet rolls are driven by each of these vertical engines, whilst the horizontal engine drives the shears, &c., needed for cutting the steel bars and trimming sheets. We were shown a new description of patent rolls, which are to be used in finishing and polishing round bars of steel which is expected to make a great improvement in the finish of the bars.

The foundations upon which the engines and the mill machinery are placed, are built in the most substantial manner, and no wood or timber of any kind being used they may be expected to last for ages.

Twelve large steam boilers generate the steam used by the seven engines and fourteen steam hammers in use at these works.

Several of the furnaces in use at these Steel Works are built upon the gas generative principle, as patented by the Messrs. Siemen, of England, and are the first of the character erected in this country. These furnaces, after abundant trial, are found to work to the entire satisfaction of the firm, saving full 50 per cent of fuel over the old plan.

SIEMEN'S FURNACE AT PITTSBURGH.

Some time since we published a description of the furnace invented in England by Mr. Siemen, a German, and we expressed the opinion that it would prove a very important invention wherever bituminous coal is used for fuel in the arts. The *Pittsburgh Commercial* gives this account of the use of the furnace in that city:

"The process was first introduced into this country by Park Brothers, extensive manufacturers of steel and sheet copper, at Pittsburgh, under the supervision of Mr. Powe, their capable and accomplished superintendent, who had seen it applied in England. Mr. Powe erected a producer, modified to suit our American coal, and applied to the reheating furnaces of the establishment. It has done all, and in some respects even more than the inventor promised. The quality of the steel turned out of this establishment is equal to any in the world, while the facility of managing the heat is the admiration of every practical man who visits the works. The process requires of course superior intelligence in the manager, but this is rather a virtue than otherwise, as no other class of men should be employed in superintendence.

"In the extensive flint glass works near Park Brothers, Mr. Davis has tested the process for eight months, with the most satisfactory results. The furnaces formerly used about nine tuns of the best coal to do work which is now done by about five tuns of the poorest coal. The finest quality of glass is made at these works. The manageableness of the heat is shown by the fact that a furnace exposed to a temperature of 4000 degrees showed no signs of fluxing, the central pillars coming out with every angle as sharp as when the heat was first applied. In other establishments preparations are making to introduce the new process, and it is very clear that it must rapidly come into general use."

Perhaps a brief description of this furnace will be acceptable to some of our readers, who may have overlooked the one previously given. The first object of the invention is to produce an intense heat. When solid fuel is burned in an ordinary furnace, at least 1000° of heat are absorbed and made latent by the change from the solid to the gaseous form. In Siemen's furnace this change is effected before the fuel is introduced into the heating chamber. This is done by setting a mass of coal on fire in a close chamber, and subjecting it to slow combustion with an imperfect supply of air. In this operation a large portion of the coal undergoes destructive distillation, and is converted into hydrocarbon gases and vapors of a highly combustible nature, while that portion of the coal which is burned is formed into carbonic oxide only, in itself a combustible gas. The gases thus generated are led into the heating chamber, where they are mingled with just the proper supply of atmospheric air to effect their complete combustion. The absorption of heat by the change of state, having taken place in the gas generating chamber, the heat resulting from the combustion of gases in the heating chamber is at least 1000° greater than that which results from the burning of solid coal.

But a considerable portion of the heat resulting from the chemical union of the gases with the oxygen of the air is absorbed in raising the temperature of these substances. Mr. Siemen, therefore, to still further augment the intensity of his heat, raises the temperature of both the atmospheric air and the gases before they are introduced into the heating chamber. This is effected by passing each through a honeycomb mass of brick work previously raised to the temperature of white heat. There are two pairs of these masses of brick work, and they are heated alternately by the passage through them of the products of combustion, on the exit of these products from the heating chamber.

As the supply of air and combustible gases may be readily controlled by valves in the conducting pipes, the quality of the flame may be varied at will. By adjusting the flow of gas slightly in excess of the air required to effect its combustion, the presence of free oxygen to attack the iron would be avoided, and bars might be raised to a welding heat without being burned in the least.

From the clearness and controlability of the flame, the intensity of heat, the absence of smoke, and other advantages, this furnace is doubtless destined to play a very important part in the mechanic arts.

THE WAY ROGERS'S STATUARY IS MADE.

Many of our readers are doubtless familiar with Rogers's exceedingly life-like and spirited groups of statuary representing scenes of the war, and would like to know how they are made. Having just returned from a visit to Mr. Rogers's studio and workshops, we can give a correct description of the process.

FORMING THE MODEL.

The very first step is the formation of the immaterial image in the artist's mind. The gift of this intellectual conception is, of course, possessed in all varying degrees by different artists, and the few whose names will never die owe the immortality of their fame to the possession in a rare and eminent degree of this spiritual power.

The next step is to embody the thought in material form. For this purpose some substance is needed that can be enlarged or diminished at will with the greatest ease and facility, and the best material yet discovered is moistened clay. A lump is placed upon the table at a convenient hight, and is roughly fashioned by the hands, approximating to the desired form. It is then finished by a very simple instrument called a molding stick, which is simply a stick of pine with a little spoon of boxwood fastened to each end, one spoon being more delicate than the other. By means of this implement the artist cuts away the clay where it is redundant, and adds where it is needed, the material being worked either way with surprising ease. During this process the clay is kept of the proper degree of moisture by being sprinkled with water.

THE PATTERN FOR THE CASTINGS.

When the clay model is complete, a single plaster cast is taken for a pattern, and is finished with the most scrupulous care by the artist. This cast is used as a pattern for making whatever number of molds may be needed, to supply the demand for any particular group or statue.

THE MOLDS.

The molds are made of glue softened with water so as to be about as limber and elastic as india-rubber, or of about the consistence of a printer's roller. This is poured over the pattern while in a warm and liquid condition; it is therefore necessary to surround the pattern with a stiff case to hold the glue in place. This case is made of plaster and is built up by hand around the pattern. The statue is placed upon a table, and the workman forms the case around it, leaving a space about an inch in thickness between the statue and the inner surface of the case. The case is made in two parts, the dividing line being a smooth plane, as near as may be in the middle. When the case is finished it is inverted with the pattern statue in the middle of the cavity, and liquid glue is poured into the space around the statue till the space is filled. When the glue has become sufficiently hard, the two parts of the case are removed, and the glue envelope is cut by a thin sharp knife in a line corresponding pretty nearly with that dividing the case. Then the two parts of the glue mold are pulled from off the pattern, and placed again in the corresponding parts of the case, which are bound together by means of a cord, the precise position being secured by dowel pins, and then the mold is ready for casting.

The use of glue for these molds is a French invention, and is a very great improvement. The yielding and elastic nature of the substance enables the mold to be drawn from off the pattern where the pattern is "cut under," and where a rigid substance could not be employed. This permits the mold to be made in only two pieces, thus avoiding a great many seams in the statue, saving labor in finishing, and producing a more perfect and beautiful work.

THE CASTING.

The statuary is made of plaster of Paris. The workman inverts the mold and pours into it a quart or two of a liquid mixture of plaster of Paris and water, shaking it about and pouring all that does not adhere to the inner surface of the mold. He then drops in a number of bent wires, to strengthen the statue at the bends of the limbs and other places particularly liable to be broken, after which he fills the mold with plaster moistened to a soft paste. In about twenty minutes the plaster sets so as to allow the case to be opened, and the glue mold to be pulled off.

THE FINISHING.

Notwithstanding the yielding nature of the glue mold, it is frequently necessary to cut off limbs and other portions from the pattern, and to cast these separately. The parts thus cast are then attached by means of wires to their places on the statue, and the joints are finished by plaster paste. Some parts are apt to be broken in drawing off the mold, and these also must be added in paste applied by hand. These operations, together with the removal of the seams and other imperfections, absorbs a large portion of the labor of casting these statues. Mr. Rogers has three men employed in casting, eight in finishing and two in coloring, besides one or two in boxing and other incidental operations.

THE COLORING.

Mr. Rogers's statuary we regard as among the most exquisite works of art that we have ever seen, and their pleasing effect we attribute in no small degree to their color. This is simply an oil wash which is applied in three successive coatings by means of a delicate brush.

THE ARTIST.

Mr. John Rogers is from the neighborhood of Boston, in Massachusetts, and his statuary must certainly be placed in the very highest rank in this department of art. While the anatomy and features are produced with the utmost fidelity to nature, there is a life, a spirit, an emotion, a soul, beaming forth from the inanimate material that has rarely indeed been equalled or approached by the workers in marble. The emotions, too, excited by this artist's works are the highest and noblest that belong to humanity.

THE manufacturers of Troy have, by mixing different irons, produced one that will resist a tensile strain of 100,000 pounds per square inch of section. 60,000 pounds is considered about the average of good iron.

Horse Chestnuts.

Of all the waste substances which might be profitably employed in domestic economy, there is none which has given rise to more discussion or on which so many attempts have been made as the fruit of the horse chestnut, which contains a large quantity of starch. At various periods the utilization of this product has attracted public attention, and many speculators have essayed to make it an object of commerce.

When first introduced from Constantinople, the fruit of the horse chestnut was considered edible: and Parkinson, writing in 1629, included it among his fruit trees, and described the nut as of "a sweet taste and agreeable to eat when roasted." Very little use has ever been made of the nuts in this country; though in Turkey they are mixed with horse food, and are considered good for horses which are broken-winded. When ground into flour, they are used in some places to whiten linen cloth, and are said to add to the strength of book binder's paste. They contain, moreover, so large a quantity of potash, as to be a useful substitute for soap, and on the latter account they were formerly extensively employed in the process of bleaching. The nuts contain a great deal of starch.

In March, 1776, Lord Wm. Murray obtained a patent for extracting starch from horse chestnuts, which was merely by peeling them, grating the nuts, washing the pulp several times, and baking it or drying it.

Various attempts have been made to utilize them by producing sugar and spirit from them; and on removal of the bitter principle, excellent edible fecula and maccaroni have been made from horse chestnuts in France.

"Fecule de marrons d' Inde" is now made by H. de Callais, sold at twenty-two francs the kilo, 18 Rue de Bellevue, Passy, near Paris. The process adopted by this maker permits the purifying of the fecula without having recourse to the peeling which was formerly considered indispensable, and hence the extraction of the starch is as easy and cheap as that from the potato. The following is given as the cost :—

	Francs.
Collection of 20,000 kilograms of horse chestnuts in the park of St. Cloud	400
Conveyance to the factory of the Abbey de Val, belonging to Mr. Becappe	280
Manufacture and total other charges	200
Total	880

Horse chestnuts are much used on the Continent, especially in the Rhine districts, for fattening cattle and for feeding milch cows. Hermstadt gives the following analysis of a sample dried in the air, and with 21·8 per cent of the shell removed:—

Starch	35·42
Flour fiber	19·78
Albumen	17·19
Bitter extract	11·45
Oil	1·21
Gum	13·54
Total	98·59

Pabet estimates that 100 lbs. of dried horse chestnuts are equal in nutritive value to 150 lbs. of average hay. Another authority, Petri, makes them equal, weight for weight, to oatmeal.

The starch obtained from the horse chestnuts is white, and when thoroughly washed, perfectly free from any bitterness. They yield 29 to 30 per cent, and sometimes nearly 35 per cent, and contain besides a glutinous matter which, according to Liebig, possesses eminently nutritive properties, but which experience proves very inferior to the gluten of cereals. Adopting the analysis of M. Chevallier and M. Lefrage, 17 per cent may be taken as the main yield of starch with operation conducted on a large scale. Therefore, in its starch produce, the horse chestnut may be taken to be equivalent to the potato, which contains about 25 per cent in the solid state, but after deducting the pulp rarely yields more than 18 per cent of starch.

Mr. Mercandier, in the "Journal Economique" for December, 1757, stated that horse chestnuts furnish a soapy water, proper for bleaching linen. The same observer remarks that the pulp or residue of the starch furnishes an excellent food for the poultry in the farmyard, and which can be employed as a fuel.

In 1780, M. Bon, President of the Royal Society of Montpellier, published a process founded on the use of alkaline leys "for softening horse chestnuts and rendering them fit for fattening cattle in countries where acorns and pulse are not used for that purpose." About the same period an abbot of Anchin, in French Flanders, discovered a means of extracting from horse chestnuts a good oil for burning, and obtained from their flour a weaver's starch, which was used subsequently by weavers of Geneva.

FARMERS' CLUB.

From the great variety of subjects discussed at the meeting of Tuesday, March 21, we select the following:

FROZEN POTATOES AND FISH.

The question of the effect of freezing on potatoes being again introduced, Dr. Trimble remarked that whether the potatoes were injured or not depended wholly on the rapidity of the thawing. If they are thawed very quickly they are ruined, but if they are immersed in cold water, or, better still, if they are buried deeply in cold ground, where they will thaw very slowly, they will not be injured. The same is the case with apples and with fish. The speaker had seen a basket of fish frozen so solid that they rattled like dry sticks, and, on being placed in well water, in half an hour they were swimming about as lively as ever.

GRAFTING.

Solon Robinson, in reply to a correspondent, stated that a rose may be grafted with success upon the yellow locust, and that the large Spanish chestnut may be grafted upon our common chestnut.

ABOLITION OF FENCES.

It seems that Solon Robinson and some other members of the Club have long been contending for the general abolition of fences, advocating a law compelling owners of stock who wished to pasture their animals to fence them in or herd them, so that farmers who chose to dispense with fences might do so with impunity.

A communication was read from Livingston County, in Illinois, saying that in that county the plan is in successful operation, the general practice of farmers being to dispense with fences. Solon Robinson stated that he was informed on good authority that the unfenced lands in that county are quite as high in price as the fenced farms of other counties, showing that this simple regulation will save the great expense of fencing the western prairies.

Mr. Ely, the President, remarked that the same system is in operation in the valley of the Connecticut River, both in Connecticut and Massachusetts.

CLOTH FROM MILKWEED.

Dr. Henry Guernsey, of 37 East Eleventh street, New York City, exhibited samples of cloth made in part from the down of the milkweed, the warp being of silk, wool or cotton, and the filling of the milkweed down. It is necessary to remove the glossy smoothness from the fibers to make them adhere to each other, and this is done by treating them with vegetable oil. The process is patented. It is estimated that 500 pounds may be obtained from an acre, and the fiber takes colors as readily as silk.

BOOKS AND PUBLICATIONS.

DEMOREST'S ILLUSTRATED MONTHLY MIRROR OF FASHIONS.

This is an exceedingly useful publication to ladies who desire to dress handsomely at a low price. By the aid of the illustrated patterns, not fashion plates, all the latest styles of children's garments, cuffs, neckties, and a great many other things which are so fearfully and wonderfully made that we don't know the names of them, any person can cut and make their own decorations as well as those sold in the stores.

Combined with this leading feature, there are a number of short stories and poems which will serve to pass an idle hour pleasantly. For sale at all bookstores.

MANUAL OF DRAFTING INSTRUMENTS AND OPERATIONS. By S. Edward Warren, C. E. John Wiley, publisher, 535 Broadway, N. Y.

Mr. Warren has in this work given a great deal of practical information upon the use of drawing instruments, both as relates to the construction and use of them. It is a very useful and indeed indispensable work to artisans who are learning mechanical drawing by themselves or without a teacher. Shading in white and colors is also treated of, and instructions are given to represent woods of different kinds, also iron and brass. Every one interested in this subject should procure the work.

UNDINE, THE WATER SPRITE; THIODOLPH, THE ICELANDER, and GHOST STORIES, illustrated by Darley, are all romances published by Isaac Miller, 525 Broadway, N. Y.

The first named is the charming, world renowned tale of Fouque, and needs nothing further to commend it to our readers. The Ghost Stories are, says the title page, "collected with a particular view to counteract the vulgar belief in ghosts and apparitions," which they will doubtless do, if there are persons nowadays who believe in such nonsense.

A Water Propeller.

At the Sheffield Literary and Philosophical Society's annual gathering, a model was exhibited of an improved invention for propelling ships. The idea is an old one, but there is considerable novelty in the details. A screw is placed in a horizontal cylinder or tube in the bottom of the vessel, with a short perpendicular suction pipe. The motion of the screw forces water into a valve-box, from which are four open tubes, two to the bows and two to the stern of the vessel. The forward motion of the vessel is obtained by closing the bow tubes and running the water out of the valve-box by the stern tubes in a strong stream. The vessel is backed by closing the stern tubes and running the water out at the bow, and can be kept motionless by running half the water in each direction. All this being done by a mere regulation of the valves, without stopping, reversing, or otherwise interfering with the speed of the engine. The invention has been tried on the Sheffield dams, it is said, with complete success. The inventor is Mr. Terry, clerk at Sheffield.

[Why not put the propeller itself in the water and have done with it?—EDS.

Method of Working Poor Ores of Lead.

The operation on lead ores, which contain too little lead and too much quartz to be smelted profitably, Lampadius treats with muriatic acid, with heat, upon plates on stone or lead, by which the galena is completely converted, if the ore has been properly prepared, into chloride of lead. The mass is then lixiviated in tubs with double bottoms, holding each 15 or 20 cwts., with boiling water, to extract the chloride of lead, which crystallizes out in great part on cooling, the mother liquid being again heated to boiling, and used over again continually. The deposited chloride of lead is reduced to the metallic state by zinc, forming a spongy lead, which may be either melted down or used for making white lead, &c. Some iron having been thrown down from the chloride of zinc solution by chloride of lime, the zinc must be precipitated by lime as pure white oxide of zinc, suitable for pigmentary purposes.—*Chemical Centralblatt.*

Paper Carriages.

"A Patent Carriage Company, Limited," has been formed at Birmingham, for the purpose of bringing into use sundry novel improvements. The framework is of angle-iron, welded. By using this several inches of space are saved, and added to the accommodation. The panels, which in ordinary cabs are of wood, in these new ones are of papier mache. The paper resembles leather, but is stiffer and very tough. Every part of a cab usually of wood, indeed, is in this instance made of paper. The springs are beneath the body, which brings the wheels 5in. nearer than in the ordinary vehicle, and yet also gives additional room in the width. The window runs along the roof on the inside, and draws down like a sash; and there is a sash door, which may be pushed down, and coils itself below the body of the vehicle. The ventilation is also improved. One style of Hansom has a top which slides down, and thus an open carriage is provided. The cost of vehicles is said to be considerably reduced by the new mode of construction.

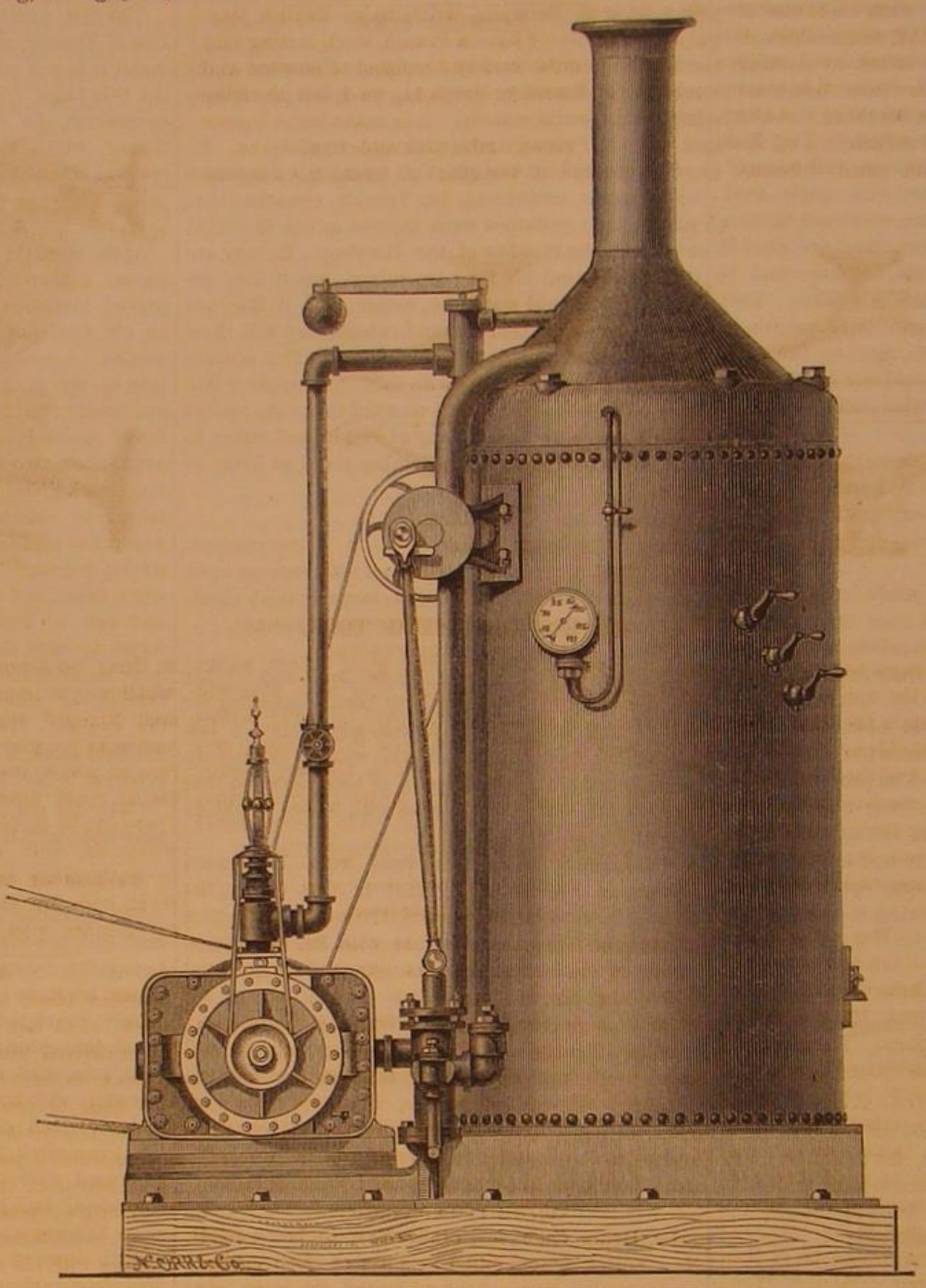
AT the mines of Traversella, in Savoy, magnets revolving on a wheel are used to pick up the iron from the powdered ore, leaving the copper-pyrites behind.

Double Piston Square Engine.

This new and simple steam engine continues to attract a great deal of attention from the engineering world, and having in several previous numbers referred to its novel construction and great practical efficiency, we now present it in a portable form, with boiler, heater, pump and fixtures, ready for the application of steam, adapted to mining, boring, pumping petroleum, and for any other use to which its capacity may be applied.

The engraving represents an engine of 15 horse-power, with upright cylinder boiler, with fixtures and connections complete, on a scale of one twenty-fourth or one-half inch per foot; the boiler is four feet diameter, seven feet high, with 127 tubes four feet long, of two inches external diameter, and ample space for circulation. The fire-box is 36 inches high and 42 inches diameter, has 9½ square feet of grate, and over 200 square feet of heating surface. The steam is taken from a circular dome attached to the top of the boiler with perforated tubes, to avoid priming. The exhaust passes through a heater into the funnel, which is 12 feet high and 12 inches diameter.

These portable engines, of 5, 10, and 15 horse power, are manufactured by "The Root Square Engine Company, and are for sale by Benjamin & Root, 155 Duane street, New York, where they can be seen in operation, and all further information be obtained.



ROOT'S DOUBLE PISTON SQUARE ENGINE.

The Great Floods.

From all parts of the country the telegraph sends tidings of great disaster to life and property from freshets. The severe winter left behind it huge snow drifts which, melting on the approach of warmer weather, swelled the small streams, feeding the large rivers so that they overran their banks, with the results as above stated.

In some portions of the country the damage has been much greater than others, and in the valley of the Susquehanna particularly the loss is great. At Harrisburgh, in 1846, the year of the great flood, the water rose to 22 feet above low water mark.

This year, however, in one day the water had reached nineteen feet above low water, and at seven in the evening it reached twenty-four feet eight inches, eighteen inches higher than in 1846. Some idea of the rapidity of increase in volume, may be gathered from the fact that during the space of eleven minutes by the watch, the river had risen three inches. From nine to four o'clock it rose two feet, and continued to rise at the rate of seven inches per hour.

Between two and six o'clock the following afternoon there was a rise of some twenty inches, being a decrease of rate as to hight attained, but not as to volume.

Early in the morning the engine room of the City Water Works was submerged, the fires extinguished, and the engines stopped working.

The scenes and incidents are thus described by the Philadelphia *Inquirer*:—

"Timber, in all shapes came rushing down with the rolling torrent at the rate of about eight miles per hour. It was curious to see, as they approached the bridge, how they appeared like so many battering rams, bent on a war of extermination. They seemed to prepare themselves for the occasion. Now and then a sleek, fat 'boom log' would come sailing along like a clipper ship, and, nearing the bridge, would poise itself for the attack, and go crashing through the weather-boarding and timbers much to the delight of the urchins assembled; or, failing in that, would gracefully rebound, and then dive under to reappear on the other side, on its voyage to the Chesapeake. But the bridge stood these damaging attacks most manfully. Stretching far as eye could reach, almost, was the yellow, muddy element, raging and roaring where it met with obstacles, like the billows of a troubled sea, spitting its white foam in mad glee. An immense concourse of people were intent upon watching the bridge and the mad capers of the floating timber."

The damage in Harrisburgh alone is estimated at $1,000,000.

Browning Iron and Steel.

The *Moniteur des Interets Materiels* publishes this receipt for giving a brown color to the surface of polished iron or steel: Mix four parts of water by weight, one part gallic acid, two parts chloride of iron, two parts chloride of antimony. The chloride of antimony (butter of antimony) should contain the least possible acid in excess. Dip a sponge in the mixture and rub the metal to be colored. By repeating the process the color can be deepened at will. Wash thoroughly with water, and when the surface is dry cover it with a light coating of boiled linseed oil.

Apple Wine.—Williams Pratt, of East Hartford, has been experimenting in making and preserving cider, and has an article which he calls "refined" cider. He removes all impurities by refining, which leaves the cider nearly as colorless as water. It is then colored a light olive color by putting in a little burnt sugar and chopped raisins, and the cider comes out perfect in flavor and color, and will keep for years. It is really apple wine.

Effects of Shot on our Iron-clads.

The *Montauk* recently arrived at the Washington Navy Yard. This vessel has been on active picket service off Charleston and Savannah for over two years, and shows some two hundred and fifty marks of the enemy's shot, shell, etc., expended in futile attempts to injure her, amongst the most dangerous of which was the explosion of a torpedo directly under her port boiler, while she was in front of Fort McAllister, in the Ogechee river, below Savannah, starting some bolts and rivets, and necessitating the bolting down of a large sheet over the break on the inside; also, on the port side the marks of four solid shot, three of which have cracked the five one-inch plate sheathing on the hull, and one going entirely through, lodging somewhere in the four and a half feet of wood, behind the five-inch plates, which composes the overhang. A solid shot fired from a ten-inch columbiad at direct short range, whilst on picket duty in Charleston harbor, has left an indentation in the turret (which is composed of eleven one-inch sheets) of about three inches, without any very perceptible injury on the inside.

The *Montauk* comes to this yard to receive two 15-inch guns, now on the wharf at the yard-sheers, in place of her present 15-inch gun, which has been fired five hundred times, and is declared unfit for further service, and her 11-inch Dahlgren shell-gun. Her ports are to be enlarged in order to allow her new guns to be fired with the muzzles outside of the ports, and thus obtain more elevation and a better range.—*National Intelligencer.*

A Self-acting Candlestick

Among the objects recently displayed at the South London Exhibition was a rough model of a candlestick, which, the inventor says, possesses the following extraordinary properties:—"Indicates the time after the candle is partly consumed; repeats the hours over again if required; snuffs itself out, rings you up, opens your door, boils a pint of water, by a pot which boils at both ends, to make a cup of tea or coffee, and rings a bell when the water boils; rings the servant up, and drags off the bedclothes, and pulls her out of bed if refusing to get out at the proper time."

Damp Corn.

A Chicago contemporary says: Disappointment is expressed at the condition in which the new corn is coming to market, scarcely any of it passing inspection as No. 1, the great bulk coming in rejected, and very damp at that. The winter weather it seems has been too steadily cold for drying out the corn, which improves better under a changeable temperature if it is not too wet.

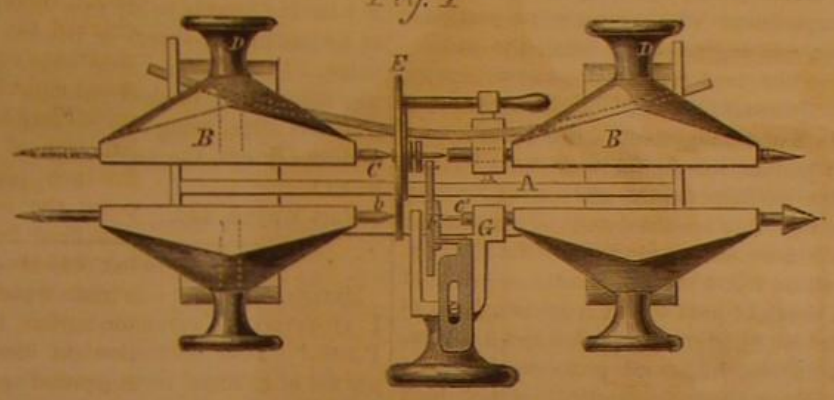
[How does this happen when there are so many kilns for drying grain invented, patented, illustrated and advertised yearly?—Eds.

The Difference.—"After staying eighteen years in this country," said Prof. Agassiz, "I have repeatedly asked myself what was the difference between the institutions of the old world and those of America; and I have found the answer in a few words. In Europe every thing is done to preserve and maintain the rights of the few; in America, *every thing is done to make a man of him who has any of the elements of manhood in him.*"

Improved Depthing Tool.

This engraving illustrates an invention used by watchmakers to determine the correct position or depth of the lever in relation to the balance. An ordinary tool of this description has two sets of centers side by side, one set to take in the arbor of the balance, and the other to take the lever staff, so that the correct position of the latter, in regard to the balance, can be ascertained. In such tools one of the centers, which takes the lever staff, passes through the balance, and the arms of the latter, by striking said center, prevent the mechanism from being set in motion until it is taken from the depthing tool and adjusted on the watch; the final adjustment of the watch has to be accomplished with great difficulty and loss of time. These disadvantages are overcome by this machine. It consists in the application to one of the centers intended to sustain the lever staff, of a U-shaped supporting bar, provided with a suitable center to take in the loose end of the lever staff, in such a manner that the whole mechanism can be set in motion while in the depthing tool, so that the relations of the principal parts can be found with ease and celerity; precisely the same as if the movement were in the watch.

Fig. 1



RUSH'S DEPTHING TOOL.

The construction is as follows:—The bed, A, is similar to all others; on this bed there are two sets of heads, B, which carry four centers, C; these centers can be adjusted by the screws, D, to suit the lengths of the staffs to be held in them. The centers, C and *c'*, are intended to take the arbor of the balance, E; and the staff of the lever, F, is placed with one end in the center, *c'*, and the other end in the center in the U-shaped bar, G, before spoken of, which is attached to the center, *c'*, by a set screw or otherwise. The center, *b*, which would otherwise interfere with the motion of the balance, is not required to support the lever, F, and the various parts of the escapement can be adjusted without difficulty. The loose end of the hair spring, *e*, Fig. 2, is secured in a stud, *d*, which, in turn, is attached to the center, C, being adjustable thereon by means of a set screw. The U-shaped bar bears the spring, *f*, Fig. 2, with projections or pins on the ends to take the place of the banking pins that have to be used in an ordinary lever watch. By means of this tool the lever can be adjusted to the correct depth without placing it in the watch, and the entire operation may be performed while all parts are plainly visible. This invention was patented through the Scientific American Patent Agency, Dec. 6, 1864, by Artemus Rush, of Fairfield, Iowa; for further information address him at that place.

Asiatic Manna.

A letter from Mr. Hardinge, to Sir Roderick Murchison, describing the appearance of a large quantity of manna in July, 1864, observed near Diarberker, Asia Minor, was published some time since, and created a good deal of controversy regarding the nature of manna. We believe, however, that there can be very little doubt that it is a species of lichen, which, like a fungus, springs up in the course of a single night, and thus gives rise to the notion that it has fallen from the skies. This manna is ground into flour and baked into bread, the Turkish name of it being "Kudert-bogh-dasi," which means wonder-corn, or grain. Though used as bread, its composition is remarkable; for it contains more than 65 per cent of oxalate of lime, and has about 25 per cent of amylaceous matter. This substance is evidently the manna of the Hebrews, who gave it the name of "Man-hu," which signifies "What is it?" from the circumstance of its sudden appearance and their previous unfamiliarity with it.—*Technologist.*

Use of the Common Nettle in Yellow Fever.

Mr. P. W. Nicoll, of Jersey, Eng., having seen the accounts in the papers of the fearful ravages of the yellow fever at Bermuda, writes to an English journal as follows:—"I have a French work stating that the common nettle dried and reduced to powder, and used as a condiment for preparing food, is a preserver against this fearful malady. It is made into a liqueur and sirup in France, and is preferable to absinthe. I have succeeded in bringing this useful but despised plant into general use here with great benefit, as acknowledged by several medical men, both here and in London. To preserve it it should be put in bottles or any package which preserves it from damp and mildew. By its use a man can be his own doctor, and if living in the country, without any expense. The late M. Soyer, the prince of cooks, recommends it justly as a good and wholesome vegetable."

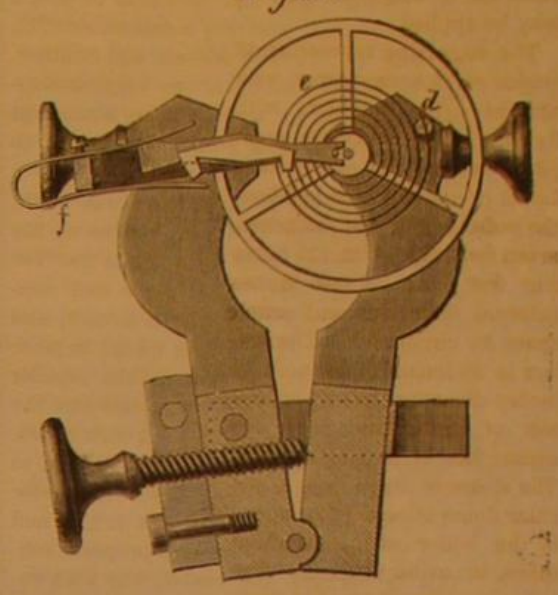
National Defenses.

During the last session of Congress Mr. Sherman, of Ohio, in the course of debate made the following sensible remarks:

"We have provided here $1,000,000 for field-works and field operations, and the very fact that during this war these improvised earthworks made entirely of earth, with wooden magazines, which are drier and better for many purposes, according to the books, have resisted us more than any other form of fortification, ought to prevent us from continuing the old system of fortifications. Wherever earth can be found, wherever it can be hauled, wherever it can be reached, it is admitted now to be the best basis of fortification, and granite works and stone-works are to be only used where earth cannot be found. That is shown by one case of Fort Fisher and by the case of Fort McAllister. Not a single one of the old fortifications which cost this country $150,000,000 has ever been of any material service to us or, I believe, to the rebels. The $150,000,000 which have been expended in fortifications, if put out at interest at the time the money was expended, and accumulated to this hour, would carry on this war for one year. There never has been money worse wasted than that we have spent in building a system of fortifications which must be changed every ten or twelve years to adapt them to modern improvements.

"I have been perfectly willing to vote any amount of money for building iron-clads and iron boats wherever they have been demanded. I believe the only way to defend our sea-coast is by building a certain class of monitors and boats to float in our harbors. It appears to me sensible and reasonable that a single battery floating upon a monitor in the port of New York, for instance, in such a position that it can be moved from place to place, can follow a public enemy, itself impervious against attack, so strongly armed that the most powerful projectile now known to modern warfare cannot penetrate, is the proper kind of harbor defense upon which we must rely. Earthworks, and stoneworks, and guns planted on the shores will not answer the purpose. Hereafter naval contests and all contests along the shore will be such contests as that between the *Monitor* and *Merrimac*, where they were eye to eye, face to face; and the cannon exploded within eight feet of where the shot struck. If ever hereafter two maritime nations are engaged in war, the great battles on the sea will not be at the distance of a mile, like the battles of the Nile and Trafalgar, but they will be wrapped together face to face, more like the battle of Lake Erie, under the gallant Perry. Sir, we shall hereafter rely for the defense of our ports upon the iron-clads. Iron supersedes stone. This is the age of iron; no longer the age of stone. Earthworks which may be improvised in a month will disappear, and iron-clad turrets and monitors, and all the numerous progeny that will spring from the inventive race of which we are a part, will supply us with ample coast defense in case we have a foreign war. These can be made within a year. These can be made within one tenth of the time that a single field-work or fortification can be built. We must rely upon them, and therefore I am opposed to this constant expenditure upon an old system of fortifications.

Fig. 2.



Analine Black.

Aniline black is a colored derivative of aniline, which, so to say, completes the series of brilliant colors derived from this base. It differs, however, in many respects from the other colored derivatives. The mode of production, the way of fixing it on fabrics, and the insensibility to physical and chemical agents which it presents are points on which it differs essentially from the red, blue, and violet of aniline. M. Lauth's process, which is admitted to be but a simple modification of Mr. Lightfoot's, consists in printing with the mixture of hydrochlorate of aniline and chlorine of potassium an insoluble oxidizable salt, which will become soluble on the fabric—sulphide of copper, for example. By the oxidizing action of the chloric acid (or the chlorine which is set free by the reaction of hydrochlorate of aniline on chlorate of potassium), the sulphide of copper is transformed into sulphate. In this same process some of the disadvantages of Mr. Lightfoot's process are avoided. It is more economical, the mixture does not act on the steel rollers, nor does it weaken the fabric—not more, at all events, than madder black. The color is very permanent, and is fixed at from 20° to 40° C. Its composition allows of its being printed with all sorts of colors. Aniline black has a specially beautiful appearance; it has a very rich black velvety look. It is completely insoluble in water, alkaline, or acid, and is not affected by soap. Acids change the black to green, but the original color is restored by an alkali. Bichromate of potash deepens the shade, but a very strong solution slightly reddens it. Strong chloride of lime bleaches it, but the color returns after a time.

Composition for Coating Wood.—A method of coating wood with a varnish as hard as stone has been recently introduced in Germany: the ingredients are forty parts of chalk, forty of rosin, four of linseed oil, to be melted together in an iron pot. One part of native oxide of copper, and one of sulphuric acid, are then to be added, after which the composition is ready for use. It is applied hot to the wood with a brush, in the same way as paint, and, as before observed, becomes exceedingly hard on drying.

Correspondence

Facts Concerning Screw Propulsion.

Messrs. Editors:—The subject of screw propulsion being much under consideration by engineers and scientific people it may not be amiss to give a few details to the point. Noticing a communication on page 150, Vol. XI., on twin screws, and another, page 182, and having the details of one very successful twin screw steamer, as well as being somewhat acquainted with many others, I take the liberty to send the following:—

At the time the propeller *Independence* was built, which your correspondent, R. C. B., writes of, 300 tuns was about the largest ever built, while now 700 to 800 tuns is the usual size. They were not confined so much in the size of their wheels as now, and the notion prevailed that large wheels would be more effective with the same engine power, than smaller wheels wholly submerged; the consequence was the engines were almost always overloaded with wheel. The wheel being turned slow the water had time to slip away, and much power was lost. It is now found that wheels small in proportion to engine and a rapid motion is best if the wheels are properly submerged. This is perhaps the reason why with engines and boiler the same, the power applied to one wheel drove the *Independence* so much faster than when applied to two wheels; her motion was very slow at best. There have been many twin screw steamers built lately and all have been very successful, and we can draw from them some arguments in their favor. The opinion is still held by many that one screw is preferable; "first cost," perhaps, influencing some, but as the size of vessels increase the feeling grows in favor of twin screws. The distribution of the weight over greater space increases the durability of the vessel, and in case of accident to one there is still a fair propelling power in the other. In the summer of 1860 the twin screw steamer, *Iron City*, made a voyage from Saut St. Marie, through Lake Huron, to Detroit, she having lost one wheel a few miles above the "Saut"; many instances have been known of the same kind. Twin screws being smaller can be more submerged and can be hung further forward which diminishes the danger to machinery when the stern is lifted by a wave; the greater exemption from dangers of collision in consequence of the greater ease with which they can be maneuvered in all circumstances, are arguments strongly in favor of twin screws.

The steamer *Monitor* came out in the spring of 1863; her dimensions are as follows:—Length of keel 201 feet, breadth of beam 30 feet, depth of hold 12 6 in. She has two vertical, direct, high pressure engines, 26½ inches bore, 30 inches stroke, attached to Loper wheels 8 feet 6 inches in diameter, and two return flue boilers 20 feet long, 8 feet diameter of shell. She was built for speed and has been a decided success, beating the fastest propellers on the lakes so far.

In the fall of 1863 the steamer *Pewabic* came out. This boat was built principally for freight; her performances have been very remarkable; her dimensions are:—Length of keel 200 feet, breadth of beam 31 ft., depth of hold 12 feet 6 inches. Govt. tunnage 738, draft of water with 80 tuns fuel and 400 tuns freight on board—forward, 8 feet; aft, 9 feet 6 inches. She has two boilers, length of each 21 feet; diameter shell 9 feet, with 5 direct flues; two of 14 inches diameter, 3 of 10 inches diameter, 110 return flues 3 inches diameter; length of grates 5 feet 6 inches, width of same 6 feet 9 inches; one smoke stack for both boilers, 60 inches diameter; two vertical, direct, high pressure engines, bore 26½ inches; stroke, 30 inches; two Loper wheels 8 feet 6 inches, 16 feet pitch; steam pressure used, 72 lbs., distance cut off, ⅜, revolutions per minute, 86; speed with everything as above, 12 miles per hour. She has beaten everything she has been alongside of yet, either screw or paddle, without any increase of steam pressure, using steam full stroke; she has been so remarkable a success that it has occasioned many inquiries. It seems to be partly due to the genius of her engineer, who superintended her machinery from the beginning, and partly to her water lines being very hollow near the stern post giving a very free current of water to and from the wheels.

Screws seem to be more successful as hollow water lines are more used. Your correspondent, "Naval Engineer," thinks single screws best on full vessels; perhaps it is because single screws are farther away from the hull than twin screws are, but the growing improvements in marine architecture must soon do away with such a reason. The vibration occasioned when the fans of a single screw pass the stern and rudder posts must be very destructive to the hull. I notice all the older one-wheeled propellers are badly hogged aft, probably occasioned by this vibration. For many purposes the single screw will no doubt be best especially where sufficient immersion is attainable and for small crafts, but it is still to be ascertained by experiment with properly proportioned wheels—boiler, and engine power being the same—which will give the best results, one or two screws, and we can only await the decision. Meantime it is certain all kinds of arrangements have their appropriate place; paddle wheels for very shoal waters, twin screws for medium depths and screws for deep waters. The following are the details of a small one screw tug built here last spring called the *Pioneer*. length over all 54 feet 4 inches, breadth of beam 11 feet 4 inches, depth of hold 4 feet 5 inches, draft of water with fuel for 24 hours, forward, 3 feet 3 inches, aft, 4 feet 3 inches, immersed cross section 26.5 square feet. Engine, single, vertical, direct high pressure, bore 10 inches, stroke 12 inches, wheel Loper, diameter 4 feet, pitch 7 feet 6 inches. Boiler length, 8 feet, hight, 6 feet, width, 40 inches, with 50 return flues 2 inches diameter, length of grates, 4 feet, width, 2 feet 8½ inches, square feet heating surface, 232·6, pressure steam used, 70 lbs., revolutions per minute, 130, fuel used per hour, ⅛ cord of wood; speed as above, 10 miles per hour. She is a very hollow line model with largest frame located at mid length of load line. J. W. C.

Sugar Island, Mich., Feb., 22, 1865.

[These are interesting facts; it is believed by our leading engineers here that single screws are more economical than double ones.—Eds.

Comments on Slovenly Workmanship and Want of System.

Messrs. Editors:—Your remarks in a late number on turning and boring tools are very true, especially as regards keeping the cutting edges the same shape until the tools are worn out. Grinding a little off the extreme edge in a hurry until the tools are the reverse of their original bevel, is a very slovenly practice, and a sure sign of a botch. In order to do first-rate work, great care is necessary in the grinding of lathe tools. It is an utter impossibility to keep the requisite edge and slant upon them unless the grindstone is kept in good trim. In some shops the foreman objects to have the stone turned up frequently, from a mistaken notion that it is wasting it. There is a large propeller shop in Buffalo, N. Y., where several hundred hands are employed, and only one grindstone for machinists, boiler-makers and blacksmiths. The consequence is that after one day's use the stone becomes about the shape of a horse's head. I have seen instances of good workmen leaving because the foreman obstinately declined to have it turned up. Further comments on such slovenly style are unnecessary.

I see by your last week's issue that grinding valves together with emery had gone out of practice for fifteen years. I can assure you that in the aforesaid shop of untrue grindstone notoriety this slovenly and abominable habit of grinding valves is still continued, although everybody that knows anything about it knows that a scraped joint is vastly superior to a ground one. The fact is they have no true iron surface plate in these shops, or they would quickly find out by applying it to a ground surface that it is further from perfection than before the oil and emery were applied. The same remarks may be applied to piston rings. In such shops, after the piston and packing are turned, the piston is put in the lathe again; a sheet-iron spring clamp is put round the rings; the follower is tightened up by degrees, and emery and oil are showered on in the most filthy and wasteful manner for hours. The antiquated style in which work is still done in some shops has to be seen to be believed. There is a total want of system—"a place for nothing, and nothing in its place." New mandrels have to be made for every job; wooden chucks and bolts to be got ready. A man that has been accustomed to work in a shop with tools to work with, and seeing work done as it ought to be done, feels in a shop of that kind a regret that he was not brought up a feeder of swine.

Another thing I wish to call your attention to is the shocking bad care that some men take of machines. A splendid new lathe, got up in the best and most modern style, will in a few years become a perfect scrap heap, through the dirty, slovenly, and careless work-in-a-hurry style of the men. The shears of a slide lathe are often got up with great care and accuracy, and might be just as good after twenty years' use, but for the abominable practice of not having boards to lay over them. Nothing ought to be laid on the shears or bearing parts of any machine. I have seen a shop where not even a wrench was allowed to be laid on them. The consequence was that after being in constant use for upward of a dozen years, the tools sold for above their value when new. A Veteran Latheman.

Fort Wayne, Ind.

Dental Plates.

Messrs. Editors:—In your issue of Feb. 18, 1865, I observed a communication headed "Dental Plates." Your correspondent complains of his upper set of artificial teeth producing a galvanic action in the mouth since the teeth were repaired. I think the trouble with his plate is that the solder used in repairing them was of an inferior kind, alloyed with too much copper or brass. The fluids of the mouth being probably more or less acid, from decomposed food around the teeth or other causes, a galvanic action might very possibly obtain. A pure article of gold will not usually produce any unpleasant sensation of a galvanic nature, or cause a brassy taste in the mouth. There are cases, however, but very rare, where a metallic plate cannot be used with comfort, owing to an unpleasant feeling and taste. A perfectly pure plate of gold would be too soft; it must be alloyed, or it would soon wear out. The solder which is used to attach the teeth to the plate must flow at a lower temperature than the plate, otherwise the plate would melt in soldering. To cause the solder to flow it must be alloyed to a lower grade than the plate, and in extremely sensitive mouths, unless pretty pure, it will cause an unpleasant taste. Hard rubber as a base for artificial teeth does not produce any unpleasant sensations. It is easier to keep a rubber set clean, there being no interstices between the teeth and plate for the food and fluids of the mouth to lodge, decompose, and become offensive, as in a metallic plate. I should recommend "S. H." to provide himself with a set upon rubber. If he will, his troubles will all be over, and he will be able to masticate his food the rest of his days in peace and comfort.

Although my name is not upon your books as a subscriber, yet for years I have taken the Scientific American from newsdealers, and feel that I cannot do without it. It is more popular with my patients than any other publication which I keep upon my table. E. J. Church.

Michigan City, March 13, 1865.

Raw Pork and Tape-worms.

Messrs. Editors:—In your paper of March 18th I notice an article entitled "Raw Pork and Tape-Worm," by Dr. C. A. Canfield, of Monterey, Cal., in which he says:—"As for the tape-worm being caused by eating raw pork, that is about the last thing to which an intelligent observer who had resided in California would attribute it."

The Doctor argues thus:—"Tape-worms are found in herbivorous animals, therefore men cannot get them from pork." The Doctor is certainly a logician; but his logic does not agree with the natural history of the parasite.

The whole class of vertebrates is liable to these invaders, fishes not excepted—

> "Fleas have other fleas to bite 'em;
> And these fleas, fleas, ad infinitum."

so every animal has its own tape-worm that can never be perfected except in its own intestines, and in every case must be introduced in the food. The propagation of this kind of parasite is in a cycle. In man

for example, the *cysticercus cellulosae*, or larvæ of the tape-worm is taken into the stomach in measly pork, and developes in the intestines into the full-grown worm. The eggs of this tape-worm, after passing off in the feces are taken up in the sap of succulent plants, eaten by the hog, and developed into the *cysticercus*. The eggs of the tape-worm, taken into the human stomach, will undergo no change, and, in short, will never develop save in the intestines of the hog, whence they find their way over the entire animal. So also the *cysticercus*, eaten by the hog, never developes, nor will it in any case except when eaten by man.

The tape-worm of the sheep, of which Dr. Canfield speaks, is from the eggs passed from the dog. In like manner the tape-worm of the rat is from the cat.

These are facts in natural history, established beyond a doubt by actual experiment, our California friend to the contrary notwithstanding.

I have noticed the article in order that the good effects of your very proper caution in your issue of Nov. 19th may not be lost. If one must eat that filthy article of food, pork, let him be sure that it is fully cooked, otherwise the vitality of the *cysticercus* will not be destroyed.

By experiment I found that when the well-known anthelmintics, kousso, pomegranate, male-fern, and others, failed, the old woman's remedy of pumpkin seeds invariably brought the parasite away. Two ounces of pumpkin seed deprived of the outer covering and beaten up with sugar and water into an emulcient, taken at a single draught and followed in two hours by castor oil removes the troublesome and disgusting parasite.

A scientific friend at my elbow says that Washington officials are troubled with a new species which he calls *taenia rubra*, or red-tape, and he recommends in some instances *tinctura auri* applied to the palm of the hand. A. G. W.

Washington March 21, 1865.

[These statements are the same as those made in our first article on the subject, in Vol. V., page 100. —Eds.

Opposite Motions of the Earth at the Poles.

Messrs. Editors:—To give a clear illustration of the motion of the earth at the poles, it will be necessary to take in hand a small globe and bring the poles to a horizontal position by giving the globe a motion from west to east, and at the same time bringing the equator to the horizon. Here we find (say at the north pole) a left-hand horizontal motion. We now turn the globe, still keeping up the motion, so as to bring the south pole vertical; here at this pole we find a right-hand horizontal motion directly opposite the motion just witnessed at the north pole. We never have seen these ideas advanced by philosophers, but this simple experiment will satisfy the most skeptical that opposite motions exist at the poles. F. D. Spalding.

Elkhart, Wis., March 7, 1865.

SPECIAL NOTICES.

Phebe Ann Fish, executrix of Almond D. Fish, deceased, of Chazy, Clinton Co., N. Y., has petitioned for the extension of a patent granted to Almond D. Fish on the 14th day of November, 1848, for an improvement in coffins.

Parties wishing to oppose the above extension must appear and show cause on the 15th day of May next, at 12 o'clock, M., when the petition will be heard.

Henry Moeser, of Pittsburgh, Pa., has petitioned for the extension of a patent granted to him on the 24th day of June, 1851, for an improvement in printing names of subscribers on newspapers, etc.

Parties wishing to oppose the above extension must appear and show cause on the 5th day of June next, at 12 o'clock, M., when the petition will be heard.

John Crum, of Ramapo, N. Y., has petitioned for the extension of a patent granted to him on the 1st day of July, 1851, for an improvement in machinery for cutting files.

Parties wishing to oppose the above extension must appear and show cause on the 12th day of June next, at 12 o'clock, M., when the petition will be heard.

A bill punishing strikers who interfere with workmen with a fine of $100 and six month's imprisonment, has passed the Legislature of Minnesota.

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:—

Mouth-piece for Cigars and Cigarettes.- In the manufacture of cigarettes the mouth-piece is one of the most important parts. Cigarettes without a mouth-piece are disagreeable to smoke, because the tobacco which forms the filling is liable to be drawn into the mouth of the smoker, much to his annoyance. The mouth-piece which forms the subject of this patent is made of the stems of tobacco or stalks of other suitable plants; enough of these are taken to form the desired size for the mouth-piece and wrapped or rolled up in paper or leaf tobacco, and then cut up in pieces of the requisite length for insertion in the end of the cigarette. Mouth-pieces made in the same way are inserted or formed in the ends of cigars. To explain: a prepared Havanna stem, long enough to reach the entire length of the cigar, is placed with one of its ends in the mouth-piece, above described, and the filling placed around the same, then the binder is rolled around this, and afterward the wrapper is wound around the whole, and the ends finished in the usual manner. The mouth-piece thus inserted in the cigar affords a firm bearing for the teeth, and the smoker cannot easily chew up the end of the cigar; a better draught is insured by means of the mouth-piece, and the strips running through causes the cigar to burn more evenly; and at any stage in the smoking the cigar may be inserted, if desirable, in a cigar holder, and it will draw freely, which is not the case with the ordinary cigar after the end has been wet. Cigars made in this way are about as agreeable to smoke without a cigar-holder as ordinary cigars are with one. The inventor of this mouth-piece is M. J. Danziger, tobacconist, No. 54½ Division street, New York.

Combined Friction Wheel and Oil Chamber.—This invention is more especially intended for railroad car brakes, but is also applicable to other machinery to which power is transmitted through the medium of a friction wheel. It consists in combining with a friction wheel an oil chamber arranged in such a manner that the former will always be kept in a perfect state of lubrication, the importance of which, in connection with a friction wheel for transmitting power, may be easily imagined. A. I. Ambler, of Chicago, Ill., is the inventor.

Steam Whistle.—This invention consists in the arrangement of two or more apertures of different size, in the lower end of the bell in such a manner that different sounds are produced by the action of the steam issuing from the whistle. Said bell is supported by strips extending between the round apertures and screwed into the bowl which connects with the steam supply pipe so that the center of the bell is left perfectly free, and no central bearing is required. The plug, around the edge of which the steam issues, is provided with two surfaces corresponding to the supports of the bell, and secured by the same in the pawl in such a manner that the steam extending from the supply pipe is divided, causing it to strike the edge of the bell with more force than it does in a whistle of the ordinary construction. Chas. K. Ward, of Cincinnati, Ohio, is the inventor.

Improved Waterfall.—This invention consists in the use of horse hair instead of human hair in the manufacture of waterfalls, Horse hair or other hair of sufficient length can be doubled up at the upper edge of the waterfalls, and drawn in double strands over the pillow or stuffing, and when it is secured by braiding extending across the waterfalls near the upper ends of the strands; then again, a little further down, and again on the under side of the pillow in two different places, the strands of hair used as a covering of the pillow are securely held in place, and an article is produced which is not liable to get out of order. The stuffing in ordinary waterfalls is composed of hair inclosed in the inner ends by a piece of gauze or other suitable textile fabric, and on the other directly by the covering hair, so that when the covering hair is slightly dislodged, nothing but hair is visible below. But in these improved waterfalls the stuffing is made of a pillow composed of hair or other suitable material inclosed in a case made of some textile fabric, and each waterfall can be worn with perfect safety because the covering hair of the same is held so firm in its place that it is not liable to become dislodged, and the pillow is effectually concealed. The inventor is Philip Walter, who is manufacturing the article at 113 Leonard street, New York.

Dress Skirt Plaiter and Adjuster.—This invention is intended to do away with the old and tedious process of plaiting and gathering the material for the dress skirt, and to render this part of dressmaking more easy. The invention consists of a flexible metallic band, which can be adjusted to any sized waist, so that the exact measure of the lady's waist is obtained. An elastic card is placed around the metallic band which serves to compress the goods when plaited, and while in process of plaiting; there are also metallic clasps to secure the goods at each quarter. By means of this unique and useful instrument a lady may plait her dress and try it on, and the goods being firmly held in the adjuster, she can regulate the length and shape of the lining, and then sew it to the waist or band while the goods are still within the cord and band, and all this is done without the use of a pin. The inventor of this useful and convenient article is Israel M. Rose, of New York city. The manufacturers are Messrs. W. S. Thomson, Langdon & Co., 391 Broadway, New York.

Separating Gold and Silver from other Mineral Substances.—This invention consists in a new process of separating gold, silver and other metals from metalliferous rock, in which ashes and coal are used as a flux, and the metals are finally obtained by a novel solution, composed of ashes or charcoal, and mineral salts, and sulphuric or other suitable acid, the whole being then subjected to heat and afterwards allowed to settle, when the valuable metals will be found at the bottom, the earthy matters in the middle, and the chloride at the top and in the liquor. George N. Jennings, of Virginia City, Nevada Ter., is the inventor.

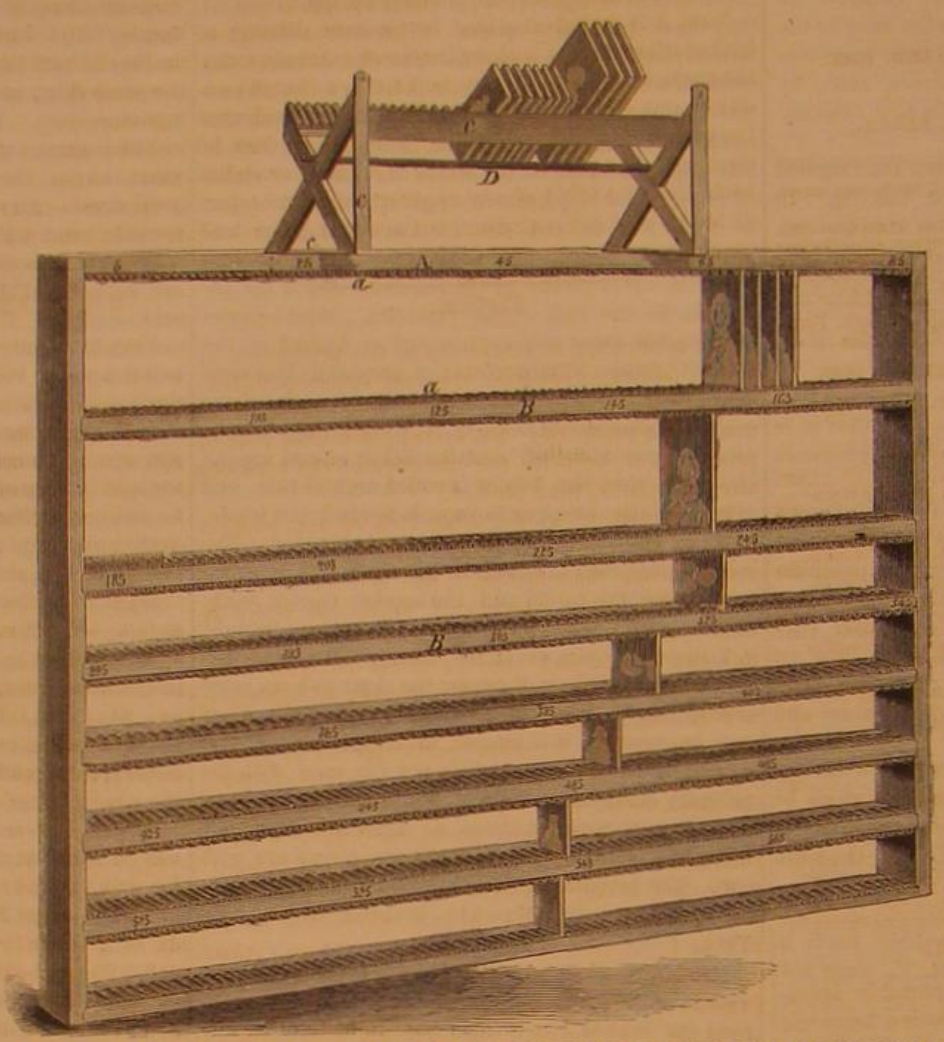
Oil Ejector.—This invention consists in closing the bottom of a well tube in which an oil ejector is used, and placing a valve therein below the embouchure of the ejector. The effect of this construction is to prevent the pressure of the currents of fluid or liquid delivered into the tube from the ejector from acting upon the gaseous or liquid contents of the well, and so to relieve the packing and also the gases and liquids in the surrounding rock from such pressure. By means of this invention the whole energy of the currents which pass through the ejector is used directly to litt the column of gases and liquids in the well tube, and none of it is allowed to react against the packing or against the incoming oil and gases. F. S. Pease, of Buffalo, N. Y., is the inventor.

Still for Oil and other Liquids.—This invention consists in a still with two chambers, one above the other, and communicating with each other through suitable pipes or valves arranged in combination with a supply pipe and with separate heads and escape pipes in such a manner that oil or other liquid introduced into the upper chamber can be freed from its most volatile constituents and heated to a high temperature before it is let down into the lower compartment in which the first distillation is effected. The valves which open and close the supply pipe and the passage leading from the upper to the lower compartment are connected to floats in such a manner that the level of the liquid in both compartments remains uniform by the automatic action of said floats and valves. The formation of a sediment in the bottom of the still is prevented by a stirrer to which a continuous rotary motion is imparted while the distilling operation is in progress. Cearles A. Hardy, Pittsburgh, Pa., is the inventor.

The *Cronstadt Messenger* describes a rare phenomenon witnessed there a few days ago, when two parhelia, or false suns, were seen flanking the real sun right and left, on a line parallel to the horizon. Between the sun and the two parhelia the light assumed all the shades between a yellowish green and a bright red, while streaks of white light, not unlike the tails of comets, seemed to issue from the parhelia. This phenomenon occurred in a remarkably fine day, the sky was perfectly clear, there was no wind, the thermometer steed at about 5 degrees Fah., and the barometer at 30 inches.

Photographers' Registering and Drying Rack.

Great progress is being made in photography, and also in the apparatus and mechanical appliances of the work-rooms. The registering rack here illustrated, consists of a frame, A, with as many cross-pieces, B, as are necessary. Upon the opposite faces of the cross-pieces, B, strips of corrugated metal, *a*, are tacked, whose grooves or depressions are of the same depth and width; those in the strips above are opposite to each other, so that the plates will stand when inserted in the grooves, in vertical parallel planes. The grooves of the rack are distinguished by attaching a printed series of numbers corresponding to each groove, so as to assist the operator in enumerating the negatives and enable him to readily select the required negative or plate. The drying rack and negative porte, C, is shown sitting upon the registering rack, but it is arranged to be hung up by the iron straps, *c*, at the convenience of the operator. The gutter, D, will carry off the drippings from the corners of the plates, as shown in the figure. The drying rack is light and easily carried, thus making a negative porte, which will prevent the negatives from getting scratched while being carried or handled while printing. It also saves the plates of glass from breakage while handling in washing, cleaning and varnishing, thus furnishing a complete drying rack.



SMITH'S NEGATIVE REGISTERING AND DRYING RACK FOR PHOTOGRAPHS.

The great advantages of these racks consist in the saving of space and in the indestructibility of their metal surfaces. A registering rack, such as shown in the engraving, five feet long, four feet wide and one foot deep, will hold 4,140 half-size negatives, while the drying rack, two feet three inches long, will hold 92 plates In a well-regulated gallery no piling of negatives ought ever be allowed, neither should the collodion face of a negative ever be allowed to touch any other surface.

The numbers are printed upon strips of paper and pasted on, so that the great labor of numbering the racks is saved the operator. The register will be numbered to suit the purchaser when desired. This improvement was patented through the Scientific American Patent Agency in December, 1864, by W. G. Smith, of Carlisle, Pa. For further information address the manufacturers, Messrs. G. and J. D. Scott, Ansonia, Conn.

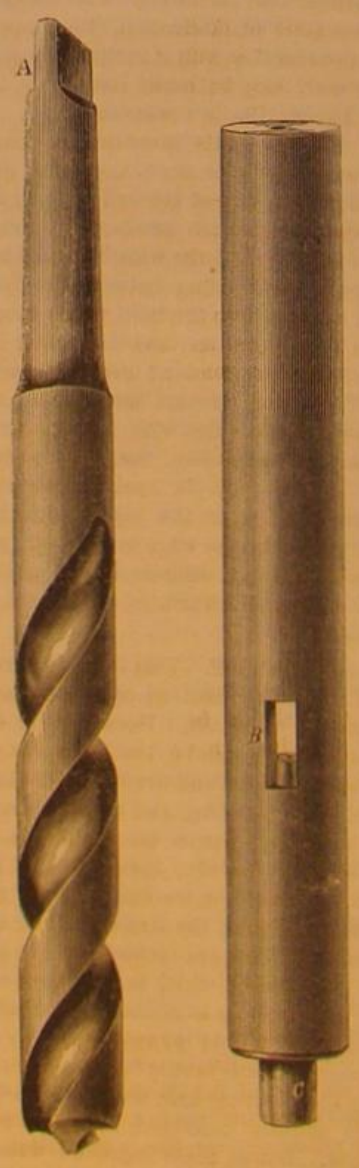
Did the Monitors Damage Fort Sumter?

Time that reveals all things seems to have disclosed the extent of the damage done to Fort Sumter at the time of Dupont's first attack. A correspondent writing from Charleston since it has fallen into our hands says: "I had the curiosity to make an inspection of the wall facing Moultrie to see what was the effect of the fire of the iron-clads in Dupont's attack. A close inspection shows that it was a very damaging fire. There are seams in the masonry and great gashes where the solid bolts crumbled the bricks to dust. It is evident that if the fire could have been continued any considerable length of time there that wall would have fallen. The effect of that fire led to the filling up of the lower casemates."

The latest novelty in card photographs is an album frontispiece consisting of a couple of simple stanzas, asking those who examine the collection of pictures to add their own portraits to the list. The verses are enclosed in a neat and appropriate border, and photographed in a size and shape to fill the first page in the album.

STANDARD TWIST DRILL.

There is no tool more indispensable in a machine shop than the drill, yet, strange as it may seem, very few persons take much pains in making one properly, or using it right when made. In half the machine shops in the country, drills lie around on the floor, or are left sticking in window corners where no one can find them. They are also altered at will by any person who is too lazy to look for the proper size; they are improperly ground, and, in short, ill used in so many ways that great delay and loss is the result.



The Manhattan Fire-arms Company, of Newark, N. J., have, at great expenditure of time and money, perfected a system for manufacturing twist drills for the trade, and a sample of them is shown herewith. As a specimen of workmanship these drills have been greatly admired by all mechanics, and as tools are unequaled. We have had an opportunity of seeing these drills at work, and they certainly cut to perfection. They feed easily and without straining through the work, and leave a round, true hole from end to end.

These drills are all turned from shank to point in a turning lathe, and milled out in the grooves by a peculiar machine invented by Mr. Arnold, of the Manhattan Fire Arms Co.; they are of standard sizes, varying by 32ds of an inch, from $\frac{3}{8}$ths up to $1\frac{1}{4}$ inches, so that a hole of any known size can be made with the set; any such hole drilled to-day will fit the same work years hence. Machinists will see the great advantage resulting from this feature. They are tempered up to the end of the twist, and one may be run into the shank without withdrawing it from the work to clear the chips.

Accompanying these drills are sockets, like that shown by the side of the tool illustrated. These are to be fitted in the machine the drills are to be used in, and may be planed square on the blank end or turned taper, for which purpose a plug center, C, is fitted in and a center left in the other. The shank of the drill fits in the socket, and the flattened end, A, is held by the keyway, B, in the socket, so that the tool cannot turn; a key driven into this keyway loosens the drill, so that it can be taken out.

The advantages to be derived from the use of these drills over those ordinarily made are very great: they are always ready for use; any size can be found in the set without altering; they require no dressing, and when properly used will last for years. They are, withal, sold remarkably cheap, much lower, in fact, than they could be made by individuals. They are about twelve inches long, and will drill from seven to nine inches deep; they are made of the best cast-steel, and are, in all respects, first-class goods. They are now in use in the United States Navy Yard, at Brooklyn, and all over the country, by our largest manufacturers.

For small metal workers, such as model makers, watch and clock makers and dentists the Company make drills of Stubb's steel wire, with straight shanks of all sizes, from No. 1 to 60, which is about 1-32d of an inch. Every one should try them.

For further information address the Manhattan Fire Arms Company, Newark, N. J.

The Coal-tar Colors.—The trade in coal-tar dyes, which began in 1860, continues to expand, amounting probably to from a quarter to half a million annually. The colors are magenta, various shades of blue and violet, purple, yellow, orange, and green. The dyes are sent from London to Lancashire and Yorkshire and other places, to be used in the preparation of silk and cotton velvets, printed calicoes, delaines, merinoes, finished cottons, silks, ribbons, flannels, and fancy and flannel shirtings. An export trade is beginning to China and the United States, the dyes being sent in their solid form to save freight. It is said that several thousand pounds are annually spent in defending the patent.

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VOL. XII. NO. 14...|NEW SERIES.|....*Twentieth Year.*

NEW YORK, SATURDAY, APRIL 1, 1865.

Contents:

(Illustrations are indicated by an asterisk.)

*Lyon's Self-feeding Hand Drill	207	Aniline Black	3211
Manufacture of Steel at Pittsburgh	207	Comments on Slovenly Workmanship	212
Siemen's Furnace at Pittsburgh	208	Dental Plates	212
The Way Rogers's Statuary is Made	208	Raw Pork and Tape-worms	212
Horse Chestnuts	209	The Curious Action of a Glass Rod	213
Farmers' Club	209	Opposite Motion of the Earth at the Poles	213
Books and Publications	209	Special Notices	213
A Water Propeller	209	Recent American Patents	213
Method of Working Poor Ores of Lead	209	*Smith's Negative Registering and Drying Rack for Photographs	214
Paper Carriages	209	Did the Monitors Damage Fort Sumpter?	214
*Root's Double Piston Square Engine	210	Standard Twist Drills	214
Browning Iron and Steel	210	Production of Light	215
Effects of Shot on our Iron-Clads	210	System	215
Self-acting Candlestick	210	Some Facts about Piano Making	215
Damp Corn	210	Improvements in the Steam Engine	215
*Rush's Depthing Tool	211	Illustrations of the Patent Office Reports	215
Asiatic Manna	211	Patent Claims	216, 217, 218
Use of the Common Nettle in Yellow Fever	211	*Converting Reciprocating into Rotary Motion	222
National Defenses	211	*Johnson's Horse Shoe	222
Facts Concerning Screw Propulsion	212		

PRODUCTION OF LIGHT.

Doubtless the cheapest and most portable apparatus for making gas from petroleum is a kerosene lamp. This apparatus also overcomes the most serious difficulty that has been encountered in the various attempts to manufacture illuminating gas from petroleum, that is, the condensation of vapors in the pipes; these vapors being produced in the lamp so near the flame that they have no opportunity to condense before they are consumed.

It has also been argued that in the lamp the greatest possible amount of light must be produced from a given quantity of oil, as the oil is all burned without a particle of waste. But this conclusion does not follow from the premises. If we were considering the production of heat it would be a safe inference, but not in the production of light.

Gases, however highly heated, give out very little light, differing in this respect from even the same substances when in a liquid or solid condition. According to the experiments of Dr. Draper, of this city, all solid bodies begin to grow luminous at the same temperature, about 977° Fahr., and the light rapidly increases with the rise of the temperature. When first perceptible it is of a dull red color, and as the temperature rises, it passes through orange and yellow into a pure white, which, when the heat becomes extremely intense, assumes something of a violet tinge.

When hydrogen gas is burned in pure oxygen, in the compound blow-pipe, though the heat is intense, there is scarcely any light; but if some solid substance that will not be fused, such as lime, be placed in the flame, the light becomes too dazzling to be borne by the eye. The still more brilliant electric light is emitted from intensely heated particles of carbon, as they are carried over from one point to the other. The light also from a lamp or candle comes from solid particles of carbon highly heated in the flame for an instant before they are consumed.

In a kerosene lamp the liquid oil is drawn up by the wick, and when it reaches so near the flame that the temperature is equal to its boiling point, it is evaporated. As it floats upward in the flame it is decomposed, the hydrogen maintaining the gaseous form, and the carbon being precipitated in the solid state. The particles of carbon thus precipitated, being extremely minute, are instantly heated to a very high temperature, in which state they give out the light of the blaze. As soon as these particles of carbon reach the outer surface of the body of burning vapor, where they come in contact with the atmospheric air, they encounter the oxygen of the air, and combine with it to form carbonic acid. Carbonic acid is a gas, and though it remain at the temperature of the shining carbon, it emits no light.

Now, it is conceivable that by the mere dilution of hydrocarbon vapors with hydrogen or carbonic oxide the particles of carbon may be kept in a heated condition one thousandth of a second longer, and that the quantity of light which they emit might thus be doubled. The process by which light is produced is such that the effect of any apparatus cannot be predicted by *a priori* reasoning, but must be determined by experiment.

SYSTEM.

The application of machinery to the production of wares, fabrics, utensils of whatever description, texture or nature, is in these days of competition indispensible to prosperity; but system, or a fixed plan of procedure to regulate the operation of the works is oftener wanting than present.

It is surprising to see what lack of appreciation there is for habits of order and routine among many of our manufacturers, and it is strange that any profits accrue where such make-shift policy as some practice prevails. We know of one shop in this city, the largest and the oldest concern of its kind in the country, which has literally no beginning nor ending, for the construction of its work. If a man wants a tool for some particular job he makes it out of another tool, and in the end throws it on the floor, or leaves it where he gets through with it. The work is sometimes commenced in one part, sometimes in another; it goes backward and forward, and round about, is hoisted up, lowered down, carried on trucks, or left on one side altogether, at the will and pleasure of the foreman in charge. Holes are drilled for which there are no bolts, and bolts are forged which are too long or too short, and new ones are made while the old ones are kicked around under foot. The yard is full of iron scraps; washers, nuts, bolts and rivets lie about indiscriminately vexing the sight of orderly persons, and running to loss and waste generally.

What excuse is there for such a style of things? Not the slightest. The picture is so far from overdrawn that we dare not tell all that may be seen lest those at a distance should deem the statement incredible. Work is polished in a lathe, put somewhere on one side, becomes damp, gets rusty, and then a laborer comes with his emery paper and oil and does "lathe work" sitting on a bench. What an absurdity. It is more than this; it is a positive wrong; no workshop should be permitted to fall into such hands, for, apart from the actual loss involved in wasted time and material, the example has a mischievous tendency and destroys the ambition of the workmen.

There can be no dividends where such outrageous disorder prevails. Said a New England man to us a short time ago, "I came a long distance to see your works, and from the time they have been in existence I expected to find the latest improvements, but after I had gone through one or two rooms I got homesick and went out; such disorder I never saw before."

If there was any necessity for this slovenliness and waste there would be some excuse, but there is none, and it should be remedied. There is nothing that men admire more than clean, well arranged workshops, and we have noticed in our travels about the country that order and system have a marked effect on the men themselves. Good workmen will not stay in a place where they are up to their knees in filth, or where they see the jobs in hand made to cost four times what they should. Let every one interested in manufactures of any kind examine their factories and they will find ample room for improvement in many places.

SOME FACTS ABOUT PIANO MAKING.

At the last meeting of the Polytechnic Association Mr. Weber described the mode of making pianos, and made the following statements in relation to the industry.

The largest manufacturers in the world are Broadwood & Sons, of London. The business was established in 1780, by the grandfather of the present proprietors, and the establishment has turned out 132,000 instruments.

In the city of New York there are seventy separate establishments engaged in the manufacture of pianos and the weekly product is from 250 to 300 instruments. The whole number manufactured annually in the United States is between 35,000 and 40,000, surpassing considerably the product of any other nation.

The hammers are covered with felt which is imported from France, and a single piece less than a yard square costs $56 in gold. It is made expressly for the purpose, the pieces being wedge-shaped, with a thickness ranging from three eighths to one inch.

IMPROVEMENTS IN THE STEAM ENGINE.

Very great improvements in the steam engine are being made at the present time. These relate to reduction in the size, simplicity in detail, freedom from abrupt and complicated movements, and a general absence of working parts which were formerly thought indispensable. An oscillating engine with a slide valve on the side of the cylinder connected directly to the eccentric without the intervention of a rock shaft, was in former years thought to be the essence of simplicity, yet inventors have so far improved upon this plan that they have no slide valves in some instances and in others the connections are so close as to be exceedingly economical of space. In Root's engine the cylinder is square; the piston is on the crank pin, and the valve is on the eccentric—a disposition of the parts which every one will, without controversy, admit to be compact.

In Hicks's engine, lately patented, the piston is the slide valve, or performs the office of this detail for itself—admitting and releasing the steam at the proper times without choking or compression. Here four cylinders are combined in a small space, radiating at angles of 90 degrees from a common center; the shaft and all the pistons working on one crank pin through connecting rods. This engine may be seen at 480 Broadway. In still another engine now being patented, four cylinders revolve about the shaft, taking and receiving steam without valves, and requiring no balance wheel, since the cylinders themselves act as such. Many other improvements involving radical changes are going forward both in engines and boilers, which will result in enhancing the value of the steam engine—king of motors—very greatly. In any one or all of these engines before specified steam can be used expansively or as a dead weight to impel the piston without expansion.

The economy which is claimed for these two systems can therefore be or not be realized according to which ever theory the proprietor of the engine favors. Besides the special engines there are many others in progress which for obvious reasons we have no right here to allude to.

ILLUSTRATIONS OF THE PATENT OFFICE REPORTS.

We are indebted to Messrs. E. R. Jewett & Co., of Buffalo, for a copy of the illustrations engraved to accompany the Report of the Commissioner of Patents for 1863. It is a large, handsome volume of 1,063 pages, with the engravings printed on only one side of the leaves. The engravings are in the same style as those made by the same firm for the reports of previous years; and the high quality of the workmanship, of which we have heretofore spoken, is at least equaled, if not surpassed.

We are pleased to learn that the contract for engraving the illustrations for the report of 1864 has been awarded to the same firm. For that year the inventions to be illustrated number more than 4,400—which shows considerable progress.

QUICK WORKING.—In one of the processes of steel-pen making done by females at Birmingham, a quick worker will cut out in one day of ten working hours 250 gross, or 36,000 pens, which involves 72,000 distinct motions of the arm, two in every second.

SHARP'S rifle-works, at Hartford, employ 500 workmen, and the machinery is kept running night and day. Twenty-five hundred rifles and carbines are manufactured every month for the Government.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING MARCH 21, 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.

46,867.—Friction Wheels and Oil Chamber.—Augustine I. Ambler, Chicago, Ill. Ante-dated March 10, 1865:

I claim first, The wheel, C, combined and arranged with the bushing or collar, B, upon a shaft, A, in such a manner as to form a friction clutch and anvil chamber substantially as set forth.

Second, In combination with the male and female parts of the clutch, the feather and groove, a b, spring, G, nut, F, when used with a friction wheel, C, substantially as and for the purpose specified.

Third, The bi-conical spiral grooved head, I placed on the shaft, A, in combination with the friction wheel, C, for the purpose specified.

46,868.—Thread and Needle Box.—Hamlin Babcock, New York City:

I claim a thread and needle box for soldiers and travelers constructed of a hollow spool, adapted to having thread wound upon its exterior and to contain thimble, needles, buttons or other articles substantially as above described.

[This invention consists in the construction of a box to contain thread, needles, wax, pins, buttons and other articles which are necessary or desirable for travelers and other persons away from home, and which have hitherto been carried in receptacles called housewives, needle-books and similar arrangements.]

46,869.—Grain Binder.—W. P. Barker, Grand Rapids, Mich. Ante-dated March 6, 1865:

I claim the revolving and longitudinally moving tube, A, provided with the hook, h, the sliding tube, F and the rod, G, provided with the hook, l, in connection with the shield, E, or its equivalent, all arranged to operate in the manner as and for the purposes herein set forth.

I further claim the sector, D, connected with the tube, A, by a cord, C, or by gearing, in connection with the bar, m, provided with the curve, n, and the pivoted bar, H, and the spirally slotted hub, B, and pin, d, all arranged as shown for operating the tubes, A F, and rod, G, as described.

46,870.—Smoking Pipe.—James P. Baxter, Portland, Me.:

I claim, first, A diaphragm or septum placed below the smoke passage in the bowl of a tobacco pipe.

Second, A diaphragm composed of one or more pieces of metal or other suitable material, so arranged in relation to each other or the inner surface of the pipe as to form a concavity for the retention of air or any material which may have a cooling effect on the contents of the pipe.

Third, The channels, e f, in combination with the diaphragm, D, in the bowl, A, and with the stem, C, constructed and operating substantially as and for the purpose described.

Fourth, The diaphragm or septum as described with the plug as described.

46,871.—Tuck-creasing Device for Sewing Machines.—James Bolton, Chicago, Ill.:

I claim, first, The tuck marker, A, for use with a sewing machine, made and operated substantially as above described.

Second, I also claim marking parallel lines for tucks or for seaming or for perforating of material on a sewing machine, by means of a marker which is operated by a presser bar having a positive vertical motion substantially as above described.

[This invention consists in a novel mode of constructing and operating tuckers to be used on sewing machines, being composed of only two pieces hinged together so as to make one instrument, and so attached to the presser-bar as to be operated at every movement of the feeding devices.]

46,872.—Mop.—Alonzo T. Boon and Wm. W. Spaulding, Galesburg, Ill. Ante-dated Feb. 1, 1865:

I claim the rod, B, with cross rod, C, and heads, H H, the handle, D, with crop rod, E, and set screw, I, and spiral springs, F F, when their parts are arranged as specified in combination with the handle, A, for the purpose set forth.

46,873.—Composition for Preserving Wood and Coating Oil Barrels.—Charles Brandenburg, New York City:

I claim the within described compound for preserving wood and coating barrels and other vessels.

46,874.—Window Springs.—E. K. Breckenridge, Meriden, Conn.:

I claim the combination of the plate, A, latch, B, and spring, D, constructed as described to operate in the manner specified.

46,875.—Process for Refining Amalgam.—Wm. Bruckvner, San Francisco, Cal.:

I claim the application and use of bichloride of copper or its equivalent, together with iron pyrites and salt without reference to the exact proportion of each ingredient in the manner and for the purpose herein described.

46,876.—Grain Conveyer.—D. W. Bryant, Chicago, Ill.:

First, I claim the combination of the metallic buckets, I, the endless chains, D D, and pulleys, A A, arranged and operating substantially as and for the purposes herein set forth and shown.

Second, I claim the combination and arrangement of the metallic buckets, I, the shafts, C, the endless chains, D D, the friction wheels, F, and trucks, G, operating as and for the purposes specified and shown.

46,877.—Seeding Machine.—Marvin S. and J. R. Cadwell, Dexter, Mich.:

We claim the employment of the revolving seed box, D, in combination with the gage plates, m m m m, and distributing plates, P P P P, substantially in the manner and for the purposes as herein specified.

Second, The arrangements of plates, P, on a revolving box, substantially in the manner and for the purpose described.

Third, The arrangement of the revolving box, constructed and operating as described, in rear of the axle, for the purpose set forth.

46,878.—Marine Railway.—Wm. F. Channing, Providence, R. I.:

I claim the employment of a water support or caisson in the manner and for the purposes described for the overland transportation of vessels between navigable waters.

Also the combination of a water tank or basin for floating a vessel, with a railway car truck or trucks.

Also in a marine railway a compound or multiple railway track having parallel rails so disposed, that each rail excepting the two outer rails, may serve as a part of a track at each side thereof, in the manner and for the purposes herein described.

Also the combination of a multiple or compound track with a dock or docks at one or both extremities of a marine railway, for transportation of vessels from one body of water to another as herein described.

Also the vertically moving terminal section of the track as herein described, constructed and arranged to operate in connection with elevating, supporting and lowering apparatus and with the water support or caisson to receive and discharge the vessel substantially as set forth.

46,879.—Sofa Bed and Crib.—Solomon Chapin, Cincinnati, Ohio:

I claim the combination of the several parts as described for the purposes set forth.

46,880.—Churns.—Edgar Chipman, New York City:

I claim the rockers, B, in combination with the ledges or cleats, b', on the ways or guides, C C, to prevent any lateral movement of the churn on the ways or guides as set forth.

Second, The cords or chains, D D, applied to the churn and the cross-bar, E, of the ways or guides to prevent longitudinal slipping of the churn, on the ways or guides as specified.

Third, The tubular fixed dasher, E, when used in connection with a rocking or oscillating churn, substantially as and for the purpose specified.

[This invention relates to a means employed for keeping the churn in proper position on the ways on which it oscillates or rocks and also in an improved means for keeping the cream at a proper temperature most favorable for the production of butter.]

46,881.—Fence.—J. R. and C. B. Clark, Mount Pleasant, Iowa:

We claim a roller or series of rollers applied to a fence substantially as and for the purpose herein set forth.

46,882.—Carpet Stretcher.—F. J. Collier, Canonsburg, Penn.:

I claim the carpet stretcher above shown constructed to operate by friction substantially as above described.

[This invention consists in constructing an implement for stretching and straightening carpets preparatory to securing them to a floor, by means of a friction surface, and in the use of which no injury is done to the fabric.]

46,883.—Flood Gates for Mill Dams.—Martin Colton, Sardinia, N. Y.:

I claim a self-acting safety flood gate, composed of the gate, C, working beams, F, and connecting rods, I, placed and used in a plume, B, for the purposes and substantially as herein described.

46,884.—Railway Gates.—Samuel N. Cushing, Waltham, Mass:

I claim the combination for operating the gates arranged with respect to the roadway and railway as described, the same consisting in the arms, the impelling rods, the carriage or its equivalent, and the carriage windlass and ropes or a mechanism for moving the carriage in manner as explained, the whole being applied to a frame erected at the crossing or junction of the roadway and railway and so as to separate, and be capable of being operated substantially as specified.

46,885.—Cigarettes.—M. J. Danziger, New York City:

I claim forming the mouth piece of a cigarette, of stocks or stems of tobacco in the manner and for the purpose described.

46,886.—Knap-sack Supporter.—Adam Dickey, Cincinnati, Ohio:

I claim the knap-sack supporter composed of the parts, D E E', and their described or equivalent accessories, substantially as set forth.

46,887.—Preserve Jar.—Timothy Earle, Valley Falls, Smithfield, R. I.:

I claim the use of the detached ring, C, in combination with the cover and neck of a preserve jar substantially as described.

46,888.—Producing Coloring Matter for Dyers.—Jonas Eberhardt, Philadelphia, Pa.:

I claim the phenico described, as a new article of manufacture for the use of dyers.

46,889.—Seeding Machine.—Charles H. Eggleston, Marshall, Mich.:

I claim the employment of the seed slide, s, and brush slide, K, when connected together substantially as described, in combination with the spring, M, and guard plate, N, as and for the purposes specified.

46,890.—Fly Wheel.—David Eldridge, Philadelphia, Pa.:

I claim the combination of the flanged wheel, B, fly wheel, D, pulley, F and G, belts, J and K, and treadle, H, or its equivalent arranged to operate substantially as described.

46,891.—Bolts for Doors and shutters.—Julius Feldman, New York City:

I claim the application to a slide bolt for doors, shutters, etc. of a pinion ratchet, spring and pawl, to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and useful improvement in slide bolts, such as are applied to doors, shutters, etc., to serve as a fastening for the same.]

46,892.—Jacquard for Weaving Three-ply Fabrics.—John S. Ferguson, Poughkeepsie, N. Y.:

First, I claim the mode herein described of arranging the needles, and inserting the cords through them, for the purpose of giving to the cords the three positions above described.

Second, The mode herein described of constructing the middle trap board, and the use and motions of the rods or bars placed above them, for the purposes substantially as set forth

Third, Giving to the front and rear trap boards the motions herein described, for the purposes specified above.

Fourth, Tying the harness in three equal and uniform parts in looms for weaving three-ply goods, as above specified.

46,893.—Engine for Preparing Paper Stock.—Joseph G. Fuller, Brooklyn, N. Y.:

I claim a revolving wheel, composed of teeth in sections, with stone intermediate, or other rough material, in combination with a hopper containing the vegetable material, to be operated on as set forth.

And in combination with the said revolving wheel of alternate teeth and roughened surfaces, I claim the stationary concave of teeth in the trough, a, as and for the purposes specified.

46,894.—Coal and Ash Sifter.—J. L. Gilbert, Boston, Mass.:

I claim the box, B, provided with a spout, C, and flange, a, and fitted over a proper ash receptacle, A, in connection with a reciprocating screen, D, placed within B, and having an inclined sieve, e, to discharge into spout, C, and with the hopper, E, upon the box, B, all arranged substantially as described.

I further claim suspending the screen, D, upon parallel guide rods, c c, to admit of the ready working of the screen, as set forth.

[This invention relates to a new and improved device for sifting coal ashes, without allowing the ashes to escape during the sifting operation.]

46,895.—Base-burning Stove.—H. G. Giles, Troy, N. Y. Antedated Sept. 21, 1864:

I claim the combination of apertures, e, in the fire pot of a base-burning stove, communicating with hollow radial bars, b, provided with openings in the sides, and mica windows, d d d, arranged and operating substantially as and for the purposes set forth.

Second, I claim the air pipes, g g, in combination with the openings, f f, air chamber, h, reservoir, C, and cylinder, A, arranged and operating substantially as and for the purposes set forth.

46,896.—Spinning Roller.—Isaac Goodspeed, Norwich, Conn., and Gurdon S. Goodspeed, Providence, R. I. Antedated March 8, 1865:

We claim a roll for drawing, roving or spinning machinery, constructed with a surface of cork applied with its flaws or interstices parallel with the axis, and compressed and turned, as hereinbefore described.

46,897.—Transparent Sign for Street Lamp.—Francis L. Hagadorn, Brooklyn, N. Y.:

I claim the application of printed lettering, or its equivalent, to the glass plates of street lamps, or their equivalents, in combination with paper, which performs with the said glass plates the function of ground glass, substantially in the manner and for the purpose herein set forth.

46,898.—Regulating Ventilator.—Nelson Hammond, Tioga, Pa.:

First, I claim adapting both the bar, B', and the weight, J, to be adjusted longitudinally upon the lever, C, to maintain a uniform effect of the weight while varying the extent to which the ventilator will be moved by a given motion of the piston.

Second, I claim, in combination with the close vessel, A, the piston, B, arm, B', when connected to the lever, C, in the manner described, so as to permit the said arm or bar, B', to be adjusted vertically upon the lever, to adjust it to the hight of the fluid, or the position of the ventilator, the whole constituting a thermal medium for regulating ventilators, substantially as set forth.

Third, In combination with the lever, C, operated as described, I claim the rod, G, and cord, G', for raising and lowering the sashes, F F', as explained.

Fourth, I also claim, in combination with the aforesaid lever, C, and the close vessel, A, cylinder, A', and piston, B, the levers, H, and rods, h, for transmitting motion from the sashes of one window to those of the other or others, substantially as specified.

Fifth, I claim the combination of the vertical slots, e, with the weight, J, and piston, B, for restricting the motion of the lever, C, to the operating end thereof, while the ventilator is being opened or closed, and permitting the fulcrum end of the lever to move after the operating end has reached the extremity of its movement, substantially as and for the purpose set forth.

46,899.—Still for Oils, Etc.—Charles A. Hardy, Pittsburgh, Pa.:

I claim the arrangement and combination of parts in the diaphragm still, consisting of the float valves, m p and k g, governing the inlets to the upper and lower compartments, B and C, respectively, and the heads, D E, communicating with the separate escape pipes, D' E', as described and represented.

46,900.—Window-sash Supporter.—J. O. Harris, Ottawa, Ill.:

I claim the combination and arrangement of the two ratchet wheels, lever pawl and spring aforesaid, with the tumbler, g h i, operated by a removable key, substantially as and for the purposes shown and described.

46,901.—Lamp Burner.—John O. Harris, Reading Pa.:

I claim the combination of the jackets, D D', intermediate space, d, apertures, d', and tube, E, the whole being employed in connection with a wick tube, C, in the manner and for the purposes herein set forth.

46,902.—Submarine Safety Mouthpiece.—James Hawkins, Braddock's Field, Pa.:

I claim the T-shaped piece, A, provided with a mouthpiece, a, flexible tubes, d d', and valves, e e', and applied to the face of a diver, substantially as and for the purpose set forth.

[This invention relates to the application of air exhaust and supply valves, in combination with a mouthpiece fitted to a mask, which is applied to the face of the diver, and with two pipes leading to the surface of the water, in such a manner that the inhaling of the breath is regulated, and the diver is supplied with the requisite quantity of pure air, to enable him to live under water for the desired length of time.]

46,903.—Gang Plow.—L. Holloway, Gilroy, Cal.:

I claim the link joint, I, in combination with the adjustable rods, h i, lever, J, plow frame, H, and truck, A, constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention relates to an improvement in that class of gang plows in which the plows are attached to a separate frame, which connects by a hinge with a truck, so that by drawing the truck through a field the plows are caused to act on the soil to any desired depth.]

46,904.—Doubletree for Carriages.—John Hoover, Manchester, Md.:

I claim the elastic double and singletrees, when arranged, constructed and combined, as herein described and set forth.

46,905.—Band Cutter and Feeder for Threshing Machine.—H. Upton Hoover, Macomb, Ill.:

I claim, First, In combination with the rollers, c c, and frame, A, the revolving smooth or sickle-edged knife, F, substantially as described and for the purpose set forth.

Second, The L L, constructed and operated substantially as described.

Third, The vibrating table, N, substantially as described and for the purpose set forth.

Fourth, In combination with the vibrating table, N, the vibrating fork or fingers, Q, substantially as described and for the purpose set forth.

Fifth, The combination of the revolving knife, E, rakes, L, vibrating table, N, vibrating fork or fingers, Q, constructed and operated substantially as described.

46,906.—Method of Transporting Oil.—W. W. Horton, Freeport Ill.:

I claim, First, Oil tanks, both stationary and movable, constructed and operating as and for the purposes herein set forth.

Second, I claim the method or process herein described for storing and transporting oil in bulk, substantially as set forth.

46,907.—Spoon.—R. Humphrey, Unionville, Conn.:

I claim a spoon or fork handle provided with a projection, d, at the juncture of its widest part with its stem, and with a similar projection at its juncture with the bowl, substantially as described.

[The object of this invention is to strengthen the handle of a spoon or fork at such places where the same, as now constructed, is most liable to bend and break; and the invention relates more particularly to such handles which are produced of thin sheet metal, and rendered stiff by turning the edge downward.]

46,908.—Machine for Cutting Tobacco.—W. W. Huse, Brooklyn, N. Y.:

I claim the combination, substantially as herein described, of the non-rotating feeding screw, the rotating nut, mounted thereon, and provided with a ratchet wheel, the vibrating pawl or ratchet hand, and the adjustable cam plate for determining the extent of feed motion which shall be imparted to the ratchet wheel, for the purpose specified.

46,909.—Process for Separating Gold and Silver from Mineral and Earthy Substances.—Geo. N. Jennings, Virginia City, N. T.:

First, I claim the process herein substantially described, for the purpose set forth.

Second, I also claim the use of ashes and charcoal as a flux in reducing quartz and other rock for separating gold and silver and other metals therefrom, substantially in the manner above described.

Third, I also claim the amalgamating solution, composed substantially as above described.

46,910.—Steam Whistle.—C. Kupferle and J. H. Ward, Cincinnati, Ohio:

First, I claim the bell, C, constructed with supporting strips, d e, dispensing with a central support, and forming a plurality of apertures, f g, substantially as and for the purposes herein described.

Second, The shoulder, b, of the plug, B, and segmental annular spaces, c, produced thereby between said plug and the bowl, substantially as and for the purpose set forth.

46,911.—Letter Envelope.—T. S. Lambert, Peekskill, N. Y.:

I claim constructing a letter tab or flap, substantially as shown and described.

46,912.—Winders for Oyster Dredges.—Henry S. Lawson, Baltimore, Md.:

I claim the arrangement of the reel shaft and reels with the crank shaft and cranks, the whole being constructed and susceptible of being operated as herein set forth.

46,913.—Ventilator.—Peter Lear, Medford, Mass.:

I claim the combination as well as the arrangement of the wind wheel, B, the conduit, A, the inverted conical case, D, and its series of radial flanges, b b, the whole being applied to a spindle, C, substantially as and so as to operate as herein before explained.

I also claim the combination as well as the arrangement of the wind wheel, B, the conduit, A, the inverted conical case, D, the series of radial flanges, b b, and the deflector, E, the whole being applied to a spindle, C, substantially as and so as to operate as herein before specified.

I also claim the combination as well as the arrangement of the wind wheel, B, the conduit, A, the inverted conical case, D, the series of radial flanges, b b, and the weather cap, F, the whole being applied to a spindle, C, substantially as and so as to operate as herein before described.

I also claim the combination as well as the arrangement of the wind wheel, B, the conduit, A, the inverted conical case, D, the series of radial flanges or wings, b b, the deflector, E, and the weather cap, F, the whole being applied to a spindle, C, substantially as and so as to operate as herein before set forth,

46,914.—Lock-key Guard.—Charles Leavitt, Cleveland, Ohio:

I claim the guard, D, in combination with the lock key, and the the escutcheon, and keyholes at right angles to each other, as and for the purpose set forth.

46,915.—Apparatus for Washing Paper Stuff.—Samuel Lenher and Hallam H. Spencer, Philadelphia, Pa.:

We claim, First, The application of jets of water forcibly impelled against the stuff produced from refuse newspapers and waste paper in the manner herein before described, for the purpose of separating from said stuff the coloring matters and carbonaceous particles of ink and other fine impurities and retaining the fibrous pulp on sieves, whether the latter be rectangular circular arranged as an endless band, or in any other form whatsoever, and whether the same be made of wire gauze or muslin or any other textile fabric.

Second, The application of the above process, substantially as set forth, for the removal of dust and other like fine impurities from rag stuffs and other fibrous stuffs used in the manufacture of paper.

46,916.—Fruit Gatherer.—James A. Little, Danville, Ind.:

First, I claim the raking device, A B, employed substantially in the manner and for the purpose herein explained.

Second, I claim the knives, D F, employed as accessories to the fingers, A, in detaching the fruit, as set forth.

Third, I claim the extension rod, C C', in connection with the fruit gatherer, as described, to adapt the device for gathering fruit from different hights.

46,917.—Coffee Pot.—Lewis H. Little, Copake, N. J.:

I claim placing a cone within a coffee pot for the purpose and in the manner substantially as above described.

[This invention consists in placing a body of conical form centrally within a coffee pot so as to leave an annular space between the base of the cone and the inner sides of the pot. The object is to "settle" the coffee, or prevent the sediment from rising in the upper part of the vessel.]

46,918.—Chaff and Straw Stacker.—Wm. H. Loomis, Fairfield, Iowa:

I claim, First, A stacker which is so constructed as to receive the straw and chaff from a thrashing machine upon an elevator, and within chambers which are closed at their sides, substantially as described.

Second, The removable wings, C C, in combination with a trunk which is adapted for receiving the straw directly from a straw carrier of a thrashing machine, substantially as deicribed.

Third, The armholes, D D, through the wings, C C, arranged substantially as and for the purpose described.

46,919.—Apparatus for Bolting Flour.—James E. Madigan, Beloit, Wis.:

I claim. First, The bolting apparatus, herein described, consisting of the cylinder, A, blast pipe, G, air chest, C, series of internal perforated pipes, b b b, conducting pipe, g, and external perforated pipe, d, all combined and operating in the manner and for the purpose specified.

Second, I further claim so mounting the pipe, d, that it may be turned by a crank, i, or other suitable means to deliver the blast at any angle desired.

[This invention consists in introducing currents of air into the bolt for the purpose of cooling the flour and increasing the efficiency of the bolt, and also in directing a blast of air downward upon the outside of the bolt for the purpose of keeping its meshes clear.]

46,920.—Farm Gate.—Joseph Martin, New Oxford, Pa.:

I claim the automatic closing gate which opens only in one direction, constructed with the several parts as described, so that it can be opened by a person approaching it from either side, and also latched open and unlatched, substantially as set forth and described.

46,921.—Flyer for Roving Frames.—Thomas Mayor, Pawtucket, R. I.:

I claim the combination of two or more lateral orifices in the neck of the flyer as described at unequal distances from the mouth of the delivery tube with the said delivery tube, for the purposes specified

46,922.—Manufacture from the Fibers of Epilobium.—Rutger B. Miller, Utica, N. Y.:

I claim the utilization of the fiber of the epilobium plant for the manufacture of the articles above enumerated, and for all articles to which it is applicable, as a substitute for the cotton fiber.

46,923.—Apparatus for Distilling Petroleum, etc.—Adolph Miliochau, New York City:

I claim the distillation of heavy and light oils jointly to produce a burning oil by means of a second still within the main still for petroleum and similar oils, substantially as specified.

46,924.—Process for Purifying Metallic Oxides.—Alfred Monnier, Philadelphia, Pa.:

I claim the treatment of metallic oxides for their purification, substantially as set forth.

46,925.—Oil Ejector.—George M. Mowbray, Titusville, Pa.:

I claim the coupling, D, when combined with a stuffing box, E, so constructed that while one pipe is fixed another may be moved in the stuffing box without disturbing the seed bag or other packing, substantially as herein described and for the purpose set forth.

46,926.—Hand Cultivator.—John Naugle, Mooresville, Ind.:

I claim as a new article of manufacture the herein described hand cultivator when constructed substantially as herein set forth.

46,927.—Washing Photographic Prints.—Marcus Ormsbee, New York City:

First, I claim the elastic yielding rollers, C C, journaled within the frame, D D', in the manner explained and employed in the process of washing photographic prints, substantially as set forth.

Second, In combination with the above, I further claim the elastic or impervious cloth, A, to contain the prints between its folds and receive the direct pressure of the rollers, as and for the purpose described.

46,928.—Hand Corn Planter.—M. S. Orton, Galesburg, Ind.:

I claim the perforated plate, B, operated substantially as shown, in combination with the perforated bottom, b, of case, A, and seed spouts, E, arranged to open and close through the movement of plate, B, substantially as and for the purpose set forth.

I further claim the arms, m, applied to the pin, l, of plate, B, when used in combination with the spouts, E, and all arranged to operate in the manner substantially as and for the purpose specified.

[This invention relates to a new and improved machine for planting corn by hand, and has for its object the planting of the corn in the hill in a scattered state or with the grains or kernels at a suitable distance apart, and by a means which admits of being operated with facility or with but little labor, and without the liability of becoming choked or clogged.]

46,929.—Harvesting Machine.—Samuel N. Page, Salona, Pa.:

I claim, First, In combination with the driving wheel, A, adapted for adjustment upon its shaft in the manner explained, the crank wheels, D D', fixed upon one and the same rotating shaft, d, the latter carrying a pinion, d', to receive motion from the driving wheel, A, as set forth.

Second, In combination with the above parts, I claim the lever, H, and rack, H' h', constructed, arranged, and employed substantially in the manner and for the purposes herein described and represented.

46,930.—Raking Attachment to Harvester.—Samuel N. Page, Salona, Pa.:

I claim the combination of the slotted bar, L, and crank arm, L', the latter carrying a wrist pin, l, which actuate said bar, L, for the purpose of operating the rake, I, in the manner explained.

46,931.—Oil Ejector.—F. S. Pease, Buffalo, N. Y.:

I claim in oil ejectors closing the well tube below the place of delivery of the currents of air or other fluids or liquids by means of a valve, substantially as described.

46,932.—Variable Cut-off Valve Gear for Steam Engines. Horatio O. Perry, Buffalo, N. Y.:

I claim, First, The combination with the rocking steam toes having a motion coincident (or nearly so) with the piston, of two independent steam lifting toes acting upon one valve stem in such a manner that as one ascends the other will descend, by which construction and the operation of an appropriate adjustable tripping device, the steam may be cut off at any required part of the stroke.

Second, In the combination with the independent steam lifting toes, E', of the spring catches, G, and spring bolt, J, and adjustable tripping cams, H, operating for the purposes and substantially as described.

46,933.—Mowing Machine.—John G. Perry, South Kingston, R. I.:

First, I claim the arrangement of the escapement wheel, X, rocker shaft, Y, and connecting rod, P, in combination with the stationary tubular axle, K, substantially as herein set forth and for the purpose specified

Second, I claim the arrangement of the frame, D, and sliding plate, I, having the standard a, and lever, O, attached to it in combination with the tubular axle, K, substantially as herein described and for the purpose set forth.

46,934.—Stove-pipe Elbow.—John G. Perry, South Kingston, R. I.:

First, I claim making a cast metal stove-pipe elbow frame by leaving openings through its surface, substantially as herein described and for the purposes set forth.

Second, I claim closing the openings through the sides of a cast metal stove pipe elbow frame with a piece or pieces of sheet metal or any suitable mineral substance, substantially as herein described and for the purposes specified

46,935.—Washing Machine.—William H. Perry and Wallace Woodworth, Los Angelos, Cal.:

I claim providing a washing machine with a chamber, M, to receive the water after it has been expressed from the clothes and retain the sediment, substantially as described.

46,936.—Quartz Crusher.—George K. Peterson, San Francisco, Cal. Antedated March 3, 1865:

I claim the crushing plates, A A', connected and arranged to operate substantially as described for the purpose set forth.

I claim the mode described of connecting the journals, K K, of the plates, A A', or such an equivalent device as will enable the operator to lengthen or shorten the rods which connect the journals, K K.

46,937.—Plow.—Norman Platt, St. Louis, Mo.:

I claim the combination of the frame, b, plate, a, and colter, a', the several parts being constructed and arranged as and for the purpose set forth.

46,938.—Sirup Valves.—A. D. Puffer, Somerville, Mass.:

I claim the shouldered, hollow screw plug, with its packing, the washers, d, the screw collar, e, and the screw thread on the valve case body when arranged with a sirup valve or faucet, substantially as shown and specified.

Also, conducting the air tube which facilitates the emptying of the measuring chamber through the passage of the valve case, substantially as and for the purpose described.

46,939.—Grate Bars.—A. D. Puffer, Somerville, Mass.:

I claim in a recessed bar, the reversed arched form given to the bifurcated portion thereof, for the purpose described.

Also, sharpening or beveling the surfaces of the bar upon which the coal is supported into thin edges, for the purpose set forth.

Also, the radiating braces, h, substantially as shown and described.

46,940.—Tobacco Hooks.—A. Putnam, Jr., Chester, Vt.:

I claim the tobacco hook constructed and operated substantially as above described, as a new article of manufacture.

[This invention consists of a tobacco hook for suspending obacco plants in a drying house, constructed with spring sides, an eye for suspending it to a nail, and prongs for securing the stalk.

46,941.—Heat Radiator for Stoves.—William E. Rennolds, Chicago, Ill.:

I claim an air heating drum or radiator, formed or composed of tubes, a a', arranged within a cylinder, or drum so as to form flues or draught passages, e f h, around the tubes, the latter being perforated at their lower ends for the admission of cold air and open at their upper ends for the escape of the heated air, substantially as shown and described.

[This invention relates to a new and improved heat radiator or air heating drum to be applied to stoves, whereby cold air is admitted into the drum, heated and diffused into the apartment in which the stove is placed; or, the heated air may be conveyed by pipes into other compartments of the building.

46,942.—Machine for Cutting Meat.—Wm. E. Richardson, Chicago, Ill.:

I claim the employment of a circular saw for cutting meat or other like substances, in combination with contrivances for spreading said substances during the operation of sawing, and keeping its surfaces from forcible contact with the sides of the saw, substantially as described.

46,943.—Manufacture of Vinegar.—Moritz Rino, Williamsburg, N. Y.:

I claim the manufacture of vinegar by the quick process directly from the natural unmanufactured or unrefined vegetable produce which contains starch or saccharine matter, or both starch and saccharine matter, substantially in the manner herein described.

46,944.—Frames for Gathering Skirts.—J. M, Rose, New York City:

I claim, first, The frame for gathering and plaiting the skirts of dresses, constructed and operated substantially as above described.

Second, I also claim in combination with the frame, the elastic cord, B, or any equivalent means of holding the plaits and gathers of a skirt in place, substantially as above described.

Third, I also claim the clamp, D, one or more in combination with the said frame for the purpose of holding the skirt thereon, constructed and applied substantially as above described.

46,945.—Apparatus for Triturating and Heating Linseed &c.—Thomas Rowe, Brooklyn, N. Y.:

I claim the combined arrangement of the chauffer pan, E, heated by steam or other means and the platform, D, of the triturating apparatus in the manner and for the purpose substantially as herein shown and described.

[This invention consists in the combination of the chauffer pan heated by steam or other means with the ordinary edge runners or mullers in such a manner that the seed or other material after it has been triturated by the action of said mullers can be discharged directly into the chauffer pan and thereby all the labor usually required for removing or transporting said seed or other material from the triturating apparatus to the chauffer pan is saved, and furthermore, said material on arriving in the chauffer pan retains the heat imparted to it by the action of the mullers and the operation of heating is attended with less expenditure of fuel or steam.

46,946.—Combined Shovel and Ash Sifter.—Richard Schaap, Jr., Brooklyn, N. Y.:

I claim a combined shovel and ash sifter, composed of a shovel blade perforated and provided with a perforated sliding plate, substantially as herein set forth.

[The object of this invention is to combine with the ordinary fire-shovel, such as is used for putting coal on a fire, taking up ashes, etc., etc., an ash sifter and having the implement devised, constructed or arranged in such manner that it may, by a very simple adjustment or manipulation, be made to serve either as a shovel or sifter as may be required, equally as well as if made for either purpose specially, thereby combining in the most perfect manner, and at an inappreciable cost the two implements specified.

46,947.—Hopper for Grain Separators.—Frederick H. Shroeder, Bushnell, Ill.:

I claim the employment of the rollers, D, and E, in combination with the seed hopper, A, when arranged and operating substantially as and for the purposes set forth.

46,948.—Buckles.—Charles Sears, Monmouth Co., N. J., and Tappen Townsend, Kings Co., N. Y.:

We claim, first, A double acting lever for buckles.

Second, A concave strap bearing surface upon buckle frames.

Third, We further claim making and attaching the double lever to the buckle frame, in form and manner substantially as described.

Fourth, The combination of the double acting lever with buckle frames, thus making buckles with double acting levers, substantially as described.

46,949.—Drills.—Alexander Shiland, West Troy, N. Y.:

I claim the combination of the tube, A, with the inner shaft, B, having the spiral part, C, acting between parallel bars segments or grooves; these parts or their equivalents arranged and operating as and for the purpose set forth.

46,950.—Cooling, Drying and Ventilating Granaries and other Buildings.—Danl. E. Somes, Washington, D. C.:

I claim, first, Constructing granaries and similar buildings with bins or apartments containing air passages, flues or channels so as to furnish means for cooling and ventilating them substantially as set forth.

Second, I claim cooling and ventilating granaries or buildings for storing grain by means of air compressed and dried substantially as herein set forth and described.

Third, I claim cooling the air for ventilating granaries by means of subterranean coolers as set forth and described.

Fourth, I claim in combination with devices for cooling and introducing air into granaries suitable channels for carrying off any moisture that may be deposited, so as to prevent its coming in contact with the grain.

Fifth, I claim drying air to be used in ventilating granaries by means of hygrometric or absorbent materials as set forth.

Sixth, I claim in combination with multiple walls, any or all of the devices herein described for cooling and ventilating granaries and other similar buildings.

Seventh, I claim constructing bins or apartments for grain or other materials to be injured by being kept in a close chamber, with a system of cooling and ventilating devices, substantially as herein set forth and described.

46,951.—Machine for Sharpening Saws.—Reuben Sparks, Buffalo, N. Y.:

I claim the combination of the grinding wheel, B, sliding saw table, C, or C', and adjustable guide bar, D, for the purposes and substantially as set forth.

46,952.—Churn Dashers.—N. Starbuck, Wilmington, Ohio:

I claim the knob, B, or an equivalent support on the lower end of the rod or staff, B', in connection with a rod, C, passing through the rod or staff and a groove, c, or equivalent pins or projections on the upper surface of the dash, all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to an improvement in that class of churn dashers which are placed loosely on their ends or staffs, so that they may rotate thereon under the action or resistance of the cream while being operated or worked up and down therein.

46,953.—Butter Worker.—Le Roy S. Starrett, Newburyport, Mass.:

I claim the box, A, provided with the rails, B B, in combination with the shaft or bar, C, with lever, D, attached and the latter having the plunger, F, connected to it, all being arranged to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved butter worker, for expressing the buttermilk from butter, and it consists in the employment or use of an oblong box provided at each side, above its upper edge, with a rail, between which rails and the top of the box there is placed a shaft or bar having a lever attached, to which there is suspended a pcessure plate, all being arranged in such a manner as to admit of the work aforesaid being performed expeditiously and in a perfect manner.]

46,954.—Gate.—George Stovel, Chicago, Ill.:

I claim the combination and arrangement of the swinging gate, A B; with the vertically adjustable gate, E, operating substantially as and for the purposes herein specified and shown.

46,955.—Machine for Winding Sewing-Machine Bobbins.—A. W. Todd, Chicago, Ill.:

I claim the combination and arrangement of all the parts of the machine, as and for the purpose described.

46,956.—Molding and Pressing Brick.—John Treadway, Haverstraw, N. Y.:

I claim in that part of the above-described machinery for driving out the molds, the weighted lever, in combination with the rock shaft and its arms, or the equivalents thereof, and the cam lever operated by the crank, substantially as described and for the purpose set forth.

And I also claim the platen with its two standards, with cross grooves to receive the wedge key, in combination with the connecting rod, adapted to slide between the said standards, and provided with projecting pins adapted to slide in longitudinal grooves in the standards, as and for the purpose described.

46,957.—Composition for Preventing Disease in Vegetables.—Joanna B. Tribble, Middleborough, Mass.:

I claim the said composition, made and for use, substantially as specified.

46,958.—Car Coupling.—Thomas Tripp, Chicago, Ill.:

First, I claim providing the drawhead, A, with the vertical slot, S, constructed, arranged and operating as and for the purposes specified and shown.

Second, I claim the combination of the drawhead, A, and link, D, constructed, arranged and operating substantially as and for the purposes shown and described.

Third, I claim the combination and arrangement of the drawhead, A, hook, B, and link, D, constructed and operating as and for the purposes delineated and set forth.

Fourth, I claim the combiation of the drawhead, A, hook, B, and spring, C, arranged and operating as and for the purposes shown and described.

46,959.—Tobacco Pipe.—Luther C. Walker, Baltimore, Md.:

First, I claim the converging apertures, a a, in combination with the chamber, C, and channel, b, the whole being arranged as set forth.

Second, I claim forming a pipe stem with chamber, b, opening at the upper side of the stem, as at b', instead of at the end, substantially as described.

Third, I claim providing the mouthpiece of a pipe stem with a cavity, b2, in the manner and for the purpose explained.

46,960.—Hand Shears or Nippers.—Theodore Wallis and Thomas Witbeck, Scipio, N. Y.:

We claim the toothed segmental fulcrumed levers, B, in combina-

tion with the shears, and attached thereto, and operating thereby the stirrups, all constructed as herein described.

46,961.—Waterfall Head-dresses for Ladies.—Philip Walter, New York City:

I claim, First, The use in the manufacture of waterfalls of strands of horse hair, C, doubled up at the upper edge of the pillow or stuffing, and secured to the same by binding, a b c d, substantially as and for the purpose set forth.

Second, In combination with the above the employment in waterfalls of stuffing inclosed in a case of gauze or other textile material, substantially as and for the purpose described.

46,962.—Neck-tie.—Thomas S. Wiles, Troy, N. Y.:

I claim, First, The neck-tie, B, with the loop, C, attached to the collar, A, the said tie being susceptible of expansion for laundrying, all arranged and combined in the manner substantially as and for the purposes herein described and set forth.

Second, I also claim the employment of the loop, C, arranged and combined with the neck tie, B, at the upper edge thereof, in the manner substantially as and for the purposes herein described and set forth.

46,963.—Dressing Mill Stone.—Abram Wing, Mayville, N. Y.:

I claim the described method of dressing mill stones, consisting of the narrowed lands, a, extending in full hight to the eye, C, in combination with the tangential and intermediate inclined furrows, b, and e e, widened toward the eye, and gradually narrowing outward to the periphery of the stone, substantially as and for the purposes herein specified.

46,964.—Fence.—Orson H. Woodworth, Columbia City, Ind.:

I claim the combination and arrangement of the permanent jaw, o, the movable jaw, i, the block, m, and the keys, n n, substantially as described and shewn.

46,965.—Time Fuse for Explosive Shells.—Geo. Wright, Washington, D. C.:

I claim the longitudinal time fuse, B, constructed and located substantially as described, for the purpose set forth.

46,966.—Sawing Machine.—A Beekman (assignor to Theodore and Charles Wenzel), New York City:

I claim the rack, C in combination with the pinion, G, and strap, D, placed on the vertical shaft, E, and all arranged with the radius bar, B, to operate in the manner as and for the purpose herein set forth.

[This invention relates to a new and useful means employed for feeding the bolt to the saw of sawing machines designed for sawing cared stuff, such, for instance, as chair backs, fellies, and other articles which are sawed in the form of segments of circles.]

46,967.—Machine for Making Beaded Wire.—Edward Croft (assignor to Benedict & Burnham Manufacturing Company), Waterbury, Conn.:

I claim, First, A machine for producing beaded wire, having a connected series of gradually increasing semicircular grooves adapted to act successively upon the beads, in the manner herein described.

Second, The helical graduated grooves, h h', in the peripheries of the rollers, B B', revolving in the same direction, and operating substantially as and for the purpose set forth.

[This invention consists in the employment or use, for the purpose of rolling beaded wire, of two rollers revolving in the same direction, and provided on their peripheries with helical grooves, of gradually increasing pitch, in such a manner that a thin piece of wire is passed through between the rollers lengthwise, the grooves at one end, and gradually rolling the wire along, finish the same at the other, the grooves being so graduated that there is just enough metal taken into the groove at the beginning to form a complete bead, without closing the metal together and forming cold sheets, as would be the case were the grooves hot or not properly graduated.]

46,968.—Boring Wells.—Charles E. Foster (assignor by mesne assignment to George O. Evans and W. S. Hassall), Philadelphia, Pa:

I claim, first, The movable plate, G, in combination with the dogs, J J, or their equivalents, when combined and operating substantially as described, for the purpose specified.

Second, The shaft, H, with its worm, i, and pinion, h, and stationary rack, m, in combination with the plate, G, the whole being arranged and operating substantially as set forth.

46,969.—Cane Juice Evaporator.—F. Groves (assignor to Chas. A. Diehl), New Oxford, Pa.:

I claim, First, The combination and arrangement of heating pipe, c, through the furnace, with a series of pans, one above the other, substantially as described.

Second, The arrangement of the oblong pans, H H, etc., with openings on alternate sides, so as to keep the juice flowing briskly as it is evaporated

Third, The fire door, o o, in combination with doors, A and A A, so as to regulate the fires and throw off the scum, as described.

46,970.—Device for Moving Churn Dasher.—A. W. Hall, New York, assignor to Benjamin W. Robinson, South Reading, Mass., and Chas. W. Clark, Brooklyn, N. Y.:

I claim, First, The employment or use in a churn, provided with a rising and falling dasher, of a spring attached to the dasher rod, and a plurality of hooks, applied to any suitable fixture, to admit of the suspension of the spring at different lengths, substantially as and for the purpose specified.

Second, The graduating of the spring or lengthening and shortening the same, in connection with one or more hooks or points of suspension, substantially as and for the purpose set forth.

46,971.—Loom.—Orange B. Hubbard (assignor to himself, Lyman S. Smith and Lucas I. McMasters), Lowell, Mass:

I claim the combination and arrangement of the adjustable spring H, the clasp, I I, and picker staff, E, substantially as herein set forth and for the purpose specified

I also claim the method of adjusting the spring, H, substantially as herein set forth and for the purpose specified.

46,972.—Mallet.—Allen Partridge, Medway, Mass., assignor to himself and Butterfield & Haven, Boston, Mass.:

I claim as a new article of manufacture the mallet constructed substantially as herein described.

46,973.—Process for obtaining the Condensed Extract of Hops.—Samuel R. Percy and Walter S. Wells (assignors to George R. Percy and Walter S. Wells), New York City:

We claim, First, The process of making a condensed extract of hops by a continuous vacuum and exhaustion, whether with or without the addition of alkali or alkaline salts, molasses, saccharine matter, or the extracted liquor of grain, or with or without the addition of one or all of these, such process being vastly superior to any other, and contains the fine aroma of the hops, which is entirely lost and dissipated when made in the open air.

Second, We claim the use of steam in the steeping vessel to exhaust the properties and virtues of the hops.

Third, We claim the use of alkali or alkaline salts in the water or steam used in extracting the essential qualities of the hops, as it tends to make the resin of the hops more soluble, and also counteracts the acid in the molasses or other saccharine matter.

Fourth, We claim the process of coating or covering the inner surface of the vacuum condensing pan with any oily or fatty substance to prevent burning, etc.

Fifth, We claim the commingling of a sufficient quantity of molasses, saccharine matter, or the extracted liquor of grain, whether matted or not, to the watery extract of hops.

46,974.—Sulky Gang Plow.—Ira C. Pratt (assignor to J. M. Campbell, D. Moobery, E. Emerson and H. Reeves), Morton, Ind.:

I claim, First, Attaching one or more plows, E, direct to the draught pole, C, when the latter is connected to the main frame, A, and all arranged to operate as and for the purpose set forth.

Second, The oblique bar, D, attached to the rear part of the draught pole, C, and having a plow, E, secured to it, and arranged as shown, so as to be capable of being adjusted substantially as and for the purpose specified.

Third, The lever, H, with cam, I, attached, arranged and applied to the draught pole to operate in relation with the axle, a, of frame, A, and for the purpose specified.

[This invention relates to a new and useful improvement in the construction and arrangement of certain parts pertaining to a sulky gang plow.]

46,975.—Asphaltic Cement.—C. G. Reinhold (assignor to himself and John F. Sharretts, assignors to themselves and Clifford Arick), Milton, Pa.:

I claim, First, The use of distilled or inspissated coal tar, secured by the process of boiling, which when compounded with a calcareous earth, while hot, may be reduced to lumps or loaves of cement, substantially as and in the manner and for the purposes described.

Second, Combining with these pulverized earths plumbago for the purpose of uniting the same when combined with inspissated coal tar, reducible to lumps or loaves of cement when cold, substantially as and in the manner and for the purpose described.

Third, Combining with these pulverized earths, pebble stones, sand, crushed stone, granite or other concreted earthy matter, for the purpose of uniting the same when combined with distilled or inspissated coal tar, reducible to slabs or blocks of stone when cold, substantially as and for the purpose described.

Fourth, Combining with these pulverized earths, pebbles, sand, crushed stone, or other concreted earthy matter, as described plumbago or other analogous substance, for the purpose of uniting the same when combined with inspissated coal tar, reducible to slabs or blocks of stone when cold, substantially as and for the purpose described.

Fifth, I claim as an article of manufacture, trade or commerce, the said "asphaltic cement," compounded and manufactured as described, when reduced to lumps or loaves as set forth.

Sixth, I claim as an article of manufacture, trade and commerce, the said "asphaltic stones," compounded and manufactured as described, when reduced to any desired form and size, substantially as and for the purpose described.

46,976.—Apparatus for Carburreting Air.—Warren A. Simonds (assignor to himself and S. Ingersoll Lovett,) Boston, Mass.:

First, I claim the arrangement and combination of the reservoir generator air pump and force pump with the pipes connecting the same substantially as described.

Second, I claim, in combination for the purpose of constituting a carburreting apparatus suitable for steamboats, ships, etc., the reservoir generator air pump, or dry meter and receiver or their equivalents substantially as described.

Third, I claim the combination of the receiver generator air pump reservoir and force pump or their equivalents substantially as described.

Fourth, I claim the process of throwing back or returning the unabsorbed portion of the fluid employed to the head or upper reservoir without exposing it to the air and therefore without loss of vapor or material by means substantially as described.

Fifth, I claim in combination the use of pipes connecting the reservoir, to equalize the atmospheric pressure in all of them substantially as described.

Sixth, I claim as new the combination of reservoirs to be used as distributors generators and receivers as above described.

Seventh, I claim the pump in connection with the receiver and distributor as above described in specifications substantially as described.

Eighth, I claim as new the combination of gearing and pumps in the direct production of gas substantially as described.

46,977.—Breech-loading Fire Arms.—David Williamson (assignor to Moore's Patent Fire Arm Co.) Brooklyn, N. Y.

First, I claim The combination of the breech blocks, d and e, and lever, h, having a changeable fulcrum and actuating the said blocks, d and e, substantially as specified.

Second, I claim the spring, I, and the toe, n, or its equivalent in combination with the lever, h, and breech blocks, d and e, as specified.

46,978.—Manufacture of Ordnance.—Thomas Edward Vickers, Sheffield, Eng.:

I claim re-heating gun blocks made from cast steel or other metal or alloy, either cast or wrought, and cooling the same while in the annealing furnace in the manner described.

46,979.—Process of Liberating Potash or Soda from Alkaline Silicate.—Frederic Oldfield Ward, London, Eng.:

First, I claim the mode of producing or liberating potash or soda or both as the case may be from natural alkaliferous silicates, substantially as herein before described.

Secondly, I claim the employment of fluoride of calcium in conjunction with earthy material or mixture of earthy material, to act with the aid of heat on natural alkaliferous silicates, so as to produce or liberate therefrom potash or soda or both, as the case may be, substantially as herein before described.

Thirdly, I claim the extraction by water of the soluble alkaline contents of calcined produce or frit, obtained when liberating alkali from alkaliferous silicates and distinguished by the double character that it contains both alkaline matter and fluorine.

Lastly, I claim the application of insoluble residuum obtained when liberating alkali from alkaliferous silicates, and characterized by its containing as one of its ingredients fluorine, in the manufacture of manure, of hydraulic current or of puzzolana at the operator's choice substantially as herein before described.

REISSUES.

1,904.—Artificial Gums and Palate.—John A. Cummings, (assignor through mesne assignments to the Dental Vulcanite Company), Boston, Mass. Patented June 7, 1864. Reissued Jan. 10, 1865:

I claim the plate of hard rubber or vulcanite or its equivalent for holding artificial teeth or teeth and gums, substantially as described.

1,905.—Brewing.—Adolph Hammer, New York City. Patented Aug. 17, 1858:

I claim, First, The arrangement of a heater, C, on the outside of a mash tun, and in combination therewith, constructed and operating substantially in the manner and for the purposes set forth.

Second, Heating the contents of a mash tun by a current of liquid which is drawn therefrom and returned to it, and while passing from and to the malt has its temperature gradually raised, by means substantially as herein described, or any equivalent means, for the purposes specified.

Third, The arrangement of one or more horizontal perforated partitions, B, in the upper part of a mash tun, constructed as herein set forth, or in any other suitable manner, so that the malt is prevented from rising to the surface of the liquid and from coming in contact with the external atmosphere.

Fourth, Making the partition, B, in sections, substantially as and for the purpose set forth.

1,906.—Straw Cutter.—Jacob H. Mumma, Harrisburg, Pa. Patented Nov. 8, 1859:

I claim, First, The hawks bill cutters, a a, in combination with the cutting bar, C, of a straw cutter, the whole being arranged and operating substantially as set forth.

Second, The bed of slats, b, operating for the purpose of feeding the material to the rollers, and of cleaning it from dust and dirt, substantially as set forth.

Third, The ribbed feed rollers, in combination with the cutter and cutter bar, C, the whole being arranged substantially as described.

Fourth, The intermediate pinion, e, carried by a shaft which is adjustable in the head or side plate of the straw cutter, in combination with the wheel, E, on the roller shaft, and pinion, G, on the cutter shaft, the whole being arranged and operating substantially as described, for the purpose specified.

1,907.—Artificial Leg.—Dubois D. Parmelee, New York City. Patented Feb. 10, 1863:

I claim, First, Fastening the bucket of artificial limbs to the stump by means of atmospheric pressure, substantially in the manner specified.

Second, The adjustability, by the means herein described, or by means substantially the same, of the limb with respect to length, as set forth.

Third, Forming the articulation or movable connection between two parts of an artificial limb, by means of a clasp linked to or swinging in both, substantially as described.

Fourth Combining with the two parts of an artificial limb an intermediate stop, when the said parts and stop are connected by means of a clasp or the equivalent thereof, linked to and swinging in the three parts, substantially as described.

Fifth, Making the opposite ends of the limb at the movable joint of cylindrical form, and holding the same in such relative position as to move upon each other with rolling friction, substantially as set forth.

Sixth, In combination with the last-named device, I claim the double concave sector or artificial knee pan, together with projections or stops on the cylindrical ends of the limbs, as herein shown and described.

Seventh, The movable joint, constructed and arranged as described, in combination with a spring or elastic band, operating in the manner and for the purposes set forth.

Eighth, The combination of the ball and socket with an elastic sleeve, the whole forming a movable joint, substantially as herein set forth.

Ninth, Forming the foot of two parts, to wit: a foot piece proper and a toe piece, when the latter is arranged to rock up on the former, and the two held by flexible and elastic straps, in the manner and for the purpose set forth.

Tenth, The divided toe piece, so as to allow of its adapting itself to the inequalities of the ground, substantially as set forth.

Eleventh, The arrangement of the stems or tails projecting from the under side of the toe pieces in combination with the bands of leather or other suitable material, and with the elastic bands adjustable by a metal clasp or its equivalent, all constructed and operating substantially in the manner and for the purpose described.

1,908.—Artificial Leg.—Dubois D. Parmalee, New York City. Patented Feb. 10, 1863:

I claim, First, The method of making the bucket of artificial limbs of a plastic substance capable of being subsequently indurated upon a mold or cast of the stump in the manner and for the purpose set forth.

Second, Shaping the interior of buckets when made of a substance rendered plastic by heat by means of a core which is the fac-simile of the stump, in combination with the requisite degree of heat, substantially in the manner and for the purpose set forth.

Third, The manufacture of artificial limbs with buckets of hard rubber or vulcanite, or its equivalent, for holding the stump, substantially as described.

1,909.—Construction of Rooms, Cases, etc., for preserving and transporting articles of Food and other substances.—Daniel E. Somes, Washington, D. C. Patented Sept. 15, 1863. Antedated July 20, 1862:

First, I claim a vessel or chamber suitable for transporting or storing articles of food with multiple walls and air spaces.

Second, I claim connecting with a preserving vessel or chamber, such as described, a separate apparatus for cooling the air to be introduced into said chamber or vessel for the purpose of lowering the temperature and preserving articles therein contained, substantially as set forth.

1,910.—Railroad Car.—Lawrence Myers, Philadelphia, Pa. Patented June 24, 1851:

I claim, First, The combination, substantially as described, of a hollow vessel with flanged wheels or tires adapted to the rails of a railroad for the purpose specified.

Second, One or more partitions combined with the said hollow vessel, substantially as and for the purpose described.

DESIGN.

2,039.—Trade Mark.—Louis Seitz (assignor to James Toft), New York City:

EXTENSIONS.

Machine for arranging and feeding Screw Blanks.—Thomas J. Sloan, New York City. Patented Feb. 25, 1851. Reissued March 29, 1853, and extended Feb. 25, 1865:

I claim the lifters which select and lift the blanks, etc., from the hopper, substantially as specified, in combination with ways or conductors, or the equivalents thereof, substantially as specified, into or on to which the blanks, etc., are transferred as specified.

And I also claim giving to the lifters or to the inclined ways, or their equivalents, a lateral motion, in combination with a stop or detector, substantially as specified, for the purpose of arresting the operation of the lifters until a further supply is required, as specified.

And, finally, I claim the sliding carrier with its recess for receiving and holding the screw blanks, substantially as specified, in combination with the spring fingers, substantially as specified, for taking the screw blanks from the carrier and presenting them to the jaws, as specified.

Steam Engine Governor.—Junius Judson, Rochester, N. Y. Patented March 4, 1851. Reissued Feb. 28, 1865. Extended March 3, 1865:

I claim communicating the action of a governor to its valve or valves, gate, or equivalent regulating device, in such a manner that when the speed of the engine or motor becomes low, either from increase of resistance to overcome, or from diminution of pressure of the motive power, the said valve or equivalent will be accelerated or caused to move through a comparatively large space, to uncover or cover a comparatively large area of the valve or gate opening, so as to add to or take from the engine or motor, by a given change of its speed, comparatively large amounts of power; and also when the speed becomes high, either from diminution of resistance to overcome or from increase of pressure of the motive power, the said valve or equivalent will be by a like change of speed retarded or caused to move through a comparatively small space to uncover or cover a comparatively small area of valve opening, so as to add to or take from the engine or motor comparatively small amounts of power for the purpose of securing as nearly as may be uniform speed of the engine or motor under all variations of the power or resistance, substantially as herein set forth.

Steam Drilling Machine.—Joseph W. Fowle, Boston, Mass. Patented March 11, 1851. Extended March 6, 1865:

I claim the combination of a direct action steam drill in which both engine and drill are mounted on a frame which slides in a swinging frame capable of being adjusted in any required position with the apparatus substantially as herein above described, which is connected with and actuated by the cross-head of the engine, for causing the sliding frame to move along the swinging frame toward the rock.

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 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

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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The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

SPECIAL NOTICE TO INVENTORS.

The money receipts on account of patent business, which have heretofore been published in this column, and the notification of cases sent to the Patent Office, will for the present be discontinued. The receipt of specifications and money from inventors will be acknowledged promptly by mail.

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.

OFFICE A. A. PROVOST-MARSHAL-GENERAL, AND SUP'T VOLUNTEER RECRUITING SERVICE, SOUTHERN DIVISION OF NEW-YORK, NEW-YORK, March 20, 1865.

THE FOLLOWING CIRCULAR IS PUBLISHED FOR the information of the public.

RICHARD I. DODGE,
Maj. 12th Inft., A. A. P. M. Gen.

WAR DEPARTMENT, PROVOST MARSHAL-GENERAL'S OFFICE, WASHINGTON, D. C., March 8, 1865.

CIRCULAR No. 5—The following Act of Congress is published for the information and guidance of all concerned:

"AN ACT to amend the several Acts heretofore passed to provide for the enrolling and calling out the national forces, and for other purposes.

* * * * * * * *

"Section 13. And be it further enacted, That where any revised enrollment in any Congressional or draft district has been obtained or made, prior to any actual drawing of names from the enrollment lists, the quota of such district may be adjusted and apportioned to such revised enrollment, instead of being applied to or based upon the enrollment as it may have stood before the revision.

"Section 14. And be it further enacted, That hereafter all persons mustered into the military or naval service, whether as volunteers, substitutes, representatives, or otherwise, shall be credited to the State, and to the ward, township, precinct, or other enrollment sub-district, where such persons belong by actual residence, (if such persons have an actual residence within the United States,) and where such persons were or shall be enrolled, (if liable to enrollment,) and it is hereby made the duty of the Provost-Marshal-General to make such rules and give such instructions to the several Provost-Marshals, Boards of Enrollment, and Mustering Officers, as shall be necessary for the faithful enforcement of the provisions of this section, to the end that fair and just credit shall be given to every section of the country: *Provided*, That in any call for troops hereafter no county, town, township, ward, precinct, or election district, shall have credit except for men actually furnished on said call, or the preceding call, by said county, town, township, ward, precinct, or election district, and mustered into the military or naval service on the quota thereof.

"Section 15. And be it further enacted, That in computing quotas hereafter, credit shall be given to the several States, districts, and sub-districts, for all men furnished from them, respectively, and not heretofore credited, during the present rebellion, for any period of service of not less than three months, calculating the number of days for which such service was furnished, and reducing the same to years: *Provided*, That such credits shall not be applied to the call for additional troops made by the President on the twenty-first day of December, eighteen hundred and sixty-four.

"Section 16. And be it further enacted, That persons who have been, or may hereafter be drafted, under the provisions of the several acts to which this is an amendment, for the term of one year, and who have actually furnished, or may actually furnish, acceptable substitutes (not liable to draft) for the term of three years, shall be exempt from military duty during the time for which such substitutes shall not be liable to draft, not exceeding the time for which such substitutes shall have been mustered into the service, anything in the act of February twenty-fourth, eighteen hundred and sixty-four, to the contrary notwithstanding.

"Section 17. And be it further enacted, That any recruiting agent, substitute broker, or other person, who for pay or profit, shall enlist, or cause to be enlisted, as a volunteer or substitute, any insane person, or convict, or person under indictment for a felony, or who is held to bail to answer for a felony, or person in a condition of intoxication, or a deserter from the military or naval service, or any minor between the ages of sixteen and eighteen years, knowing him in either case before ment oned, to be such, or who shall defraud or illegally deprive any volunteer or substitute of any portion of the State, local, or United States bounty, to which he may be entitled, shall upon any conviction in any court of competent jurisdiction, be fined not exceeding one thousand dollars, nor less than two hundred dollars, or imprisoned not exceeding two years and not less than three months, or both, in the discretion of the court aforesaid.

"Section 18. And be it further enacted That any officer who shall muster into the military or naval service, of the United States any deserter from said service, or insane person, or person in a condition of intoxication, or any minor between the ages of sixteen or eighteen years, without the consent of his parents or guardian, or any minor under the age of sixteen years, knowing him to be such, shall, upon conviction by any court-martial, be dishonorably dismissed the service of the United States.

"Section 19. And be it further enacted, That in every case where a substitute is furnished to take the place of an enrolled or drafted man, and it is shown by evidence that shall be satisfactory to the Secretary of War, that such substitute was, at the time of his enlistment, known by the party furnishing him to be *non-compos mentis*, or in a condition of intoxication, or under conviction or indictment for any offence of the grade of felony at the common law, or to have been guilty of a previous act of desertion unsatisfied by pardon or punishment, or by reason of any existing infirmity or ailment, physically incapable of performing the ordinary duties of a soldier in actual service in the ranks, or minor between the ages of sixteen and eighteen years, without the consent of his parent or guardian, or a minor under the age of sixteen years, it shall be the duty of the Provost-Marshal-General, on advice of the fact, to report the same to the Provost-Marshal of the proper district; and if such person so enlisted and incapable shall have been, since the passage of this act, mustered into the service as a substitute for a person liable to draft, and not actually drafted, the name of the person so liable who furnished such substitute shall be again placed on the list, and he shall be subject to draft thereafter, as though no such substitute had been furnished by him; and if such substitute so enlisted, and incapable aforesaid, shall have been, since the passage of this act, mustered into the service as a substitute for a person actually drafted, then it shall be the duty of the Provost-Marshal-General to direct the Provost-Marshal of the district immediately to notify the person who furnished such substitute that he is held to service in the place of such substitute, and he shall stand in the same relation and be subject to the same liability as before the furnishing of such substitute.

"Section 20. And be it further enacted, That in case any substitute shall desert from the army, and it shall appear by evidence sati factory to the Secretary of War, that the party furnishing such substitute shall have, in any way, directly or indirectly, aided or abetted such desertion, or to have been privy to any intention on the part of such substitute to desert, then such person shall be immediately placed in the army, and shall serve for the period for which he was liable to draft, such service to commence at the date of the desertion of the substitute.

"Section 21. And be it further enacted, That, in addition to the other lawful penalties of the crime of desertion from the military or naval service, all persons who have deserted the military or naval service of the United States who shall not return to said service, or report themselves to a Provost-Marshal within sixty days after the proclamation hereinafter mentioned, shall be deemed and taken to have voluntarily relinquished and forfeited their rights of citizenship and their rights to become citizens; and such deserters shall be forever incapable of holding any office of trust or profit under the United States, or of exercising any rights of citizens thereof; and all persons who shall hereafter desert the military or naval service, and all persons who, being duly enrolled, shall depart the jurisdiction of the district in which he is enrolled, or go beyond the limits of the United States, with intent to avoid any draft into the military or naval service, duly ordered, shall be liable to the penalties of this section. And the President is hereby authorized and required forthwith, on the passage of this act, to issue his proclamation setting forth the provisions of this section, in which proclamation the President is requested to notify all deserters returning within sixty days as aforesaid, that they shall be pardoned on condition of returning to their regiments and companies, or to such other organizations as they may be assigned to, until they shall have served for a period of time equal to their orignal term of enlistment.

"Section 22. And be it further enacted, That the third section of the act, entitled "An act (further) to regulate and provide for the enrolling and calling out the national forces, and for other purposes," approved July fourth, eighteen hundred and sixty-four, be, and the same is hereby repealed.

"Section 23. And be it further enacted, That any person or persons enrolled in any sub-district may, after notice of a draft, and before the same shall have taken place, cause to be mustered into the service of the United States, such number of recruits, not subject to the draft, as they may deem expedient, which recruits shall stand to the credit of the persons thus causing them to be mustered in, and shall be taken as substitutes for such persons, or so many of them as may be drafted, to the extent of the number of such recruits, and in the order designated by the principals at the time such recruits are thus as aforesaid mustered in.

"Section 24. And be it further enacted, That section fifteen of the Act approved February twenty-fourth, eighteen hundred and sixty-four, entitled "An act for enrolling and calling out the national forces, and for other purposes," be and the same is hereby amended, by inserting after the words "any civil magistrate," the words "or any person authorized by law to administer oaths."

"Section 25. And be it further enacted, That the Secretary of War is hereby authorized to detail one or more of the employees of the War Department for the purpose of administering the oaths required by law in the settlement of officers' accounts for clothing, camp and garrison equipage, quartermaster's stores, and ordnance, which oaths shall be administered without expense to the parties taking them, and shall be as binding upon the persons taking the same, and if falsely taken, shall subject them to the same penalties, as if the same were administered by a magistrate or justice of the peace.

"Section 26. And be it further enacted, That Acting Assistant-Surgeons, Contract Surgeons, and Surgeons and Commissioners on the Enrolling Boards, while in the military service of the United States, shall hereafter be exempt from all liability to be drafted under the provisions of any act for enrolling and calling out the national forces.

"Section 27. And be it further enacted, That this act shall take effect from and after its passage; *Provided*, That nothing herein contained shall operate to postpone the pending draft, or interfere with the quotas assigned therefor.

"Approved March 3, 1865."

[Sections from one to twelve, inclusive, do not relate to this Bureau, and are omitted.]

JAMES B. FRY,
14-1 Provost-Marshal-General.

OFFICE A. A. PROVOST-MARSHAL-GENERAL, AND SUP'T VOLUNTEER RECRUITING SERVICE, SOUTHERN DIVISION OF NEW-YORK, NEW-YORK, March 20, 1865.

THE FOLLOWING "OPINION" IS PUBLISHED for the information of the public.

RICHARD I. DODGE,
Major, 12th Inf., A. A. P. M. Gen.

OPINION.

ATTORNEY-GENERAL'S OFFICE, Feb. 9, 1865.

SIR; In your letter of the 28th January, you ask my opinion on the legal points presented in the letter of Gov. A. G. Curtin, to you, of date the 25th January.

Gov. Curtin's letter is in relation to the construction of the Act of Congress, approved 3d March, 1863, commonly called the Enrollment Act. He insists—

1st. That the words "periods of service," since the commencement of the Rebellion, as used in the 12th section of the Act, do not require the President, in assigning the quotas to the several States, to take into consideration the whole term of enlistment of the volunteer and militia man; and

2d. That that part of the Act of the 3d of March, 1863, which makes the period of service an element in the calculation necessary to determine the number of men due from a State, district, county, or town, has been repealed by the 2d section of the Act amendatory of the Enrollment Act, approved 24th February, 1864.

It will be more convenient to consider these questions in the reverse order, inasmuch as if it shall be found that the repeal has been made as contended for, the first point made by the Governor need not be considered.

The great objects of the Enrollment Act are:

1st. To declare who shall constitute the national forces; and

2d. To organize a plan by which the national forces can be made available.

Subordinate to the purpose of raising and organizing the national forces, the plan adopted by Congress shows a desire that the draft upon the industrial population of the several States, and the communities thereof, should be equalized as nearly as practicable.

By the 4th section of the Act of the 3d of March, 1863, the United States is divided into districts, of which the District of Columbia shall constitute one, each Territory of the United States shall constitute one or more, as the President shall direct, and each Congressional District of the respective States, as fixed by a law of the State next preceding the enrollment, shall constitute one. The 8th section provides, that there shall be a Board of Enrollment in each District. By the 9th section, it is provided, that if the Board of Enrollment shall deem it necessary, a District may be divided into two, and, with the assent of the Secretary of War, into any greater number of sub-divisions.

By the 12th section, it is made the duty of the President, in assigning to the Districts the number of men to be furnished therefrom, to take into consideration the number of volunteers and militia furnished by and from the *several States* in which said Districts are situated, and the period of their service since the commencement of the present Rebellion; and shall so make said assignment as to equalize the numbers among the Districts of the several States, considering and allowing for the numbers already furnished as aforesaid, and the time of their service.

It is evident, from the face of this Act, that the several States and Districts had furnished a number of volunteers and militia, and for periods of service.

The first duty of the President was to have the National forces enrolled; his next duty was to ascertain what number of volunteers and militia had been furnished from the several States, and the periods of their service since the commencement of the present Rebellion; and then, from what Districts in the several States they came, that he might equalize the numbers among the Districts of the several States, considering and allowing for the numbers already furnished as aforesaid, and the time of their service. Under the Act of the 3d of March, 1863, it is plain that he had no right and power to cut up a District into counties, townships, precincts, or wards, in order to equalize the draft therein. The authority given in the 9th section to sub-divide a District was for the purpose of facilitating or expediting the enrollment, and with no reference to equalization. It might, and doubtless did happen in many Districts, that one well defined portion of a District, as a county, township, or ward, had furnished greatly more than the number due therefrom, whilst other parts of the same District, equally well defined, had furnished a few or none, thereby making a draft upon the District necessary; and yet, under the Act, it was not in the power of the President to make the draft otherwise than equal over the whole District. This was unjust and oppressive. In order to correct this flagrant hardship and injustice, Congress by the 2d section of the Act of 24th February, 1864, and which is an amendment of the Act of 3d of March, 1863, declared that the quota of each ward of a city, town, township, precinct, or election district, or of a county, where the county is not divided into wards, towns, townships, precincts, or election districts, shall be, as nearly as possible, in proportion to the number of men resident therein liable to military service, taking into account, as far as practicable, the number which has been previously furnished therefrom.

It is earnestly insisted, and most ingeniously argued, that this 2d section of the amended Act repeals so much of the 12th section of the Act of the 2d of March, 1863, as makes it the duty of the President to take into consideration the period of service of the volunteers and militia from the several States. The argument in favor of the repeal rests wholly upon the words of the amendatory Act—"the *number* which has been previously furnished therefrom." It is insisted that "number," as here used, means an arithmetical count. I cannot so understand it.

The Act of the 3d of March, 1863, had prescribed a mode by which the number of men due from the several States, and the Districts of the several States, should be ascertained; and that mode required, not a simple count but a consideration of the period of service of men previously furnished. Congress used the word *number* in the 2d section of the amendatory Act, understanding that the mode of count prescribed in the original Act would be preserved.

There are many evidences upon the face of the amendatory Act which show that it was not the intention of Congress to change the mode of count prescribed in the original Act.

The amended Act does not undertake to say how the quota of a State or District is to be ascertained. In ascertaining what number is due from a State or District, the President must pursue the mode prescribed in the 12th section of the original Act—he must take in consideration the period of service; and yet, under the construction insisted upon, when he comes to equalize the draft, as authorized to do by the amended Act, in the Districts, he must be controlled by simple numbers. It cannot be that Congress intended one mode of count for the States and Districts, and a different and wholly inconsistent one for the Sub-divisions of Districts. Inextricable confusion would result.

From the language used in various parts of the amendatory Act, it is evident that Congress did not intend to disturb the mode of count prescribed in the original Act. For instance, in the 8th section of the amendatory Act, it is said that the town, ward or township shall be *credited by his service*, and in the 7th section, "the period for which he shall have been enlisted," and the "period for which he shall have been drafted," all going to show that time of service was held to be an element in the count.

Nor do I think that the argument in favor of the repeal is aided by the language of the 1st section of the act, entitled "An act further to regulate and provide for the calling out of the national forces," approved 4th July, 1864. The act says, that "any such volunteer, or in case of draft, as hereinafter provided, any substitute, shall be credited to the town," &c. Congress meant that the credit should be given according to the mode of count prescribed in the act of 3d March, 1863.

The whole purpose of the 2d section of the amendatory act was to enable the President to equalize the draft in the several districts, surely not to have one mode of count in ascertaining the quotas of the several States and districts, and another mode for equalizing the districts. Besides, it is hardly to be considered that Congress would thus incidentally strike from so important a statute a feature so prominent and equitable.

I am, therefore, of the opinion that the mode of ascertaining and assigning to States and districts their respective quotas, as prescribed in the 12th section of the act of the 3d July, 1863, is not repealed, and that the same mode must be pursued in equalizing the draft among the sub-divisions of each district.

Next comes the the question, what is the mode of count prescribed in the 12th section of the act of 3d March, 1863?

It is very plain that Coogress regarded that a consideration of the period of service would change the rule from a merely numerical one. Some credit was to be given for the period of service as well as for the man. Congress has fixed various periods of service, and States and districts, and fractions of districts, had furnished men for those periods of service. Now, how is the credit to be given?

Before proceeding to answer the question, it may be proper to state, that it is insisted that the words "period of time" and "time of service," as used in the 12th section of the act of March 3, 1863, means something different from *term of service*. It seems to me that the phrases mean one and the same thing. When the word *term* is used in reference to time, it is, according to the lexicographers, very nearly the synonym of *period*. The difference betwixt them, if any, is too uncertain and shadowy to believe that Congress meant by the use of one, something different from what is understood by the other. But the words *period* and *term*, both occur in after parts of the acts now under consideration. In the 18th section of the act of 1863, the term of service is spoken of, and the term of re-enlistment, whilst in the 7th section of the amended act, it is the period for which he shall have enlisted, and the period for which he shall have been drafted. Thus it will be perceived, that upon the very face of these acts, Congress used these words as meaning the same thing. It happens too in the act, that neither word may be used and yet the same idea intended, as in the 8th section of the amended act, where the language is "shall be credited by his services."

Regarding then "period of service," and "term of service," as meaning the same thing, any argument predicated upon a difference must be disregarded. And thus we are brought back to the question, how is the credit to be given? Must the credit be for the time of actual service, or the period of enlistment?

I think that Congress intended by the words "period of service," to give credit for the time of his enlistment. When a man enlists in the service of the Government for one, two, or three years, his services are due to the Government for that period, and during that period his services are withdrawn from the industrial pursuits of life. The act speaks as though there was a certain and fixed period for the services of each man, and yet, if any period or time is taken, other than the term of enlistment, by some system of averages or guesses, a rule must be fixed. To do so would violate the certainty contemplated by the act.

I am, therefore, of the opinion that the President must, under the act, give credit by the whole period or term for which the man enlisted.

Whether this is the rule which should have been adopted by Congress, whether it does not operate unequally, and whether it is exactly just or not, are questions that cannot now be considered. It is familiar to all that special cases of hardship will occur by the application of any general rule, neverthel ss the law, as written, must be pursued and enforced.

Very respectfully, your obedient servant,
(Signed) JAMES SPEED,
To the PRESIDENT. Attorney-General.
11

OFFICE A. A. PROVOST-MARSHAL-GENERAL AND SUP'T. VOLUNTEER RECRUITING SERVICE, SOUTHERN DIVISION OF NEW YORK, NEW YORK, March 20, 1865.

THE FOLLOWING "OPINION" IS PUBLISHED for the information of the public.

RICHARD I. DODGE, Major 12th Inf., A. A. P. M. Gen.

OPINION.

ATTORNEY-GENERAL'S OFFICE, March 14, 1865.

Hon. EDWIN M. STANTON, Secretary of War.

SIR:—The first question propounded in your letter of the 10th inst., is, whether the 23d section of the Act of March 3, 1865, "supersedes" the 4th section of the Act of February 24, 1864?

The 4th section of the Act of February 24, 1864, enables any enrolled person, before a draft, to furnish "an acceptable substitute who is not liable to draft, nor, at the time, in the military or naval service of the United States," and provides that the person so furnishing such substitute, "shall be exempt from draft during the time for which such substitute shall not be liable to draft, not exceeding the time for which such substitute shall have been accepted."

Under this enactment, any person enrolled and liable to draft, may obtain exemption from the draft during the whole period of time for which he shall procure a substitute to be enlisted, provided the substitute shall be so long not liable to draft. It is not a mere credit for a particular draft which such person obtains by furnishing a substitute before the anticipated draft, but it is an absolute exemption which he acquires from liability to be drawn at any and every draft which may occur during the entire time for which his substitute has been accepted by the Government, provided the substitute be so long not liable to draft. If, for example, his substitute is accepted as a three years' volunteer, and remains so long not liable to draft, the principal, by the provision of the law of 1864, just referred to, is insured against the risk of being drafted during the whole period for which his substitute enlisted, no matter how many drafts may occur between the enlistment of the substitute and the expiration of his term of service. But the Government, under this provision, is to be at no expense in consequence of the authorized substitution of one individual for ano her in the draft. The party who desires to avail himself of the benefit of the privilege conferred by the law, is properly and justly required to compensate the substitute.

Such being the provision of the law of 1864 on the subject of "substitutes" furnished in anticipation of a draft, the law of March 3, 1865, provides (in its 23d section) as follows:—

"That any person or persons enrolled in any sub-district may, after notice of a draft, and before the same shall have taken place, cause to be mustered into the service of the United States such number of recruits, not subject to draft, as they may deem expedient, which recruits shall stand to the credit of the persons thus causing them to be mustered in, and shall be taken as substitutes for such persons, or as many of them as may be drafted, to the extent of the number of such recruits, and in the order designated by the principals at the time such recruits are thus as aforesaid mustered in."

It is clear that this enactment provides for quite another case than that contemplated by the provision to which I have been adverting in the statute of 1864, and confers upon an enrolled person a privilege entirely distinct from that given to him by that statute, of which he may avail himself at his option, in preference to the privilege conferred by the act of 1864.

Under the provision of the 23d section of the Act of 3d March, 1865, he may, in advance of a draft, "cause to be mustered into the service" a "recruit not subject to draft," which "recruit" will "stand to the credit" of the enrolled person, causing him to be mustered in, in the event of the principal being drafted, and be taken, on the happening of that co tingency, as a substitute for such principal. But the "credit" shall avail him only for the particular draft in advance and anticipation of which he may have secured the "recruit."

There is no provision in the Act of 1865 that the person furnishing a "recruit," under the 23d section, shall be "exempt from draft" during the time for which the recruit may have been accepted and enlisted. But the only benefit which a person so furnishing a recruit derives, under the Act of 1865, is the securing, in the event of his being drafted, of a "credit" on the particular draft in anticipation of which the "recruit" may have been furnished. The "recruit" may be mustered into the service for three years, and yet, as a substitute, he can only avail the person who caused him to be mustered in for, and with respect to the one draft before, and in anticipation of which he was obtained. The liability of the principal to be drafted at any other drafts occurring after the mustering in of the "recruit," and during the term of his service, is not at all affected. There is manifestly, therefore, no conflict between the respective sections of the Acts of 1864 and 1865, to which you have called my attention. One does not impinge upon, nor even cross the path of, the other. They give different and distinct rights and privileges to

the citizen liable to draft. He has the alternative course to pursue before any draft, either to buy a "substitute," and secure him to be mustered in, and thus obtain exemption from the draft during the entire term of enlistment of the substitute, if the latter be so long not liable to draft, or he may procure for the Government a "recruit" not liable to draft, and obtain credit for such recruit in case he should be drafted, subjecting himself, however, to the liability of being compelled to repeat the operation at every succeeding draft that may be ordered by the President.

Chiefly, I suppose, the design of the provision of the Act of 1865, under consideration, was to offer inducement and present a stimulus to numbers or associations of individuals in any sub-district, before the liability of any of them became fixed by a draft, to obtain volunteer recruits for the Army. Congress, in this law, offers such associations a premium to use their exertions to fill up the armies. It says to the residents of the multitudinous counties, townships, wards and precincts throughout the country, [" Organize yourselves into recruiting societies; induce volunteers to enlist into the service before the draft; pay them such amounts of bounty as you may be able to raise by your contributions to the recruiting funds of your several districts; and, when they have enlisted into the service, the volunteers you may have raised will stand to the credit of as many of you as may happen to be drafted, to the extent of the number of recruits, 'in the order designated,' at the time the recruits are mustered in."

Such is the declaration and promise of the new law. Its policy is to encourage recruiting, not the procuration of substitutes; to induce the people to organize associations for the advancement of volunteering, rather than the purchase of substitutes.

In enacting this new law, and inaugurating this new policy, Congress, however, has not taken away the right of the enrolled persons, before the draft, to furnish a substitute, with the qualification before stated, and thus secure his exemption from draft during the time for which his substitute shall have been accepted. He still has it in his power to exercise that right in preference to the right conferred by the 23d section of the Act of the 3d of March, 1865, of obtaining a "recruit" previous to each draft, as it may occur, and securing thereby a credit in the event, on any occasion, of his being drafted.

I am of the opinion, therefore, that the 23d section of the Act of March 3d, 1865, does not supersede the 4th section of the Act of Feb. 24 1864.

The second question which you have referred to me is whether the "recruits" which are "to be taken as substitutes" are to be considered and borne upon the muster rolls and records of the office of the Provost-Marshal-General as other volunteer recruits which are obtained at the expense of the United States or as substitutes which are furnished at the cost of the principals.

I am of opinion that the "recruits" whom persons enrolled in any sub-district may "cause to be mustered into the service of the United States," in pursuance of the 23d section of the act of 3d March, 1865, are to be considered and treated as other volunteers who are obtained at the expense of the United States. It will be observed from the analysis of the law contained in the foregoing remarks that the idea involved in the law of 1864 is substitution, while the idea of the law of 1865 is crediting. The section of the act of 1865 under consideration does not speak of the "recruits" in question as "substitutes," but declares that they shall "be taken as substitutes" for the persons who cause them to be mustered in. They are not substitutes, but only of the nature of substitutes. Their primary and essential character under the law is that of credits for their procurers or principals; and this description is the first description given of them in the section in question, for, after saying "which recruits shall stand to the credit of the persons thus causing them to be mustered in," the section proceeds, "and shall be taken as substitutes for such persons, or so many of them as may be drafted, to the extent of the number of such recruits."

A critical study of the words of the statute thus develops the fundamental idea which I have supposed from other indications was intended to be embodied in the law. The "recruits" who are to stand "to the credit" of the enrolled persons causing them to be mustered in before the occurrence of a draft, I am of opinion, then, are to be considered as other volunteer recruits which are obtained at the expense of the United States, and not as "substitutes," in the ordinary sense of that term, which are furnished at the cost of the principals.

Very respectfully, your obedient servant,
JAMES SPEED, Attorney General.
14 1t

OFFICE A. A. PROVOST-MARSHAL-GENERAL AND SUP'T VOLUNTEER RECRUITING SERVICE, SOUTHERN DIVISION OF NEW YORK, NEW-YORK, March 20, 1865.

THE FOLLOWING "OPINION" IS PUBLISHED for the information of the public.

RICHARD I. DODGE, Major 12th Inf., A. A. P. M. Gen.

OPINION.

ATTORNEY-GENERAL'S OFFICE, March 15, 1865.

Hon. EDWIN M. STANTON, Secretary of War.

SIR:—Upon the 14th section of the Act entitled "An Act to amend the several Acts heretofore passed to provide for the enrolling and calling out of the national forces," which provides as follows:

"That hereafter all persons mustered into the military or naval service, whether as volunteers, substitutes, representatives or otherwise, shall be credited to the State, and to the ward, township, precinct or other enrollment sub-district, where such persons belong by actual residence (if such persons have an actual residence within the United States), and where such persons were or shall be enrolled (if liable to enrollment); and it is hereby made the duty of the Provost-Marshal-General to make such rules and give such instructions to the several Provost-Marshals, Boards of Enrollment, and Mustering Officers, as shall be necessary for the faithful enforcement of the provisions of this section, to the end that fair and just credit shall be given to every section of the country: Provided, That in any call for troops hereafter no county, town, township, ward, precinct, or election district, shall have credit except for men actually furnished on said call, or the preceding call, by said county, town, township, ward, precinct, or election district, mustered into the military or naval service on the quota thereof."

You, in your letter of the 12th of March, ask my opinion on the following points:—

First: As to the meaning of the words "actual residence," as employed in the above section, and the proper mode, according to law, of determining the actual residence of men offering as recruits.

Second: Where the "actual residence" of the recruit is in one sub-district, and he is enrolled in a different sub-district, where shall the credit be given?

Third: In cases where the recruit has no legal domicil or actual residence in any enrollment sub-district, shall he be credited to the sub-district or district where he is enrolled, or shall he be allowed to select his locality?

I. The first of the above questions may be divided into two parts: First, as to the meaning of the words "actual residence;" and, secondly, as to the proper mode of ascertaining the 'actual residence."

It is very difficult to give a test by which the question of actual residence may be determined in each particular case. A few general rules may be given, however, by which a vast majority of the cases can be readily determined.

1. Every person must be presumed to have an actual residence somewhere.

2. A man can have but one actual residence at one and the same time.

3. A residence once acquired remains until another is acquired.

4. The place of a man's origin is that of his actual residence until he acquires another.

5. Minors have their actual residence with their parents, guardians, or, if apprentices, with their masters.

6. Adults reside at the places of their dwelling. A man's dwelling is in contradistinction to his place of business, trade or occupation. He dwells at the place he habitually sleeps or passes his nights.

7. In every country there is more or less population floating like drift. They never expect to remain long at any place, and go thence whenever and wherever the hope of employment may invite or fancy dictate. Such persons have their actual residence in the community in which they may dwell at the time of the enrollment.

As to the mode of ascertaining the actual residence of a recruit, the statute gives authority to the Provost-Marshal-General to make such rules and give such instructions as will enable the Boards of Enrollment and Mustering Officers to ascertain the facts and assign the credit according to the truth of the case. In most cases the affidavit of the enrolled man would determine the matter. But as it is a question in which the sub-districts have an interest as well as the recruits, and as the recruits may, for bounties or bribes, declare contrary to the fact their places of residence, the rules to be prescribed should admit of counter proof.

II. My opinion is that where the actual residence is in one sub-district and the man is enrolled in a different sub-district, the credit should be given to the district of his actual residence.

The whole object and purpose of this section is to fix a rule by which places are to receive credits for enrolled men. It gives a rule of credits to the state, and to the ward, township, precinct, or other enrollment sub-district, for enrolled men only. It is silent as to how or where recruits not enrolled, or liable to be enrolled, are to be credited. In order that the credit may be made according to the rule in this section prescribed, the man must not only have an actual residence, but he must be enrolled. The words of the section—"and where such persons were or shall be enrolled"—relate to the fact of enrollment rather than the place of enrollment. Those words are introduced to announce the fact of enrollment, and not to affect or control the question as to the place of credit. This is manifest from the context, and especially from the words in parenthesis just following those above quoted, to wit: ("if liable to enrollment.")

III. Nothing else appearing, it must be taken for granted that the actual residence is the place of enrollment, and the credit be given accordingly. If, however, it should be made to appear that, though enrolled in a particular sub-district, the person has no actual residence, then this statute furnishes no rule by which the credit can be given. In such case the credit must be given under the law or according to the rule in force before and independently of this act.

I am, Sir, very respectfully, your obedient servant,
JAMES SPEED, Attorney-General.
14 1t

OFFICE A. A. PROVOST-MARSHAL-GENERAL, AND SUP'T VOLUNTEER RECRUITING SERVICE SOUTHERN DIVISION OF NEW YORK, NEW YORK, March 20, 1865.

THE FOLLOWING CIRCULAR IS PUBLISHED FOR the information of those concerned.

RICHARD I. DODGE, Major 12th Infantry, A. A. P. M. General.

WAR DEPARTMENT, PROVOST-MARSHAL-GENERAL'S OFFICE, WASHINGTON, D. C., March 11, 1865.

CIRCULAR No. 6.—In conformity with the Proclamation of the President herewith published, all officers and employees of this Bureau are instructed to give prompt attention to the receiving and forwarding of such deserters as present themselves in accordance with its provisions.

"BY THE PRESIDENT OF THE UNITED STATES OF AMERICA:

"A PROCLAMATION.

"Whereas the twenty-first section of the act of Congress, approved on the third instant, entitled 'An act to amend the several acts heretofore passed to provide for the enrolling and calling out the national forces, and for other purposes,' requires, 'that in addition to the other lawful penalties of the crime of desertion from the military or naval service, all persons who have deserted the military or naval service of the United States who shall not return to said service, or report themselves to a Provost-Marshal within sixty days after the proclamation hereinafter mentioned, shall be deemed and taken to have voluntarily relinquished and forfeited their rights of citizenship and their rights to become citizens, and such deserters shall be forever incapable of holding any office of trust or profit under the United States, or of exercising any rights of citizens thereof; and all persons who shall hereafter desert the military or naval service, and all persons who, being duly enrolled, shall depart the jurisdiction of the district in which he is enrolled, or go beyond the limits of the United States with intent to avoid any draft into the military or naval service, duly ordered, shall be liable to the penalties of this section. And the President is hereby authorized and required forthwith, on the passage of this act, to issue his proclamation setting forth the provisions of this section, in which Proclamation the President is requested to notify all deserters returning within sixty days, as aforesaid, that they shall be pardoned on condition of returning to their regiments and companies, or to such other organizations as they may be assigned to, until they shall have served for a period of time equal to their original term of enlistment.'

"Now, therefore, be it known that I, ABRAHAM LINCOLN, President of the United States, do issue this my Proclamation, as required by said act, ordering and requiring all deserters to return to their proper posts; and I do hereby notify them that all deserters who shall, within sixty days from the date of this Proclamation, viz: on or before the 10th of May, 1865, return to service, or report themselves to a Provost-Marshal, shall be pardoned, on condition that they return to their regiments and companies, or to such other organizations as they may be assigned to, and serve the remainder of their original terms of enlistment, and, in addition thereto, a period equal to the time lost by desertion.

"In testimony whereof, I have hereunto set my hand, and caused the seal of the United States to be affixed.

"Done at the City of Washington, this eleventh day of March, in the year of our Lord one thousand eight hundred and sixty-[L. S.] five, and of the independence of the United States, the eighty-ninth.

"ABRAHAM LINCOLN.

"By the President: WILLIAM H. SEWARD, Secretary of State."

The records and returns of these deserters will be made up in the same manner as is provided for in other cases by existing regulations, except that it will be noted on the book of deserters arrested, opposite the name of deserter, the fact of his having voluntarily surrendered himself in conformity with the President's Proclamation; and the number thus surrendering themselves to be separately stated on the report to this office.

The Secretary of War directs that no reward be paid for the arrest of deserters who may be arrested subsequent to the receipt of this order by the District Provost-Marshals.

14 3t JAMES B. FRY, Provost Marshal-General.

CLOTHING BUREAU, Q. M. GENERAL'S OFFICE, WASHINGTON, March 23, 1865.

ARMY SUPPLIES.—SEALED PROPOSALS WILL be received at the office of Army Clothing and Equipage, New York City, until 12 o'clock, M., WEDNESDAY, the 29th inst., for furnishing by contract at the Depot of Army Clothing and Equipage, New York,

Pegged Boots, standard, to be delivered immediately.
Brass Castles for Hats, do.
Brass Crossed Sabers, do.
Brass Crossed Cannon, do.
Canvas Gaiters, do.
Brass Drum-stick Carriages, do.
Drum-head Batter, do.
Drum-head Snare, do.

Further information can be had, and samples of the articles can be seen, at the Office of Army Clothing and Equipage, New York City.

Bidders will state the number they propose to furnish, how soon they can commence, and the number they can deliver weekly.

Proposals must be accompanied by a proper guaranty, signed by at least two responsible parties, setting forth that if a contract is awarded to the party making the bid that he or they will at once execute the contract and give bonds for the proper fulfillment of the same.

The right is reserved to the United States to reject any part or the whole of the bids that may be deemed objectionable.

The articles must be delivered in good, new boxes.

Proposals should be indorsed "Proposals for furnishing (here insert the name of the article bid for), and addressed to

Bt. Brig.-Gen. D. H. VINTON,
1 D. Q. M. Gen., New York City.

FOR SALE—TO PARTIES INTERESTED IN MINES in Mexico and Lower California—Plans and specifications of a Smelting Furnace and a combination of cheap chemicals for fluxing, for reducing gold and silver ores that cannot be worked by any other way than fire treatment; works cheap and quick; a patent right can be had; one-quarter interest is reserved; none but responsible parties need apply. Address C. S. F., Box 1,412 Post-office. 14 5*

MACHINERY FOR SALE.—TWO 15-HORSE STEAM Engines, with cylinder boilers; one "Kirk's" Steam Hammer; one large Trip Hammer; seven Slide Lathes; two Iron Planers; one Bolt Cutter; two Upright Drills; two Fan Blowers; one pair heavy Shears; two large Heating Furnaces; one Foundery Cupola, Oven, Etc.; two Water Tanks; 6,000 pounds Anvil and Trip-Hammer Dies; Pumps; Gifford's Injector; Anvils, Vices, Shafting, Pulleys, Etc., and Tools for Axle work. Address CHAS. H. SMITH, No. 135 North Third street, Philadelphia. 14 3

ESTABLISHED 1826.—WORLD'S FAIR AND AMERICAN Institute Prize Medal Turning Lathes for Foot and Steam Power, manufactured by JAMES STEWARTS SON, No. 252 Canal street, New York. Amateur's Turning Lathes made to order. 14 8*

BLEACHING WAX AND FATTY SUBSTANCES.—Patent Rights for fast and improved processes for bleaching most fats. The whole or separate licenses are offered by LOUIS BECKERS, No. 560 Broadway, N. Y. 14 2*

FOR SALE—RIGHTS FOR PORTER'S REST AND Blacking Box. Illustrated Vol. XI., No. 21. Address J. H. PORTER, No. 415 Hudson street, N. Y. 14 3*

THE PYRO PNEUMATIC FURNACE, FOR MALT Kilns, Drying Rooms, Dessicating Cotton, Woolen, Hat and Print Works, Laundries and Sugar Refineries. Gives perfectly dry heat with half the fuel; is cheaper and better than steam. JOSEPH A. MILLER, C. E., No. 200 Broadway, N. Y. Combustion, Heat, Drying and Ventilation Specialities. 14 4*

THE TURBINE FAN BLOWER—A NEW INVENTION—Patent applied for. The best Fan Blower ever made for Steamers, Forges, Foundries, or for any purpose requiring a strong blast of air; does not require a high speed; is more durable, and can be driven with much less power, than any other Fan Blower now in use; costs not much more than other kinds. Manufactured by MARVIN SMITH, New Haven, Conn. Send for circular. 14 5*

WANTED IMMEDIATELY — CORRESPONDENCE with the Proprietors or Managers of any Machine Works that can build or furnish a set or part of a set of Machinery for the manufacture of Butt and Strap Hinges. Address, for three weeks, J. A. D., Box 62, Troy, N. Y.
14 1*

FOR SALE—TWO RUMBLERS, NEARLY NEW, about 4½ feet long by 2½ feet in diameter; one for rough work and one for finishing. Also about 600 Octagon Pistol Barrels, rifled, made from decarbonized steel. HENRY DISSTON, Nos. 67 and 69 Laurel street, Philadelphia. 14 1*

BABBITTONIAN PENMANSHIP.—"THE MOST beautiful and scientific of systems. * * Magnificent, and worth $5 instead of $1 50.—[Jour. and Mess.

"The latest invention and the best. By its aid any one twelve years old can make a first-class penman without schools or teachers."—[Chris. Herald.

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Gold medals to be awarded in July for the greatest improvement from these copies. The system complete, consisting of 90 copies, on card board slips, illustrated by 60 wood cuts and a chart, sent, postpaid, for $1 50; 36 beautiful Babbittonian Pens, prepaid, for 50c.; one gross for $1 50, or the Penmanship and 72 pens for $2. Unequalled inducements to Agents and Teachers. Address BABBITT & WILT, No 37 Park Row, N. Y. 1*

SOMETHING NEW.—"THE BUSY BEE SEWER"—A little gem. It is, in fact, a pocket sewing machine. Every family and soldier should have one. Sent to any address upon receipt of price. Only $2. Address G. V. MORRIS & CO., Drawer 16, Albany, N. Y. 1*

FOR SALE.—ENGINES, ONE 14 BY 36, WITH TUBULAR Boilers, 16 by 36; 3 heavy Cylinder Boilers, 18 by 42, with 4 heavy Cylinder Boilers, Shafting, Pulleys, Hangers, Belting Saws for sawing marble. Any part for sale cheap, at DAVIS'S MACHINERY YARD,
14 2* Nos. 17 and 19 Morris street, Jersey City.

JOSEPH A. MILLER, MANUFACTURER AND PATENTEE. Improved fire fronts for boilers, superior to any others in use. Improved Argand furnace; saves from 20 to 40 per cent in fuel; burns smokeless; indestructible grate bars for steamship, steamboat, locomotive and other furnaces. Office 200 Broadway. 14 4*

WARDWELL SUPERIOR PATENT SAW BENCHES, made by J. Goodrich, licensee, Fitchburg, Mass. Circulars free. 14 3*

PATENT EXCHANGE, NO 229 BROADWAY, NEW YORK.—Patents and manufactured articles introduced and sold on commission. (14tf) THOMAS G. ORWIG & CO.

ATTENTION, DEALERS IN WHEEL STOCK.—THE Jacobs Wheel Company are prepared to buy seasoned Wheel Stock, of prime quality, for cash, in any quantity, such as hubs, spokes, felloes, bent rims, hickory swamp, etc. Address the JACOB WHEEL COMPANY, No. 90 Wall street, or 145 and 147 Bank street, N. Y. 14 3*

IMPORTANT TO METAL WORKERS.—THE STANDARD Twist Drills sold by us cannot be made by individuals at anything like the price we sell them for. A trial will convince all. They are now used in the U. S. Navy Yard, and in the largest machine shops. All sizes from 1-32 to 1½ inch; straight and taper shanks. Small sizes sent by mail. Also sockets to match.
Address MANHATTAN FIRE ARMS CO.,
13 3* Newark, N. J.

WANTED—A SITUATION TO LEARN THE MACHINIST TRADE—the manufacture of steam engines preferred. Address F. L. STONE, Stoughton, Mass. 13 3*

FOR SALE—A WROUGHT-IRON SHAFT—BEST quality—hammered; whole length twenty and one-half feet; eleven and one-half inches diameter. Bearings (at each end) fourteen inches long, ten inches diameter, with pillar blocks and boxes. PEASLEE & CARPENTER.
13 5* Copake Iron-works, N. Y.

SOLID EMERY WHEELS, SILICATE OR VULCANITE, of every size, promptly made or shipped from stock. N. Y. EMERY WHEEL CO., No. 94 Beekman street, New York. 13 4*

PARTNER WANTED—WITH ABOUT $10,000 CAPITAL, in a Machine and Machinists' Tool Shop, in Baltimore, doing a good business, and having full set of tools in very best condition. Object, to enlarge the business. Best of New York and Baltimore references given. Address S. H. JANNEY, Box 1476 Post Office, Baltimore, Md. 13 2*

RECIPE FOR SAFETY MATCHES, WHICH ARE not equalled by anything yet made. Burn sure, without smoke or odor, and contain neither phosphorus nor sulphur. Will sell the recipe or join a company. A. W. SPRAGUE, Chemist,
13 2* No. 89 Washington street, Boston.

THOMAS & CO., PATTERN AND MODEL MAKERS and Machine Jobbers. Have Planer Centers for sale. Worcester, Mass. 13 2*

FAN BLOWERS.—DIMPFEL'S, ALDEN'S, POTTER'S and others, of all sizes, on hand, for sale, by LEACH BROTHERS, No. 86 Liberty street, New York. 13 3*

WANTED—CURIOSITIES OF NATURE AND ART. Address MUSEUM, 378 Fulton st., Brooklyn, N. Y. Give prices and full particulars or communications will not be noticed. 11 4*

MALLEABLE CASTINGS, GREY IRON CASTINGS, Galvanized Castings of every description to order. JAMES L. HAVEN & CO.,
10 10* Cincinnati, Ohio

PARTIES IN AMERICA HAVING VALID LETTERS Patent for Great Britain, and wishing to dispose of the same, or negotiate for royalty, may address CHARLES POMEROY BUTTON, Nos. 142 and 143 Cheapside, London, England.

N. B. The object of this advertisement is to obtain control of a few meritorious inventions already patented in Great Britain, and no application from inventors will be entertained except their invention shall have been provisionally protected prior to the publication of the invention in America.

For references apply to any Mercantile Association or Trade Protective Society in Great Britain. 12 12*

WANTED—TO CORRESPOND WITH SOME PERSON or Manufacturer who has for sale or manufactures Rivet-making machines, which can be used to make rivets from 3-16ths to 3-8th inch. Address R. H. W., P. O. Box 132, Reading, Pa. 12 6*

BOILER CRUSTS REMOVED AND PREVENTED BY Winan's Incrustation Powder. Nine years in successful operation and without injurious effects. References everywhere.
12 3* H. N. WINANS, No. 11 Wall street.

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, whatever kind, can have their inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. It is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN.
No. 37 Park Row, New York City

CHIEF QUARTERMASTER'S OFFICE,
No. 1139 Girard street, Philadelphia Depot, March 15, 1865.

SEALED PROPOSALS will be received at this office till TUESDAY, March 28, 1865, at 12 o'clock M., for delivery at the Schuylkill Arsenal:—

¾ or 6-4 Blue Wool Flannel, indigo wool-dye, to weigh 5½ ounces to the yard, of ¾ width, for sack coats, Army Standard.
¾ Gray Twilled Flannel for Shirts, Army Standard.
Red, White, and Blue Bunting, Army Standard.
⅝-inch Yellow Silk Lace, Army Standard.
⅝-inch Sky-blue Silk Lace Army Standard.
⅝ inch Scarlet Lace, Army Standard.
W. Brown Thread, No. 35. Bidders to furnish sample.
Red Spool Cotton, No. 40. Bidders to furnish sample.
4-4 Black Silesia. Bidders to furnish sample.
Straw Wrapping Paper, 36x40, to weigh about 95 pounds per ream.

Parties offering goods should make separate proposals for each article offered and must distinctly state in their bids when they will commence their deliveries, the quantity they propose to furnish each week, the price (*which should be written both in words and figures*), and conform to the terms of this advertisement, *a copy of which should accompany each proposal.*

Standard samples of the articles required may be seen at this office. Samples when submitted must be marked and numbered to correspond with the proposals; and the parties thereto must guarantee that the goods shall be in every respect equal to army standard, otherwise the proposals will not be considered.

Bids will be opened on Tuesday, March 28, 1865, at 12 o'clock M., and bidders are requested to be present.

Each bid must be guaranteed by two responsible persons, whose signatures must be appended to the guaranty, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.

All proposals should be made out on the regular forms, which will be furnished on application at this office.

The right is reserved to reject any bid deemed unreasonable, and no bid from a defaulting contractor will be received.

Indorse envelope, "Proposals for (here insert the name of the article offered)," and address

Colonel WILLIAM W. McKIM, Chief Quartermaster,
13 2t Philadelphia Depot.

ASSISTANT QUARTERMASTER'S OFFICE,
No. 451 EIGHTH AVENUE, NEW YORK, March 9, 1865.

CAVALRY AND ARTILLERY HORSES WANTED.—I will purchase in open market all horses that may be presented and pass inspection at the Government stables on Thirty-fifth street, near Tenth avenue, until further notice, as follows:—

Cavalry horses, 5 to 10 years old, 15 to 16 hands high.
Artillery horses, 6 to 10 years old, 15½ hands high, and over 1,100 pounds, and dark color.

Price for cavalry horses, $175. Price for artillery horses, $180. Payable in such funds as may be furnished by the Government.

13 2 L. L. MOORE, Capt. and A. Q. M.

ERICSSON'S CALORIC ENGINES,

Of greatly improved construction. For all light work a perfect motor. Safe, economical, durable.

Also Pumps of all kinds, Hoisting Gear, Steam Engines for Oil Wells, and Machinery of every description at

ERICSSON'S CALORIC ENGINE AGENCY,
13 4* No. 164 Duane street, New York.

$150 A MONTH MADE BY DISCHARGED SOLDIERS and others with Stencil Tools. Don't fail to send for our free catalogue, containing full particulars. Address
1:10* S. M. SPENCER, Brattleboro, Vt.

WANTED.—A POWER PUNCH OF SUFFICIENT capacity to punch a hole one inch diameter through half-inch iron, either new or second hand. Address GEORGE MILBURN & CO., Michawaka, Ind. 1? 4*

N. C. STILES'S PATENT POWER FOOT AND DROP PRESSES.—Dies of every description made to order. Send for a circular. N. C. STILES & CO.,
12 8* West Meriden, Conn.

SPECIAL NOTICE TO INVENTORS AND OTHERS.—Small Iron Castings made to order, plain and fancy. Patterns made at short notice. Also Machinery to finish all kinds of small work. Japanning and Bronzing done in the neatest styles. Address READING HARDWARE WORKS, Reading, Pa. 11 8*

FOR SALE—5,000 SRINGFIELD MUSKET LOCKS; also, parts of the Lock, finished and unfinished. PROVIDENCE GUN LOCK Co., No. 106 South Water st., Providence, R. I.
10 6t* H. B. METCALF, Agent.

GRINDSTONES.—500 TUNS ON HAND, OF ALL sizes, for Spring trade, twelve miles from Cleveland, Ohio, on C. C. and C. and C. and T. Railroads. Address orders to F. M. STEARNS & CO., Berea, Ohio. 1 tf*

PAGE'S PATENT PERPETUAL DRAW BRICK AND Limekiln. Brickkiln will burn 40,000 No. 1 Brick per day, with four cords of wood or two tuns of soft coal. Limekiln will burn 300 bushels with three cords of wood or two tuns of coal. Address C. D. PAGE, Rochester, N. Y. 12 8*

BOILER INCRUSTATIONS.—A MOST VALUABLE discovery and perfect remedy for the removal of scale in fresh and salt water boilers. Has been thoroughly tried with perfect success. High testimonials and circular furnished on application to
12 11* TEMPLE & FITCH, Bridgeport, Conn.

CLARK'S PATENT FERULES FOR LEAKY BOILER TUBES.—Illustrated No. 9, Vol. XII., SCIENTIFIC AMERICAN.
12 8* E. CLARK, No. 321 Spring street, New York.

NEW LATHES.—S. H. NICHOLS, OF BALDWINSVILLE, N. Y., has just finished two new Engine Screw Lathes; bed 12 feet long; swing, 32 inches, and are for sale at reasonable prices. 12 4*

WANTED.—A PRACTICAL MECHANIC WANTS employment as Draughtsman and Superintendent of Machine, Pattern and Smith Works. Has twenty years' experience on Steam Engines, Mill Works, Machinists' Tools, Wood-working Machinery, Oil Tools. Speaks English and German. Box 110, Harmar, O. 12 4*

LUNKENHEIMER'S IMPROVED GLOBE VALVE; A complete assortment of Brass Work for Locomotives, Portable and Stationary Engines. For samples and catalogue address
CINCINNATI BRASS WORKS,
11 XII 26* No. 13 East Seventh street, Cincinnati.

FOR SALE—A VALUABLE STEAM ENGINE, ABOUT 8-horse power, in excellent running order. Address HUMASON & BECKLEY MF'G CO., New Britain, Conn. 11 4*

THE VENEER FRUIT BASKET.—BEECHER'S PATENT, May 31, 1864.—To all parties engaged in the small-fruit business we offer the above basket. Our basket is stylish, durable and cheap. For circulars of description, price, etc., address
A. BEECHER & SONS,
10 4* Westville, Conn.

SPOKE AND HANDLE MACHINE.—THOSE DESIRING to purchase the best machine in the United States for making spokes, Yankee ax handles, etc., should address
E. K. WISELL, Patentee and Manufacturer,
10 4* Warren, Ohio.

PORTABLE ENGINES, FROM 8 TO 16-HORSE POWER, ready for immediate delivery. C. GAY, No. 29 Doane street, Boston, Mass. 7 13*

DAMPER REGULATORS—GUARANTEED TO EFFECT a great saving in fuel, and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 5 Park Place, New York. 8XII. 26*

FOR A FORTUNE—ADDRESS FRANKLIN S. M. CO., Box 302, Boston, Mass. 8 10*

THE BISHOP GUTTA-PERCHA COMPANY, EXCLUSIVE Manufacturers in United States of every description of Pure Gutta-percha Goods, such as
Submarine Telegraph Cables,
Insulated Wire, of all kinds, for blasting, mining, and electric telegraph use,
Chemical Vessels for electroplating, etc.,
Photograph Baths and Dishes,
Tissue Sheet, of superior quality, for hatters, artificial flower makers, etc.,
Tubing for Pure Water, Beer, Soda, Etc.,
Bosses for Flax Machinery of all sizes—a very superior article; with a great variety of other articles made to order. Apply at office and sales room, No. 201 Broadway. SAML. C. BISHOP, General Agent.
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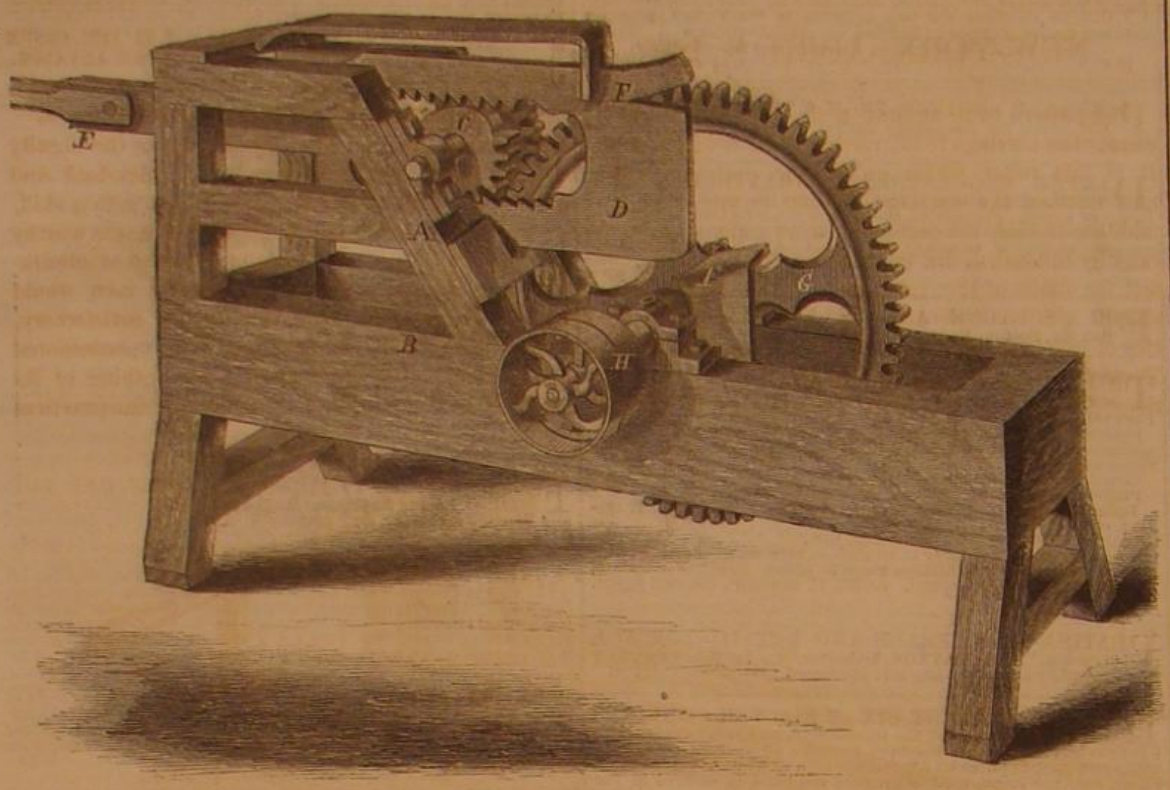
Machine for Converting Reciprocating into Rotary Motion.

This machine is for the conversion of reciprocating into rotary motion, and is intended to be used on steam engines in the place of the crank, or for other purposes where such details are generally employed.

The parts are few and the arrangement simple. A stout frame, A, is erected on the main one, B, and on this frame is a cog wheel or pinion, C, having a shaft which runs in suitable bearings. This pinion is toothed for a portion of its circumference only, and



CONVERTING RECIPROCATING INTO ROTARY MOTION.

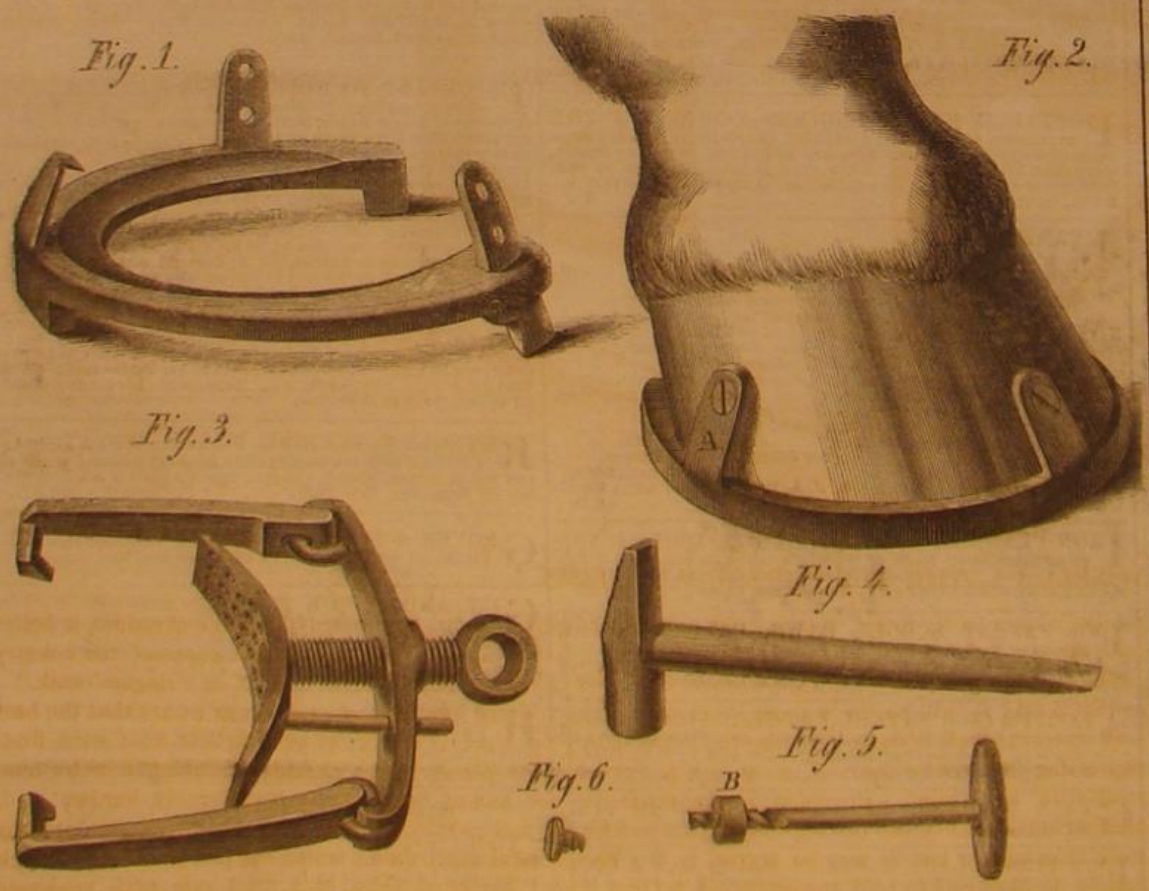
has a rack or frame, D, encompassing it. The teeth of the rack are inclined in opposite directions, and when it is moved back and forth in a straight line, by the rod, E, the teeth in contact with the pinion cause the shaft of the same to revolve half a turn; as the last tooth of the pinion leaves the last tooth of the rack, the first tooth on the other side of the pinion is thrown up in contact with the upper set of teeth in the rack and the pinion shaft is caused to revolve the other half turn so as to complete one revolution. The rack is thrown in and out of gear by the inclined planes, F. Motion is conveyed from the pinion shaft by an additional wheel to the main spur wheel, G; in this way a continual rotation is kept up and power may be taken from the pulleys, H, to any machine to be driven. A patent for this device was obtained through the Scientific American Patent Agency by P. Werni, on the 3d of January, 1865; for further information address the inventor at Manchester, Mich.

Improved Horse-shoe.

These engravings represent a new horse-shoe which is remarkable for the method by which it is attached to the hoof. The usual plan of nailing is dispensed with, and the shoe has three clips, A, forged on it, which are bent to embrace the hoof, and are provided with holes through which screws are passed and driven into the hoof by a screwdriver. The forward clip is made with a spur inside, so as to penetrate the hoof and retain the shoe without straining the screw, as in Fig. 1.

The tools used for applying this shoe are shown in connection with it; Fig. 3 is the screw clamp, which is employed where large numbers of horses have to be shod. It is made of iron and is for the purpose of drawing the shoe up to the hoof, in its place, before the screws are inserted.

The gimblet, Fig. 5, is provided with a collar, B, to prevent it from entering too far and destroying the hoof; Fig. 6 shows the screw. Fig. 4 is the hammer and the screwdriver combined. Fig. 2 represents a flat or plain shoe, and Fig. 1 a corked shoe; in the latter the screw holes are not countersunk, this secures the shoe more firmly to the hoof and adapts it for heavy work. The corks are of steel and so designed as to be screwed in when the shoe is to be used in frosty weather; by this plan they can be taken out and sharpened when necessary, or omitted entirely if not needed.



JOHNSON'S HORSE-SHOE.

Any person, says the inventor, can attach a shoe to a horse by this plan in a few minutes, and it is impossible to lame a horse with it; it leaves the hoof in a natural state and does not cramp the horse in his motions. They are cheaply made and tight when properly put on. The shoe was patented through the Scientific American Patent Agency by John M. Johnson, of Washington, D. C., on the 24th of May, 1864; for further information address the inventor at Station D, New York city.

Watering plants with the rinsings of the milk pails makes them grow finely.

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Vol. XII.—No. 15. (NEW SERIES.)

NEW YORK, APRIL 8, 1865.

$3 PER ANNUM (IN ADVANCE.

Lathe for Irregular Forms.

Lathes for turning irregular forms are now in general use in all the large armories throughout the country, and manufacturers of muskets would have been greatly delayed in filling their contracts but for the existence of this machine. The principle of it is that a pattern held in such a manner that it revolves against a roller, communicates motion to a vibrating frame, wherein the stuff to be worked is also set in centers, both sets of centers having the same motion, so that every movement of the pattern is communicated to the work. A revolving cutter wheel then acts on the work as it is brought in contact with it by the pattern moving the frame up and down, so that a perfect fac simile of it is made, either larger or smaller, as the machine is constructed.

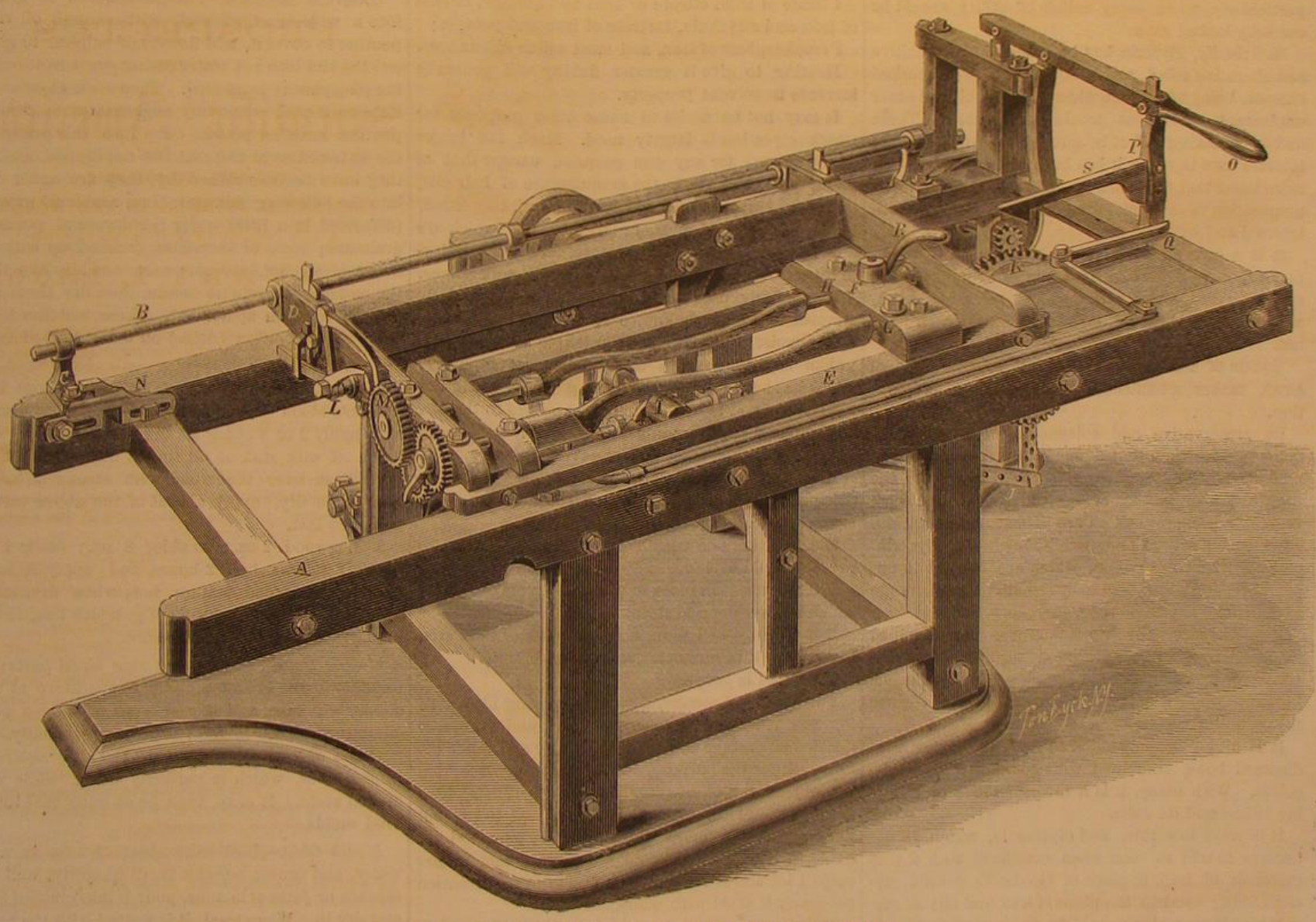
In this machine, A is the main frame, on which there is a rod, B; this rod is firm in the standards, C, and is embraced by the bearings, D, which are merely prolongations of the carriage, E. The office of these bearings is to guide and steady the carriage, and provision for wear is made by the keys and brasses in them. The carriage vibrates up and down at the furthest end from these bearings, acting on them as a door on its hinges. Inside of this carriage, on a suitable framing, F, are the two centers, G and H. The pattern to be reproduced in wood is set in the center, G, and is made larger than the finished job will be, for the work being nearer the center of vibration, will have less movement and therefore be smaller.

The pattern runs against a fixed roller, I, which causes the carriage to lift vertically, as before stated. It is this roller which guides the pattern, or the movement of the carriage up and down; when, in addition to this, the carriage is drawn along horizontally by the rod, J, driven from the gearing, K, a perfect fac simile of the pattern is made as regards the shape. At one end of the carriage there are a series of pawls, L, which act on ratchet wheels, M. These pawls strike inclined planes, N, as the carriage progresses, and cause the pawls to move the ratchet wheels partly round, rotating the pattern and presenting a new surface for the cutters to act on.

The handle, O, and post, P, are to raise the latter so that a dog, Q, will be thrown out from under the post when the work is done, and stop the machine by depressing the driving gear, K, so that it is out of mesh with the pinion. Provision is also made for altering the length of the driving rod, so that shorter work than an axe handle may be turned in it. The handle, R, is merely to hold the center, H, so that it will not slip; when the carriage is run back out of gear, the catch, S, falls over it, and holds it so that it cannot be started until it is removed.

These lathes are used for turning ax handles, hammer handles, lasts for boots, busts, gun stocks, chair legs,—in short any thing in wood that is irregular or uneven in outline

This lathe was patented on the 3d of March, 1863, by E. K. Wisell, of Warren, Ohio, for further information address him at that place.



WISELL'S LATHE FOR IRREGULAR FORMS.

Mechanical Skill of English Burglars.

THE art of burglary has all but risen to the dignity of a science. The gentlemen of the pick-lock and the crowbar manage their little affairs with a skill, a forethought, and a consummate adroitness worthy not only of a better cause, but of a species of admiration—not, perhaps, that which honest men would like to deserve, but nevertheless very satisfactory, we feel little doubt, to the thoroughly professional thief. Mechanical engineering loses nothing of its honors in such hands, and we question if the practical application, at least, of the forces of nature, is better understood in the great work-shops of the country than it is in "Thieves'-alley," or "Rogues'-walk."

Every mechanical engineer is aware that the best tool steel is a very different article from even first-class plates. It is capable of taking a better temper and of being made considerably harder, and, as a consequence, drills can always be produced by careful manipulation which can find their way through the hardened sides of a steel safe with moderate facility.

The art of making such drills is one of the burglar's trade secrets. His tools cannot be excelled in their beauty of finish and admirable quality. Nearly two tuns of "jemmies," drills, chisels, &c., were sent a few months since from the London police offices to one of the dockyards to be worked up, and we question if any iron or steel distantly approaching this in quality had ever found its way into Government "scrap" before.—*Engineer*

APPLICATIONS OF GLYCERIN.

BY W. J. M. GORDON.

Glycerin, it is generally known, possesses a wonderful range of solvent properties, dissolving many substances not soluble in alcohol or water. Its agreeable taste, harmless action upon the system and perfect assimilation with human digestion, specially adapt it when other substances would be rejected. Its sweetening property being almost equal to cane-sugar sirup, but differing from it in not being liable to fermentation; resembling oils, but, unlike oils, miscible with alcohol and water in any proportion; not volatile at ordinary temperatures, and not becoming hard at the freezing point of mercury. Possessing these properties, it cannot but be an article of importance both in pharmacy and in the arts.

The high price, heretofore, no doubt, has kept it from many uses to which it is now applied. Recently, glycerin, adapted to the various purposes to which it is extensively used, has been produced at a lower price than alcohol, sugar, or oil, which it has come in competition with, and whose places it seems specially adapted to fill to a considerable extent; and the large amount and low price at which it can be produced, makes it worthy of attention at a time particularly when every article of utility should be carefully looked after.

Medicinally, glycerin has been used for its nutritive and alterative effect, and in some cases with marked success, being admissible when cod-liver oil and other unpleasant substances would be rejected. These and its soothing effect in coughs, are the principal internal uses to which it has been applied alone. Its more important medicinal value is as a vehicle for the preparation of a great variety of remedies for both internal and external use.

It is a favorite article in combination with the hypophosphites, known as glycerole of hypophosphites and never disagreeing with the most delicate stomach, as sugar is liable to do, is admissible when sirup is not.

Iodide of iron prepared with it in the place of sirup, makes a handsome and permanent preparation.

Its preservative and solvent property being so much greater than that of sugar sirup, cannot fail to recommend it in the place of that substance for the preparation of ipecac, senega, hive sirup and such vegetable preparations as are liable to fermentation, specimens of several I now exhibit made with glycerin, costing $2.00 per gallon, which are elegant in appearance, and will undoubtedly remain without change an indefinite length of time.

Its uses externally are numerous. For chapped skin and rough and excoriated surfaces, it has no equal; for sore nipples, skin diseases, ulcers of various kinds, to prevent excessive suppuration and cleanse the secreting surface.

It is highly recommended in deep abscesses with diseased bone, combined with iodine, which it dissolves. With many, it is a favorite mode of applying iodine and its salts.

It is used in cerate, and ointments, which do not become rancid so soon when combined with it; as glycerole of lead, in place of Goulard's cerate, glycerin being used in the place of wax and oil; as glycerole of kino, which to said to be unchangeable; in the preparation of lactucarium in a liquid form, by which its activity and reliability are more certain; as glycerole of aloes, tar and arnica for external use. It is used with starch in the proportion of 1 oz. of glycerine to 70 grs. of starch for making an article called "plasma," as a substitute for lard or cerate. And it no doubt possesses advantage in preparing vegetable extracts, such as belladonna, aconite and others for external use, as they can be readily mixed with it; for liniments, in the place of oil, as it will not become rancid; and has been suggested for the extraction of the active principles of vegetable substances in place of oil and fats, to be used in the preparation of cerates or ointments.

Incorporated with vegetable extracts, it will prevent moldiness and keep them soft, and for pill masses liable to become hard it is a good addition. It may be used as an addition to poultices to keep them soft, or any article to be kept in a moist or plastic condition.

Its solvent and preservative properties are of great importance to the pharmaceutist. In the preparation of fluid extracts, it will be found to supply the place of alcohol and sugar to much advantage. My experience is such as to convince me that in most cases extracts will be more permanent by supplying the place of alcohol used to preserve them with glycerin. To fluid extract of Jalap, Veratrum viride, Cinchon. aromat. and Iris versicolor, glycerine was added and all the alcohol evaporated out, specimens of which I now exhibit, presenting a handsome appearance. Sarsaparilla and those liquids liable to fermentation will be much better preserved with it.

I have used glycerin as a menstruum in the preparation of extracts of cloves, nutmegs and Ceylon cinnamon, and the preparations are elegant representatives of the substances from which they were made.

It dissolves the vegetable acids, most of the vegetable alkaloids, sulphuret of potassium, permanganate of potassa, sulphate of copper, zinc, iron and potassa, alkaline and some of the metallic chlorides;

Iodide of ammonium, cadmium, zinc, potassa, sodium, lime and manganese;

Freshly precipitated carbonate of iron;

Most of the metallic oxides to some extent;

Nitrate of potassa, silver, copper and lead;

Citrate of iron, citrate of iron and quinine, citrate of iron and strychnia, tartrate of iron and potassa;

Pyrophosphate of iron, and most saline substances.

Heating to give it greater fluidity will generally increase its solvent property.

It may not be amiss to name other purposes for which glycerine is largely used. Much the larger quantity used for any one purpose, except that of filling gas meters, is in the manufacture of hair oils, tonics and washes, for which it is admirably fitted, taking the place of alcohol and castor oil, which are now too expensive for the purpose, and by its undrying property keeping the hair moist in appearance.

It is largely used in tobacco, and is particularly adapted to the article known as fine-cut, preserving it in a moist state an indefinite length of time; and, unlike sugar, molasses and infusion of liquorice, which has been used for the same purpose, it will not turn sour, and is unchanged by exposure to the air.

Wine and liquor manufacturers use it to improve liquors, by giving body and removing the fiery taste.

It is used by manufacturers of woollen goods in place of oil, being more economical and not requiring soap to wash it out.

Manufacturers of cotton goods use it in size to prevent rapid drying.

Printers use it in place of molasses to make rollers, which will not dry and shrink.

It is used by artists in clay and plaster of Paris, to preserve it in a plastic form for modeling.

It is used in soaps.

For filling wet meters, used in measuring illuminating gas, it is now extensively used, and possesses decided advantage over whisky or any substance before used for the purpose. It is practically free from any objection, not evaporating at any ordinary temperature, and can be sufficiently diluted to prevent its absorption of more water from the gas, and not liable to freeze at any degree of cold meters are subject to, and rendering them free from the attention necessary if filled with whisky or water.

It deserves attention as a lubricator for fine machinery, not congealing or being affected by exposure to the atmosphere.

Numerous other applications have been made of it, and its uses will increase as its wonderful properties become known.—*American Journal of Pharmacy.*

MAGNESIUM LIGHT.—The magnesium light has just received a new application in France, in connexion with the laryngoscope, a small apparatus consisting of two mirrors by means of which the lower parts of the larynx may be conveniently brought to view. A polypus seated deeply in the throat of a patient of Dr. Fournie's was examined by means of M. Mathieu Plessy's lamp, specially constructed for the magnesium light. Strong rays were projected on the mirror placed at the furthest end of the fauces, and those parts were depicted on the mirror, which was too small to be clearly observable at a distance. But on placing a bi-convex lens before the patient's mouth, the image became so enlarged that every-one could distinguish it from a distance of a few yards.

Useful Practical Receipts.

Impressions From Coins.—A very easy and elegant way of taking the impressions of medals and coins, not generally known, is as follows:—Melt a little isinglass glue with brandy, and pour it thinly over the medal, so as to cover its whole surface; let it remain on for a day or two, till it has thoroughly dried and hardened, and then take it off, when it will be fine, clear, and as hard as a piece of Muscovy glass, and will have a very elegant impression of the coin. It will also resist the effects of damp air, which occasions all other kinds of glue to soften and bend if not prepared in this way. If the wrong side, of the isinglass be breathed on, and gold-leaf applied, it will adhere, and be seen on the other side, producing a very pleasing effect. Isinglass glue, made with water alone, will do nearly as well as if brandy be used.

Medals may also be cop'ed by surrounding them with a hoop of paper, and pouring on them plaster of Paris (mixed with water to the consistence of cream) to the depth of about half an inch. Melted wax, stearine, fusible metal, or any similar material, may be used in the same way. If it be desired to copy the metal in copper, a mold should be first formed in the above manner, and the metal deposited on its surface by the agency of electricity.

Congreve Matches.—Put phosphorus 40 grammes into a wide-mouthed vial, with enough oil of turpentine to cover it, add flowers of sulphur 10 gr., and put the vial into hot water (using great caution) until the phosphorus is melted. Then cork close and agitate until cold, when any supernatant spirits of turpentine must be poured off. Into this pulpy mass the extremities of the matches are dipped, and when they have become rather dry, they are again dipped into the following mixture: Gum arabic 30 grammes, (dissolved in a little water;) chlorate of potassa 20 grammes; soot, or vermilion, (rubbed up with a few drops of alcohol,) 10 gr.; mix, and dip the tips of the matches therein as before, then dry them cautiously in a warm apartment. These matches inflame without fulmination (noise) on being rubbed against any rough surface.

Mahogany Stain.—1 Pure Socotrine aloes 1 oz.; dragon's blood ½ oz.; rectified spirit 1 pint; dissolve, and apply 2 or 3 coats to the surface of the wood; finish off with wax or oil tinged with alkanet.

2. Wash over the wood with strong aquafortis, and when dry, apply a coat of the above varnish; polish as last.

3. Logwood 2 oz.; madder 8 oz.; fustic 1 oz.; water 1 gallon; boil 2 hours, and apply it several times to the wood boiling hot; when dry, slightly brush it over with a solution of pearlash 1 oz, in water 1 quart; dry and polish as before.

Mosaic Gold.—Copper and zinc equal parts; melt together at the lowest possible temperature at which copper will fuse, and stir so as to produce a perfect admixture of the metals; then add gradually, small portions of zinc at a time, until the alloy aquires the proper color, which is perfectly white, while in the melted state. It must then be at once cast into figured molds.

Mouth Glue.—Best cake glue; dissolve in a little water, and brown sugar a small quantity, and some essence or juice of lemons, pour it into greased molds, and dry it. When used, it is wetted with the tongue, and rubbed on the paper to be joined.

Ginger Beer Powders.—Powdered white sugar 2dr.; powdered ginger 5 grs.; carbonate of soda 26 grs.; mix, and wrap in blue paper; tartaric acid 30 grs.; wrap in white paper. For use dissolve each separately in half a glass of water, mix, and drink while effervescing.

Scent Powders.—1. Corianders, orris root, rose leaves, and calamus aromaticus, of each 4oz.; lavender flowers 8 oz.; rhodium wood 1 dr.; musk 20 grs.; mix, and reduce to coarse powder.—2. Corianders, orris, calamus aromaticus, and red roses, of each 1 oz.; lavender flowers 2 oz.; mace and cloves, of each 1 dr.; essential oil of almonds 10 drops; mix as last.—3. As last, but substitute musk 3 grs. for oil of almonds. Used to fill scent bags, and for boxes, &c.

Pyrotechny.—The three prime materials of this art are, nitre, sulphur, and charcoal, along with filings of iron, steel, copper, zinc, resin, camphor, lycopodium, &c. Gunpowder is used either in grain, half-crushed, or finely ground, for different purposes. The

longer the iron filings, the brighter red and white spots they give; those being preferred which are made with a coarse file, and quite free from rust. Steel filings and cast iron borings contain carbon, and afford a more brilliant fire, with wavy radiations. Copper filings give a greenish tint to flame; these of zinc, a fine blue color; the sulphuret of antimony gives a less greenish blue than zinc, but with much smoke; amber affords a yellow fire, as well as colophony, (rosin,) and common salt; but the last must be very dry. Lampblack produce a very red color with gunpowder, and a pink one with nitre in excess; it serves for making golden showers. When lightly mixed with gunpowder and put into cases, it throws out small stars resembling the rowel of a spur; this composition has hence been called spur fire. The yellow sand, or glistening mica, communicates to fireworks bolder radiations. Verdigris imparts a pale green; sulphate of copper and sal ammoniac give a palm tree green. Camphor yields a very white flame and aromatic fumes, which masks the bad smell of other substances. Benzoin and storax are used also on account of their agreeable odor. Lycopodium burns with a rose color and a magnificent flame; but it is principally employed in theatres to represent lightning, or to charge the torch of a fury.

CLYDONICS.

At the last meeting of the Polytechnic Association the President, S. D. Tillman, read the following paper on the possible velocity of sound and other vibrations:—

Under this title, derived from the Greek, KLUDON, it is proposed to embrace those branches of Science which treat of Waves and Undulations; of Oscillations, Vibrations and Pulsations. By grouping, in this manner, manifestations of force through *to and fro* motions, more or less rapid, the student is enabled to view this class of reactions from a standpoint where comparative measurements and estimates greatly assist him in reaching and retaining correct conclusions.

This paper will be devoted to that subdivision of Clydonics which includes considerations regarding the relative action of the most common media of Light and Sound.

It is very difficult, if not impossible, to form a correct conception of the extreme attenuation and rapid motion of the ethereal medium, which is termed æth, to distinguish it from the ether of chemistry. In papers previously presented I have endeavored to show that all the distinct and apparently diverse effects known as Heat, Light and Actinism may be the result of wave motions of the same fluid varying in velocity. Bearing in mind the broad distinction between the normal movements of air waves and the transverse movements of æth waves, let us by gradual ascent upon the atmospheric ladder, so to speak, reach the dizzy hight at which rapidity of motion is apparently the rule, and rest the exception, in the wonderful economy of Nature.

The propagation of sound through air, having the temperature of the melting point of ice—the mercury of the barometer standing at 30 inches—is about 1,090 feet per second. Its velocity is directly as the square root of the elasticity and inversely as the square root of the density of the air. When the temperature is increased one degree on the Fahrenheit scale any gas is increased $\frac{1}{491}$ in bulk. The formula of Newton, with the correction of Laplace expressing the ratio of the specific heat of air at a constant volume, with its specific heat at a constant pressure, has been confirmed by actual measurements. In gases under the same pressure and of the same temperature the velocity of sound is inversely as the square root of the densities. Dulong produced tones from organ pipes by means of different gases, and found that sound was propagated in one second through Hydrogen 4,154 feet; through Carbonic Oxide, 1,105 feet; through Air, 1,093 feet; through Oxygen, 1,040 feet; through Carbonic acid, 857 feet. The density of Oxygen being sixteen times that of Hydrogen, it will be seen that the velocity of sound thus obtained in these gases corresponds very nearly with the calculated rate.

The elasticity of the atmosphere being directly as its pressure, the velocity of sound would be the same at all hights through air at the same temperature. The variations caused by decrease of heat in upward progress can be calculated from data gathered by Mr. Glaisher during balloon ascensions, to the hight of five miles. Without attempting to give even a near approximation toward the true hight of the atmosphere, which must have a definite boundary at that line where gravitation exactly counterbalances the repulsive force of its particles, attention is called to the following table showing its rarefaction, increasing in geometrical ratio with each ascent of 3·4 miles:—

	Times rarer.
At 17 miles it is	32
At 34 miles it is	1,024
At 51 miles it is	32,768
At 68 miles it is	1,048,576
At 85 miles it is	33,554,432
At 102 miles it is	1,073,741,824
At 119 miles it is	34,359,738,368
At 136 miles it is	1,099,511,627,776

This possible attenuation of air will not excite surprise when we consider that a grain of gold may be so expanded as to be divided into 4,900 millions of parts perceptible with the microscope; but astonishment cannot be repressed upon calculating the velocity of sound in a fluid 13,000,000,000 times less dense than air thus expanded, provided its elasticity remains the same as at the earth's surface under the standard pressure and temperature. The square root of 1,098,209,000,000 is 1,048,000, which, multiplied by 12·386, the number of miles per minute at which sound moves through air, gives 12,980,528 miles as its velocity through such a medium; while the propagation of light through æth is only at the rate of 11,400,000 miles per minute.

Assuming that any energy generating wave motions in a fluid in consequence of its elasticity follows the same law, we now have the means of making a comparative estimate of the density of the æth directly enveloping our globe; and it may be stated, in general terms, that such æth does not exceed in density that a cubic inch of air would have were it expanded to 1,098,209,000,000 of cubic inches.

It will not be inferred from this view that the aim has been to reach

"The first of things, quintessence pure,"

for the elastic quality of æth involves the hypothesis of a still more subtle fluid. We have raised one curtain only to find another to be raised. As the unfathomed vaults of Heaven recede before the sweep of a more powerful refractor, and nebulæ resolved reveal nebulæ beyond, so the most diminutive germ that springs from the Creator's touch discloses, through the lens of higher power, new signs of more wonderful mechanism within. Each nucleus has its nuclei. Each entoblast is but the boundary of a microcosm; each particle, a galaxy of atoms, revolving in the all-pervading æth. Thus before every far-reaching human advance, circumference and center will forever retreat.

Homes for Workmen.

We are glad to find that the subject of homes in the country for laboring men who live in Boston is engaging more general public attention. As a matter of education, as a matter of health, or as a matter of morals, we conceive that it is a subject of the first importance to practical men.

In the city of Philadelphia a man may hire a pretty house for two hundred and fifty dollars, well finished and substantially built, with every facility for water arrangements, gas and the other conveniences of modern life, the whole built on a lot one hundred feet deep. Is there any reason why, because a man works in Boston, he should be unable to enjoy these conveniences which have become necessities, unless he pays twice or thrice the price for them paid by his comrades in Philalelphia?

The workman who lives in Worcester, Mass., sees his boys grow up strong, tall and hearty, not oppressed by school, work or other confinement. If he chooses he can cultivate the half acre or acre next his house, and provide his table with better vegetables than Mr. Crœsus or Mrs. Midas can buy in Faneuil Hall Market. When winter comes, he lays down his own pork for the winter. The year through he has eggs for his table if his wife and children choose. And he does not pay so much for his rent as the workman we have described in Philadelphia. In practice, indeed, he buys his own homestead, and knows what "real estate" means.

Now the Philadelphia workman and the Worcester workman both, very probably, live half an hour from their work. Every one can see that the Boston workman might, within half an hour of his work, have just the same advantages at the same price,—if the railroad companies and capitalists would take this matter in hand on a scale of magnitude sufficient to offer these facilities to many people at once. There is land enough within ten miles of Boston for such homes as we describe in Worcester. All that is needed is that the arrangements for a large munber of houses and gardens, at cheap rents, be made at one time at one place; for it is necessary that the morning and evening special trains shall be arranged to meet the specific working hours of the city.

Let any railroad company, or any combination of shareholders, build such a village of a hundred houses, as will give homes and gardens to a hundred families at rents not exceeding one hundred and fifty dollars. The accommodation given could be made palatial in comparison with the crowded tenements in the city for which the same families are now paying from two hundred and fifty to four hundred dollars. Let the trains to Boston be arranged so that the workmen may meet the requisitions of a day's work. What they will gain will be, first, a chance for the education of their children under the open sky, and with good air and food,—an opportunity which all the city missions, and ministries at large in the world cannot give them; second, an interest themselves in the direction of their own community, which the best man loses when he is one of a thousand huddled together in a crowded alley;—third, opportunities of health, exercise, and personal improvement which would make, in a generation, an entire change in the physical stamina of our laboring men.

[These suggestions from the Boston *Advertiser* are valuable as well as interesting. If there is anything that requires attention it is accommodation for the families of workingmen in habitations where the surroundings are not destructive of all moral feeling and social decency. The erection of tenement houses of a proper kind is necessary for the convenience of those who prefer to live in cities, but there are always large numbers of well-bred and educated men who would willingly go an hour's ride from their work if their little families could have the benefit of fresh air and country exercise.—EDS.

Working and Thinking.

It is a no less fatal error to despise labor when regulated by intellect, than to value it for its own sake. We are always in these days trying to separate the two: we want one man to be always thinking, and another to be always working, and we call one a gentleman and the other an operative; whereas *the workman ought often to be thinking, and the thinker often to be working; and both should be gentlemen* in the best sense. As it is, we make both ungentle, the one envying, the other despising his brother; and the mass of society is made up of morbid thinkers and miserable workers. Now it is only by labor that thought can be made healthy, and only by thought that labor can be made happy, and the professions should be liberal, and there should be less pride felt in peculiarity of employment, and more in excellence of achievement.—[Ruskin.

Solar Pump.

La Science Pour Tous gives an illustration of a pump to be operated by the sun's rays, erected at Saida, Algeria, by Mr. Deliancourt, the Commandant of the place. An airtight hollow box of sheet iron has its top painted black to absorb the sun's rays. A pipe leads from the well into the box one fourth the distance below the top, to which hight the box is filled with water. The discharge pipe leads out of the box near the bottom, and flap valves are provided so that when the air expands in the upper part of the box the water will be forced out by the discharge pipe, and when the air contracts, water will be drawn up into the box, from the well. Shades are provided to expose the blackened top of the box to the sun's rays, and then shelter it, with as frequent alternations as possible.

IN Russia, the first diamond was discovered in July, 1829, by Humboldt and Ross, when on their journey to Siberia, on the west side of the Uralian mountains, in the gold-washing establishments of Krestowosdwisheaski, belonging to Count Shcuwalow.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening March 23, 1865, the President, S. D. Tillman, Esq., in the chair.

FORMING WOOD IN CURVES.

The formation of curved cases for pianos being mentioned,

Mr. Stetson remarked that Mr. Belfer, a manufacturer of very fine furniture in this city, acquired, in a very high degree, the art of forming wood in curves. The plan is to glue a number of sheets of veneers together, and press them while the glue is yet warm, in hot iron presses of the desired form. The several pieces are put together so that the grain will cross, thus rendering it impossible for the wood to split. On drying, the curve always increases, so it is necessary to make the mold nearer straight than it is desired to have the finished wood.

HEAVY ORDNANCE.

Mr. Norman Wiard remarked that he had occupied a good deal of the time of the Association in presenting his views in relation to large guns, and should like the opportunity to reply to some criticisms on his views recently published by Mr. Isaac Newton. It was well understood by the Association that the speaker contended that the most common cause of the bursting of heavy guns is the heat generated by the burning of the powder. When iron is heated it expands with a force equal to its resistance to compression—a force practically irresistable. The heat resulting from the combustion of gunpowder is never estimated at less than 5000°. When powder is burned in a cannon, the inner surface of the walls is highly heated, and this heat is conducted into the wall toward the exterior. If the gun is fired repeatedly in rapid succession, the heat accumulates within the wall at a distance of, say three or four inches, causing an expansion which ruptures the gun, the crack commencing at the interior surface. The speaker cited a number of facts in support of his position, among them the following:—

EXPLOSION OF A PILE HAMMER.

"Some years since I cast a pile hammer weighing four tuns. The man for whom it was cast arrived at my place just after the mold was filled, and wanted to take the hammer away that night. I told him that was impossible. He was in a great hurry, and arranged with two of the men to sit up with him all night to draw the sand away from the casting as it hardened, in order to cool it as rapidly as possible. The next day we hoisted it out and got it upon the deck of a canal boat, the deck being protected from the heat by two layers of brick. The man started off with his hammer, but before night he came back and ordered another one cast. It seems that the heat remaining in the casting set fire to the deck, and in throwing water on the fire a little fell upon the hammer; seeing that this hastened the cooling, the owner threw on more, when the casting burst with a report that was heard two miles. One half flew forward, killing a horse, and the other went towards the stern, falling thnough the bottom, and sinking the boat."

BURSTING OF A LARGE PLATE.

"In making the mold for my large cannon we cast a circular plate 10 feet in diameter, and 3 inches thick. To hasten the cooling we removed the cope from the mold, when the large surface of hot iron made the shop intolerably warm. To diminish the heat, the foreman threw sand upon the plate around the edge leaving the middle uncovered. This caused the middle to harden first, and the outside, cooling afterwards, was, of course, drawn by its contraction into a state of tension upon the interior mass.

"We had been at work upon this plate several days, drilling a series of holes through it near the edge, and had it on a drill press over a pit which communicated by a trench with the outer air. A very warm blast of wind passed over Trenton, and the next morning when I went to the shop the watchman said that the shop had been struck by lightning in the night. I went in and saw that the great plate had burst in two halves, one crashing inward among the machinery, and the other flying outward and falling into a pile of valuable castings.

"I suppose that the current of warm air had struck against the center of the plate, slightly expanding it, and thus increasing the tension of the rim sufficiently to overcome the tenacity of the metal. This diagram exhibits the form of the crack; when the pieces are in contact in the center they are considerably separated at the edges."

SPONTANEOUS BURSTING OF A GUN.

"At Pittsburgh I saw one of the 15-inch Rodman guns which had split spontaneously before it was finished. At the outside of the gun the crack was so wide that I inserted my fingers, while at the surface of the bore it was invisible, the parts being in contact.

"This gun was cast by Rodman's method, the casting being cooled by a current of water in the bore. This plan chills the metal about the bore first, and then, as the outer metal cools it shrinks upon that within, and is thus drawn into a state of tension. I suppose in the case of this split gun the tension was carried so far that it overcame the strength of the metal.

"This mode of casting puts the gun in a favorable condition to resist the pressure of the powder, but in the most unfavorable condition to encounter the principal cause of explosions, that is the expansion of the metal near the bore by heat. In fact one of these guns that had endured a shotted charge, was afterward burst in firing an unshotted salute. The metal is in a condition similar to that of the glass in Prince Rupert's drops."

EFFECT OF CAST IRON ON WROUGHT IRON.

In the course of his remarks Mr. Wiard said, "It is well known that a half-inch rod of the most fibrous iron, by being dipped endwise into a vessel of molten cast iron has its fiber entirely destroyed, while if it is dipped in sideways the fiber is not injured."

DEFECTS OF SOLID WROUGHT IRON GUNS.

"The contraction of the metal in cooling offers an insurmountable obstacle to the construction of cannon of large caliber by the process of forging solid. As the outside cools and hardens first it forms an unyielding hoop, and when the interior cools and shrinks it must be pulled asunder, forming fissures. These fissures are generally formed at the welds. Where the welds are across the piece as in the Ames gun, the fissures will run around the bore. I saw in Washington the wax mold of the bore of the Ames gun taken before it had ever been fired, and the grooves around the bore were as large as my finger."

HARDENING WROUGHT WITH CAST IRON.

Dr. Parmelee remarked that wrought iron may be case-hardened by dipping it in molten cast iron; horse shoes are hardened in this way in large quantities.

Water Pressure Engine.

These machines are coming into use wherever water can be had freely and at low price. At the late industrial fair held in San Francisco, Cal., the committee awarded the first premium for machines of this class to Messrs. Hansbrow & Redding. Their engine was 7 inches cylinder and 14 inch stroke, and is described as follows:—

"The principal feature in the invention consists in using water as an expansive agent which is accomplished by a beautiful and simple mechanical device, viz: the application of air chambers and compensating air valves at each end of the cylinder, imparting an elasticity to the water by that means and giving it a similar action in the steam engine; the compressed air also causes the discharge of the water at stated intervals after it has done its work; this arrangement allows of a much higher speed of piston than has before been obtained by engines of this kind.

"After a thorough investigation of the principles of this engine we find that as an economizer in the use of water it surpasses any known water wheel either turbine or rotary and we would recommend it in preference to any other water motor where clean water at a high elevation can be had.

ORANGES AND LEMONS IN CALIFORNIA.—The attempt to grow oranges and lemons in California is every year becoming more successful. The principal groves are at Los Angeles, where there are half a dozen men engaged in the business. Oranges are grown in other places in the State, but mainly in gardens and for private use. There were about 60,900 oranges and 30,000 lemons grown last year at Los Angeles. This year nearly 100,000 oranges and 40,000 lemons have been raised in that vicinity. The oranges grown this year are larger, and in every way better than last year's crop, and sold at the grove at three dollars per hundred. The largest growers are two Frenchmen at the Mission San Gabriel, whose crop last year amounted to about 25,000 oranges, besides a quantity of lemons.

EFFECT OF COAL ASHES ON WOOD ASHES.

At a recent meeting of the Farmers' Club a communication was read asking why it is that no soap can be made from the leachings of a mixture of wood and coal ashes, and the question gave rise to discussion, some raising doubts in regard to the fact, and others reading papers or making remarks in explanation.

A glance at Knapp's & Muspratt's tables of the analyses of coal ashes that have been made in various parts of the world, shows at once the extent to which the statement is true, and suggests the simple and only explanation.

Chemically considered, soap is a salt; it is a compound of an acid with an alkali. The two alkalies used for making soap are soda, and potash or potassa. There are also alkaline earths, as lime and magnesia, which will make soaps, though these soaps are of no value. Acids and alkalies have a strong affinity for each other. Every acid will combine with each of the alkalies, and these compounds are called salts.

The oils and fats from which soap is made are compounds of an acid with that peculiar substance glycerine, (or more strictly with the oxide of glyceril, of which glycerin is a hydrate.) The fat acids have a stronger affinity for the soda or potash than they have for glycerin, when, therefore, the fats are brought in contact with one of these strong alkalies, they are decomposed, the acid leaving the glycerine and combining with the soda or potash, and forming soap.

The fats usually employed produce with soda hard soap, and with potash soft soap. But with oils liquid soaps may be formed of any degree of fluidity. Wood ashes contain a large proportion of potash, and as this substance is soluble in water it is readily removed by the process of leaching. The question is do coal ashes contain any substance which will enter into combination with potash and form an insoluable compound that cannot be extracted by leaching, or a compound so permanent that it will not deliver up the potash when brought in contact with acid fats. Professor Johnson gives a table of analyses of nine samples of American coal, the following being about an average specimen:—

Silica	53·603
Alumina	36·687
Sesquioxide of iron	5·590
Lime	2·857
Magnesia	1·076
Oxide of manganese	0·186
Loss per cent	0·001
	100·000

In the other samples no other substances but these were found, and it will be seen that none of these would enter into combination with potash to prevent it from making soap. All of the nine samples were from localities east of the Alleghanies.

Muspratt gives a table of analyses of Scotch and Welsh coals in which all the samples showed a small proportion of sulphuric acid, ranging from 2·22 to 8·38 per cent. They also contain sufficient lime to form sulphate of lime with the sulphuric acid. This sulphate of lime would, doubtless, under proper conditions enter into combination with the potash forming a double sulphate of lime and potash. In this way the extraction of the potash might be obstructed. Or if the lime were carried into the mixture with the fat, a lime soap wold be formed which would be insoluble and worthless.

We therefore conclude that a mixture of ashes of Welsh and Scotch coals, if in sufficient proportion, might destroy the value of wood ashes for soap making, but that ashes of American coal from the Atlantic slope would have no effect whatever.

In examining more than 1100 analyses of coals from various parts of the world, we find no analysis

of the ashes of our Western bituminous coals, and only one of the ashes of English coals. We are therefore unable to say what effect they would have on wood ashes.

FARMERS' CLUB.

At the meeting on Tuesday, March 28th, the time was principally occupied in discussing a fruit-preserving house, invented by Prof. Benjamin M. Nyce, A. M., of Cleveland, Ohio, Prof. Nyce having come to this city to explain his invention by express invitation of the Club.

This house consists of two apartments, one above the other. The upper one contains ice, put in every winter, in depth usually five to six feet. This is separated from the fruit room below it by a floor of galvanized iron, the sheets of which are closely riveted and soldered, so as to be perfectly water-tight. The walls are made of two casings of sheet iron, 3½ feet apart. The edges of these sheets are painted and closely nailed to upright studding, the intervening space being filled with chaff, sawdust, or short shavings, or other non-conducting substances. The floor of the fruit room is also made of galvanized iron. Below this are placed shavings, three feet thick, on a coating of tar and pitch, spread one inch thick upon the ground, to prevent the entrance of moisture. One or more wind-wheels are placed above the roof, geared to fans in the fruit rooms. On the floor of the fruit room was spread formerly, in its dry state, the chloride of calcium, a substance which has great power of absorbing moisture; but now the waste bittern, from salt works (absolutely costless,) after being dried, is found to be equally as efficient as the former chloride.

The inventor says:—

"The elements of a complete preserving atmosphere are, coldness, dryness, purity, equality of temperature, at all times: and in every part, absence of light, and if possible, the exclusion of the great agent of decomposition, the oxygen of the air. This plan secures all these elements in great perfection. The thermometer shows a uniform temperature of 34° in all parts of the room, and is found not to vary a single degree from 34° even from April till October.

"Dryness is its leading patentable feature. Vapor is constantly given off from different kinds of fruit, amounting usually to at least half a gallon of water from one hundred bushels, per week. This vapor is taken up by the absorbent, which is spread over the floor of the fruit room. It is made to run out in tubes to the outside, once in about every month. It is then dried in large pans, of sheet iron, and returned to the house in the dried state as before. The same substance is thus used twenty or thirty times. The air in a room so completely confined, after the fruit is chilled down to 34°, becomes very still. The fans are needed to give circulation to the air, and bring the moisture arising from the fruit in contact with the absorbent, to be taken up by it.

"In the gradual ripening of fruit, hydrogen and carbon are constantly given off; the former unites with the oxygen of the air, and forms water; the latter, carbonic acid.

"This process in any confined vessel filled with fruit, consumes all the oxygen, especially if the fruit be ripe, and the air warm, in about 48 hours. The rooms of this house are gas tight, and when filled with fruit, if closed up for two days, a candle goes out in them almost instantly.

"The sources of profit are pears and grapes, kept during the fall and winter months; apples until the months of May, June and July; lemons, oranges, pine-apples, through the summer season; canned fruit, put up in six or ten gallon cans, and retailed out by measure; the fruit when taken from the cans, which are used successively for a number of years, is kept fresh in the house in the open vessel for a number of weeks. Hence this fruit may be sold by measure without loss in the summer months. Oysters, butter, and eggs are also sources of profit.

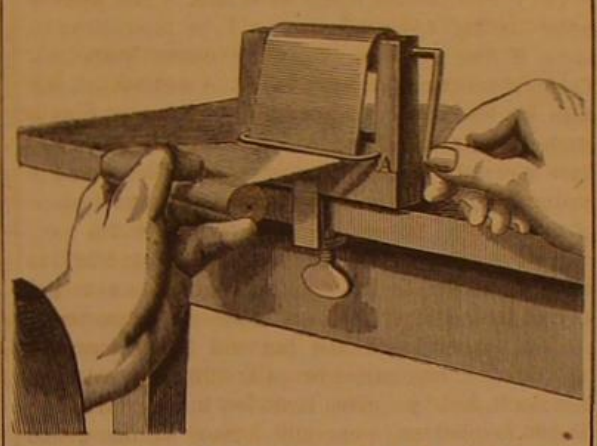
"All fruit should be in the house when tree-ripe; that is as soon as it has received all the virtue the tree, or the vine can impart to it. 'Rub an unripe, or green, apple or pear on a grater, to a pulp; wash this with cold water on a sieve,—the turbid liquid which passes through, deposits a fine flour of starch of which not even a trace can be detected in the ripe fruit. This after ripening, as it is called, is purely a chemical process. It is the starch being transformed into sugar. The more starch the unripe fruit contains, the sweeter does it become when ripe.'"—*Liebig.*

Mr. Bartlett remarked that the phraseology in which the formation of water and carbonic acid is stated is liable to be misconstrued. If hydrogen and carbon issue from the fruit as uncombined elements, they will enter into combination with the free oxygen of the air only at a burning temperature—a red heat.

Dr. Percy stated that he has gone through a long series of experiments to determine whether fruit could be preserved in an atmosphere of pure nitrogen. The fruit was placed in glass jars which were then filled with nitrogen gas chemically pure. The jars were placed in a cellar, the temperature being probably 50° or 55°. Apples kept very well 18 months; grapes and pears were also preserved satisfactorily, but peaches decayed very soon. Meats became slimy and acquired a bad taste in the course of a few days.

SANBORN'S BANDAGE ROLLER.

It is necessary that bandages, such as surgeons use in operations, should be rolled up tightly in a compact form, so that they will not unwind or get loose in the center; for this purpose it is usual to employ a common wooden roller set in a frame and provided with a crank. It is difficult to get the bandages



wound evenly with this arrangement, for in drawing the cloth the operation of turning is impeded. In this engraving a neat little device is shown attached to the common frame, so that by the use of it any desired tension can be given the bandage, and the same wound evenly and regularly from end to end. This attachment is merely the wire guard, A, through which the bandage is passed and held in the manner shown; the desired end is thus attained and the work done in a superior manner.

This is the invention of J. F. Sanborn, of Tabor, Iowa, who desires that it may be freely used by all.

Strawberry Culture.

Mr. C. G. Cotting writes to the Woodstock *Sentinel* that he makes new beds of strawberries productive the first year by the following plan:—

"You are aware that many of your readers have strawberry beds, and neglect the runners until they cover the bed so thick that they almost cease bearing. I have done the same thing. I wish to tell all such how to make a new bed to bear this year. Early in the spring, as the ground is settled, and in good working order prepare a new bed as near the old one as may be, by plowing or spading it well, and hoe or rake until it is in good condition for any vegetable crop. Mark off the new bed into rows of three feet apart lengthwise, and two feet apart crosswise. In each corner dig a hole twelve inches long by eight wide, and three inches deep; then, two feet from the edge of the old bed, draw a line the whole length of the bed; then another line parallel to it, two feet further on; then take a butcher knife, or any other instrument which will answer the same purpose, and cut three or four inches deep, following the line the length of the bed; then cut through the two feet strip again in the same manner, eight inches from the line, which will leave two feet strip between the lines in three strips, each eight inches wide, then cut across the three strips once in twelve inches, which forms it into parts eight and twelve inches. Then run a spade under the plants three inches deep, and take them up and lay them carefully without breaking into the holes first made in the new bed, press them down firmly, smooth the dirt around the plants thus placed, pull out the grass and weeds, if any. Each hill so taken up, will contain from four to eight plants, and the roots not having been disturbed, will bear this year, just as well as if they had not been moved, and far better than if left in the old bed without trimming. Wheel in good rich soil and fill up the trenches made in the old bed, thin out and clean the remaining plants; and depend upon it, you will have a good crop of berries from both the old and new bed. I have tried it.

New Petroleum Engine.

Mr. F. H. Wenham, of Clapham, has patented an invention, which consists of two pistons contained in a cylinder with open ends. The first piston works a crank by means of a connecting rod, the second is disconnected. During the revolution of the crank the second piston follows close to the first by atmospheric pressure until near the termination of the up stroke. They then separate for a short distance, at which time a mixture of gas and an explosive vapor is drawn in between them. When the first piston arrives at the end of the stroke it uncovers a small touch-hole, a flame is drawn in through the side of the cylinder, the gases take fire, and by explosion drive the second piston to the opposite end of the cylinder; here is fixed a cross-bar, through which the flat-rod of the second piston passes, this is now instantly held fast by two wedges driven into the cross-bar against the flat sides of the rod; this, and the wedges may be grooved to increase the grip. A vacuum is formed between the pistons, and the one connected with the crank in approaching the other by atmospheric pressure causes the revolution of the shaft. The piston before again coming into contact drives the products of combustion from between them through an outlet valve in the side of the cylinder. The loose piston is again released by withdrawing the wedges, and follows after the other for the succeeding stroke. The next improvement is for a means of ingiting the gaseous mixture. A gas-jet pours directly into the touch-hole in the side of the cylinder. Surrounding the flame of the jet there is a platinum coil to retain heat. There is a similar arrangement round the touch-hole, and both coils remain red-hot whilst the engine is at work, and prevent the flame from being blown out by the force of the explosion through the touch-hole. He gives increased pressure and intensity to the gas by means of a small pump or bellows. A further improvement consists in passing the gas or air through naphtha, petroleum oil, or other volatile liquids, to obtain an inflammable vapor. The receptacle containing the liquid may be heated to assist vaporization.

An English Cure for Drunkenness.

There is a prescription in use in England for the cure of drunkenness, by which thousands are said to have been assisted in recovering themselves. The receipt came into notoriety through the efforts of John Vine Hall, commander of the Great Eastern steamship. He had fallen into such habitual drunkenness, that his most earnest efforts to reclaim himself proved unavailing. At length he sought the advice of an eminent physician who gave him a prescription which he followed faithfully for seven months, and at the end of that time had lost all desire for liquor, although he had been for many years led captive by a most debasing appetite. The receipt, which he afterwards published, and by which so many other drunkards have been assisted to reform, is as follows: Sulphate of iron, five grains; magnesia, ten grains; peppermint water, eleven drachms; spirit of nutmeg, one drachm; twice a day. This preparation acts as a tonic and stimulant, and so partially supplies the place of the accustomed liquor, and prevents that absolute physical and moral prostration that follows a sudden breaking off from the use of stimulating drinks.

The Blakely Ordnance Company.

The London *Mechanics' Magazine* gives a description of a very extensive establishment now being erected on the banks of the Thames below London, for the manufacture of Blakely guns. The works will cover 14 acres; the self-acting lathes will each occupy 70 feet, and be capable of turning guns of 50 tuns weight and 20 feet length. These guns had been used to a considerable extent by the rebels, and a number of them have been captured by our forces.

Correspondence

Kerosene as a Substitute for Fish Oil in Tanning.

Messrs. Editors:—The difficulty and danger involved in procuring the vast number of codfish requisite to satisfy the commercial demand, and the labor of expressing the oil itself, must always make cod liver oil an expensive article. Even the simplest method, which is to pile the livers in great tubs, and collect the oil released from the animal tissue by slow putrefaction, requires months for its completion. Moreover, the fishermen meet with very various success in different years, and the price of fish-oil is in consequence subject to considerable fluctuation. In time of war, the fisheries are altogether interrupted, and in view of the possibility of a quarrel between this country and England, this fact becomes of grave importance. It is not then difficult to see how valuable would be some good substitute for fish-oil; coal-oil prepared by a certain process is said to be such an one, and it is the purpose of this article to consider the advantages and disadvantages of its use in that department of industry where fish-oil is principally employed, that is, in the dressing of leather.

When the hides are brought from the tannery, the first operation is to shave off the loose fleshy matter which has still clung to the inner surface of the hide. Then the outside is scoured to remove the exhausted tannin from the leather, when the hides are fit for oiling. Equal parts of oil and tallow are mixed together to make it what is called *dubbin*. This is rubbed on the flesh surface of the hide, while upon its outside they pour pure oil. Some of the tallow in the dubbin seems to be dissolved by the oil, and being carried into the leather gives it more firmness and body. When the hides have been dried, a white solid fatty substance is found where the dubbin was, resembling stearine. This is sold to candle makers and makes an inferior kind of candle. Now it is said that the tallow will dissolve to a greater extent in coal-oil than in fish-oil, and should therefore be regarded as the preferable material for dubbin. In some cases the leather prepared from mineral oil does wear excellently, and has given perfect satisfaction; in many others it has worn so badly that a large number of persons are prejudiced against leather so prepared. While some remains soft and pliable other leather dressed with kerosene grows hard and stiff, and for this reason firemen who would find their labor greatly increased and the flow of water greatly retarded, if their hose were not yielding, refuse to have it dressed in coal oil.

The difference in pliability cannot be ascribed to a difference in the leather used, because two pieces may be cut from the same hide, and the one prepared with cod-liver oil will be soft, the other with petroleum, very often will be hard. And the same facts are true whether the leather was dressed in cold or warm weather.

The process by which coal-oil is made suitable for these uses I do not know, and cannot therefore decide whether the leather manufacturers are correct in their opinion. But I find that they attribute the various results arrived at in employing coal-oil to some imperfection in the process employed to fit the crude oil for tanners' use.

The expense of coal-oil is but one-half that of cod-liver-oil, and when the immense amount of the latter that is consumed annually by tanners is taken into consideration, the great importance of settling this disputed point will be evident to all. I write for information and would be glad if some one who could speak from long experience would make some answer to the above. Albert R. Leeds.

328 Walnut St., March 27, 1865.

[We have no doubt that some of our readers will, for mutual advantage, be kind enough to forward their experience.—Eds.

Pyroligneous Acid in Chimneys.

Messrs. Editors:—The suggestions of W. O. Glover, in regard to the remedy for pyroligneous acid in chimneys are good so far as they go, but the Stuart cook stove is made to consume almost no fuel, and the heat being nearly all exhausted in the room, the little that escapes through the pipe and chimney is overcome, and the moist portion of the smoke condensed by the cold air before it reaches the top of the chimney. There is no remedy but to burn wood enough to heat the air in the chimney. I have demonstrated this the past winter beyond the possibility of a mistake.

Last fall I put up a sheet iron parlor stove called the Keystone, manufactured by Messrs. Cox & Church, Troy, N. Y., which, by its peculiar construction, gives nearly double the heat with very little more than half the fuel used by any other stove of equal size; the consequence is that a drum in the upper room through which the escaping heat and smoke pass is rendered almost useless, there being scarcely any perceptible heat about it; four feet higher the acid runs out in all directions; by reversing the laps of the pipe the acid would run down on the inside until it reaches a point where the heat would evaporate it. In warm weather pyroligneous acid will not trouble any one. N. Smith.

Delphi, Carroll Co., Ind.

The Principles of Flying.

Messrs. Editors:—On page 137, No. 9, Vol. XI. of your valuable paper is the following;—"How much power would have to be expended in beating the air in order to raise a given weight we have not the data for determining, but it is probable that some of our readers would easily ascertain." An answer never having appeared it would be interesting to know if the following could be correctly applied. The implement used is assumed to be a spiral fan say with six blades, having together the same area as a circle of the same diameter as the fan. Those blades have a certain pitch. Then say: As radius is to the cosine of the angle of pitch, so is the area to surface of resistance. Example:—Diameter of fan 7·5 feet, area 44·18 square feet, pitch 45°; then as 1:0·7071:: 44·18: 31·24 square feet, then say: as radius is to the sine of the angle of pitch, so is the semidiameter of the fan to the distance the fan will bodily travel in one quarter rovolution, or as 1:0·7071::2·75:2·64; this multiplied by 4 gives 10·56 feet in one revolution or 500 revolutions in one mile. Now assuming the fan were run those 500 revolutions in one minute, or at the rate of 60 miles an hour, it would exert a force of 562·32 pounds, because at 60 miles an hour velocity the fan has to overcome a resistence of 18 lbs. per square foot, and there being 31·24 square feet surface of resistance in the fan, it follows that 31·24 ×18=562·32 pounds is the force it exerts, and consequently will take that and a little more to overcome friction, to run at the same speed. Any other dimensions will give the same results in proportion.

Chas. Partenscky.

Oakland, Alameda Co. Cal., Feb. 19, 1865.

The Curious Action of a Glass Rod.

Messrs. Editors:—The "curious action of a glass rod," described in your last number, may be explained, it seems to me, in this wise:—The action of fire on the rod would cause that side of the rod toward it to expand, and the rod in consequence would bow out toward the fire until the gravity of that part woald cause it to fall—thus producing a rotary motion toward the fire. The same would happen, of course, if the rod were inclined—the direction of the rotation depending on the direction of the inclination. If the rod be placed on a glass or metal plate in front of a fire, the heat communicated from the plate will cause the ends to rise from it, while that from the fire will cause them to incline in the opposite direction from the fire, and falling will create a rolling motion from the fire.

Wm. H. Brown.

Worcester, Mass., March 11, 1865.

To Preserve Maple Sirup.

Messrs. Editors:—The Scientific American of March 25, clips from a cotemporary a plan for causing maple sirup to retain its delicious flavor a length of time. As many are inquiring, at this season of the year, for the most efficacious means of accomplishing this desirable result, allow me to suggest an economical and expeditious method which wife has tried several years with invariable success. It is simply this:—Having cleansed some old champagne or sherry bottles, fill with sirup to within three inches of their mouths, and force in each mouth a lock of dry cotton. Stand them in a dry, cool place. The cotton cork allows the gases of fermentation freely to escape, and at the same time offers a sufficient barrier to the external air. All true lovers of buckwheat cakes with maple sirup should not fail to try this most simple and sure plan. A.

New York.

Pleased with Prompt Action.

Messrs. Editors:—We are in receipt of the letters patent on our Sand-paper Holder, and also one copy of the Scientific American, for which, and for the prompt and efficient manner in which you have conducted our business with the Patent Office, please accept our thanks. We shall most certainly recommend your agency to our friends, as we are convinced that it has many advantages over any other. We expect to dispose of the entire right of our Holder to parties in Boston and if successful shall immediately place another case in your hands.

J. & N. W. Redding.
Box 157, Charlestown, P. O.

Boston, March 14, 1864.

[The Messrs. Redding's invention is intended to hold sand and emery paper firmly while applied to work, much being lost at the present time from getting torn for want of a suitable holder.—Eds.

Tubular Boilers and Scale.

[For the Scientific American.]

Certain engineers argue that Cornish boilers make more steam than tubulars, and a case is cited of one in Paterson that would not make steam, and a new boiler was purchased. On overhauling the old boiler it was discovered that the spaces between the tubes were filled with scale, and the water did not reach them, hence no steam could be made. Now, I affirm that the cost of the new boiler might have been saved, together with the fuel wasted in trying to make steam through this non-conducting substance (at an expense of about 75 cents weekly) by using "Winans' Incrustation Powder"—long advertised in the Scientific American. There are many evidences of its successful operation. • • •

Aniline Black.

In our last number was a short paragraph in relation to aniline black. We now have on our table a sample of the sacharate of aniline used for the black dye, which was sent us by Mr. A. Reppelman, of No. 168 Fulton street, in this city, and importer of dyes from Germany. In the instructions for using this color the manufacturer says:—

"The aniline black is not a ready-made dye, but it forms in the fiber during the dying or printing process. It has been applied successfully, however, only in printing. It consists of saccharate of aniline, which is mixed with starch, gum tragacanth, sulphide of copper, chlorate of potash, dry chloride of calcium and sal ammoniac. The proportion in which the above-named ingredients are used is as follows: solution of starch in water, 2 quarts; solution of tragacanth, 1 quart; solution of roasted starch, 1 quart. After boiling this mixture it is divided in two parts. To one part add: sulphide of copper, 4·5 ounces; chlorate of potash, 4·5 ounces. To the other part add: dry chloride of calcium, 9 ounces; saccharate of aniline, 12 ounces; sal ammoniac, 2·8 ounces. Mix both compositions cold, and use for printing in the usual manner. After printing, the fabric is suspended in a room heated to 80 or 100 degrees, and after twenty-four or forty-eight hours at the utmost the color becomes black and fixed, so that it will stand washing.

Lost Patents Revived.

We are now prepared to attend to the renewal of applications for patents under the act of March 3, 1865, which, in default of payment of the balance fee within the six months specified, have not been issued. There is a large number of inventors who, by this omission, would have lost their cases but for this new act. They ought to speedily avail themselves of this opportunity, and we are prepared to advise with them and give all necessary instructions.

The Treaty Oak.—We are indebted to Mr. Morell Clark, of Castalia, Iowa, for a sample of that famous oak under which Gen. Grant received the terms of capitulation of Gen. Pemberton and his army at Vicksburg, July 4, 1863.

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 Raising Oil and other Liquids from Deep Wells.—This invention has for its object to raise oil and other liquids from deep wells, and it consists in the use, within a well of an alternate plenum and vacuum of air or gas, produced by an air pump or other equivalent means, the said plenum and vacuum being applied by means of a suitable conducting pipe which is passed down into the well, either within or without the well tube, in connection with valves and chambers, for the passage into the well tube of the oil or other liquids to be raised. F. S. Pease, of Buffalo, N. Y., is the inventor.

Hand Mowing Machine.—This invention consists in a novel construction and arrangement of the sickle driving mechanism, whereby the gearing is fully covered and protected, a rapid motion of the sickle obtained by a very compact arrangement of parts, and the device placed under the complete control of the operator. These machines are made of various sizes to cut from ten inches to four feet in width. G. W. Jennings, of Boston, Mass., is the inventor.

Mouth-piece for Cigars.—As cigars are ordinarily made, considerable time is consumed in forming what is termed the "head," the portion or end which the smoker holds in his mouth. This head or end requires to be nicely rounded and pasted to prevent the wrapper from unwinding and with all the trouble and time expended in forming it, it is the only portion of the cigar not used or smoked. This invention consists in dispensing entirely with the tobacco head and substituting therefor one constructed of wood or other suitable material so applied as to effect a saving both in tobacco and the labor of manufacture, and, at the same time, produce a more desirable cigar, as the head or end will not be affected by chewing the same with the teeth, as is more or less the case in smoking the ordinary cigars. Jonathan Ball, of Elmira, N. Y., is the inventor.

Universal Timepiece.—The object of this invention is to produce a clock or watch which can be readily adjusted to indicate by the ordinary hands the correct or mean time for each of the places marked thereon, and which by means of a supplementary hand will show simultaneously the local time for all the places marked on the dial of the clock without calculation and mathematically correct. The invention consists in the employment or use of two or more compound or double circles on the dial of the clock or watch, the two parts of each circle containing respectively the figures for the hour and minute hands calculated and arranged to correspond with the longitude of the places marked on said circles in such a manner that the ordinary hands of the clock or watch are allowed to keep the accurate time of different localities; also in making the circles of different colors to aid the eye in tracing any given circle to any portion of the dial; further, in the use of an adjustable supplementary minute hand in such a manner that said adjustable dial can be arranged to corr spond with the local time of any circle, and at the same time the supplementary hand will give the local time of any other place marked on any or all the circles; also in so constructing the supplementary minute hand that the same can be readily turned or adjusted without interfering with the ordinary hands or with the movement of the timepiece; finally in placing upon the different circles the names of other places beside those for which the circles are calculated, together with the variations of such additional places from the circle on which they are marked, in such a manner that by a slight addition or subtraction the local time of any of the places marked on the various circles can be ascertained. A. W. Hall, New York City, is the inventor.

Clothes Dryer.—This invention consists in the combination with a bracket containing a series of radiating folding arms of a supporter arranged either to be hung upon a pair of nails or to be secured to a shelf by a screw, and provided with a tenon which fits into a corresponding mortise or socket in the bracket with the radiating arms in such a manner that said bracket can be readily attached to and removed from either of the supporters, and the supporters can be conveniently secured at any desirable spot in or about a room. The radiating arms are connected to the bracket by loops or pivots in such a manner that the same when folded are close together from end to end, and when spread they afford an extensive hanging room for the clothes to be dried. John H. Doughty, of New York City, is the inventor.

Placer Mining.—This invention consists in an improvement in the process of mining commonly called placer mining, or, in other words, that mode of mining for precious metals in the earlier stages of which auriferous or other earths are washed and the precious metals separated by means of water. This method of mining has hitherto been successfully pursued only where water is abundant, or has been abundantly supplied by flumes, canals, and other hydraulic works. In all such works, previous to this invention, the source or sources of water supply were required to be above the level of the mine, so that a fall of water could be obtained and the earth be disintegrated by the mechanical force of the falling stream or streams. Such sources of water supply are not always to be found, and many of those which are available are not ever-running, being in some cases derived from rainy seasons or from melting snow. This is very extensively the case in large mining districts in the United States, as in California, the territory of Idaho and other regions. The rich placer mines of Idaho, for this reason, can only be worked about three months in a year. This invention is designed to enable miners to work mines of this character throughout the year without any interruption save from inclement weather of such severity as would freeze up water and make out-door operations impossible. Cornelius H. Smith, Rock Island, Ill., is the inventor.

Machine for Splitting Wood.—This invention consists in the use in machines for splitting wood of a four-winged knife, the wings of which radiate from a common center, in combination with a suitable conductor, through which the blocks descend by their own gravity, in such a manner that by the action of said knife the blocks are gradually cut up in three or four-sided pieces of a convenient size for burning, and of such a shape that they can be conveniently handled. The invention consists also in the application of a feeder composed of two reciprocating toothed bars, in combination with the knife, in such a manner that when the knife is thrust forward, whereby the split portion of the wood in the conductor is separated from that which has to be split, the feeder is drawn up over the edge of the lowest pieces in the conductor, and as the knife goes back each feeder descends and pushes out one layer of split pieces, allowing the blocks to descend sufficiently far for a fresh cut. John Henry Hildebrandt, Brooklyn, E. D., N. Y., is the inventor.

Ice Sandal.—This invention consists in an ice sandal made in two parts which are connected by a slotted plate and spring bars in such a manner that it can be lengthened in order to attach it to a boot or shoe and that it will be kept in place by small caps in front and heel pin behind. The sandal is perforated with a series of slots through which the creeper points pass and said points are secured to bars which can be turned in their sockets in such a manner that the points will either project below the bottom surface of the sandal when the same is to be used on ice, or drawn in beyond said bottom surface, if the person wearing the sandal enters a building or passes to some place where the points would produce injurious results. Said creeper bars are adjusted by cords and buttons moving in segmental slots, and they are locked in the desired position by a segmental stop which is turned up when the creeper points are drawn in and which is turned down when the creeper points are turned out. Edward Fitzki, Philadelphia, Pa., is the inventor.

The Rebel Patent Office.

The report made by the Commissioner of Patents of the Rebel States shows the receipts of his office for 1864 to be $27,192 32; expenditures, $9,896 22. Forty-two patents were granted during the year for useful inventions.

A CO-OPERATIVE machine shop in East Boston is just going into operation, the first job being a locomotive.

Steel Girder Bridge.

An English engineer (Mr. Worthington) has lately constructed a swing bridge for carrying a railway over the Sankey canal, in which the girders are made of Bessemer steel plates. The object of using steel instead of wrought iron was to reduce the weight of the girders. The girders are four in number, about fifty-six feet long, with bearings varying form thirty to forty feet, and two feet deep. They were manufactured from steel plates; and were tested with loads of a ton to the foot, or more than double the weight which they could possibly be called upon to bear. The deflection varied from 1-4 inch to an inch, according to the length of the girder, and there was no permanent set on removal of the testing load. The plates used varied fron 1-2 in. to 7-16 in. in thickness; and the average tensile strength of a considerable number of plates tested was upwards of thirty-six tuns to a square inch. The weight of the girders was about 5-6ths of the weight which they would have been if wrought iron had been used. Mr. Worthington has a piece of cast iron lately taken out of the Sankey canal. Its exterior, from one-eighth to a quarter of an inch in depth, was so soft as to be easily cut with a dull knife. From the form of the casting he thought it very probable that it had not been in the canal more than five or six years. He stated that the water of the canal was strongly impregnated with liquids discharged from alkali works.

MARKET FOR THE MONTH.

The remarkable feature of the market during the month of March is the extraordinary decline in gold, and, of course, in other articles. The lowest point reached by this general standard of values was 147½, from which it has rallied to 154. The decline in the leading staples is shown by the following table:—

	Price Feb. 22.	Price March 28.
Coal (Anth.) ₩ 2,000 lb	$14 00	$13 00 @13 50
Coffee (Java) ₩ lb	47 @ 48	33 @ 35
Copper (Am. Ingot) ₩ lb	44 @ 45	34 @ 36
Cotton (middling) ₩ lb	83 @ 84	50
Flour (State) ₩ bbl	$9 80 @10 40	$9 25 @ 9 75
Wheat ₩ bush	2 50 @ 2 80	2 25 @ 2 50
Hay ₩ 100 lb	1 70	1 60 @ 1 70
Hemp (Am. drs'd) ₩ tun	320 00@390 00	275 00@300 00
Hides (city slaughter) ₩ lb	13 @ 13½	7½@ 9
India-rubber ₩ lb	72 @ 1 15	65 @ 1 05
Lead (Am.) ₩ 100 lb	13 00	9 75 @10 00
Nails ₩ 100 lb	8 50	7 50
Petroleum (crude) ₩ gal	45	33
Beef (mess) ₩ bbl	$18 00 @24 00	13 00 @21 00
Saltpeter ₩ lb	30	28
Steel (Am. cast) ₩ lb	19 @ 34	15 @ 27
Sugar (brown) ₩ lb	15 @ 20	9½@ 14½
Wool (American Saxony fleece) ₩ lb	90 @ 1 10	75 @ 85
Zinc ₩ lb	18 @ 18½	14 @ 15
Gold	2 01	1 54

SPECIAL NOTICES.

FRED. P. DIMPFEL, Philadelphia, Pa., has petitioned for the extension of a patent granted to him on the 1st day of July, 1851, for an improvement in steam engines.

Parties wishing to oppose the above extension must appear and show cause on the 12th day of June next, at 12 o'clock, M., when the petition will be heard.

LAWRENCE MYERS, Philadelphia, Pa., has petitioned for the extension of a patent granted to him on the 24th day of June, 1851, and reissued to him on the 24th day of March, 1865, for an improvement in railroad cars.

Parties wishing to oppose the above extension must appear and show cause on the 5th day of June next, at 12 o'clock, M., when the petition will be heard.

Compliment to Commissioner Holloway.

The clerks and employees of the Patent Office have presented Hon. D. P. Holloway, Commissioner of Patents, with a handsome album containing their photographs, some 100 in number. The occasion was the fourth anniversary of Mr. Holloway's control of that Department, and his associates took this method of expressing their appreciation of the uniform kindness they had received at his hands, and their respect for him as an officer and a gentleman.

IT is reported that an ingenious clockmaker of Versailles has invented a clock, no larger than the ordinary instruments, which will go for a year, or indeed for a much longer time. The internal mechanism is not altered, but the pendulum is replaced by a horizontal lever, which acts on a twist of elastic wire suspended vertically.

Ventilating Horse Cover.

"A merciful man is merciful to his beast," says the proverb, and of all domestic animals the last one to be neglected is the horse. Many persons thoughtlessly expose them to inclement weather, when a little forethought and small expenditure would have saved the services of a veterinary surgeon and the animal would have been in condition for use instead of being laid up in ordinary like a naval vessel under repair.

The horse cover here illustrated is not only water-proof, but is a great improvement on common water-proof blankets. The latter are not desirable and are regarded unfavorably by many persons owning horses. It is asserted correctly that being of a close compact texture, they prevent the natural exhalations of the body from passing off, so that the horse, after standing a while, is drenched in his own perspiration, thus superinducing disease, and in all cases making him uncomfortable and restive.

The improvements in this water-proof blanket are such as to render it self-ventilating and at the same time entirely impervious to moisture. It is constructed on a rule that works both ways, for while it allows water to escape, in the form of vapor, it prevents water in the form of rain or snow from reaching the animal. By referring to the principal engraving, the reader will see that a number of small loopholes, A, are constructed on the top of the blanket. These loopholes cover apertures below, as in Fig. 2, so that the perspiration exuded from the beast can readily escape without leaving so much as a crevice open for rain to enter. This is the principal feature, and its simplicity and utility are apparent at a glance. The main parts of the horse which perspire are those covered by the apertures, and on the flanks —from the latter the vapor readily descends and escapes at the openings beforementioned. The blanket is provided with straps and fastenings so that it can be neatly adjusted to horses of all sizes.

The invention was patented through the Scientific American Patent Agency on the 11th of October, 1864, by E. L. Perry, of New York, for further information address him at 153 Broadway, New York.

Fig. 1.

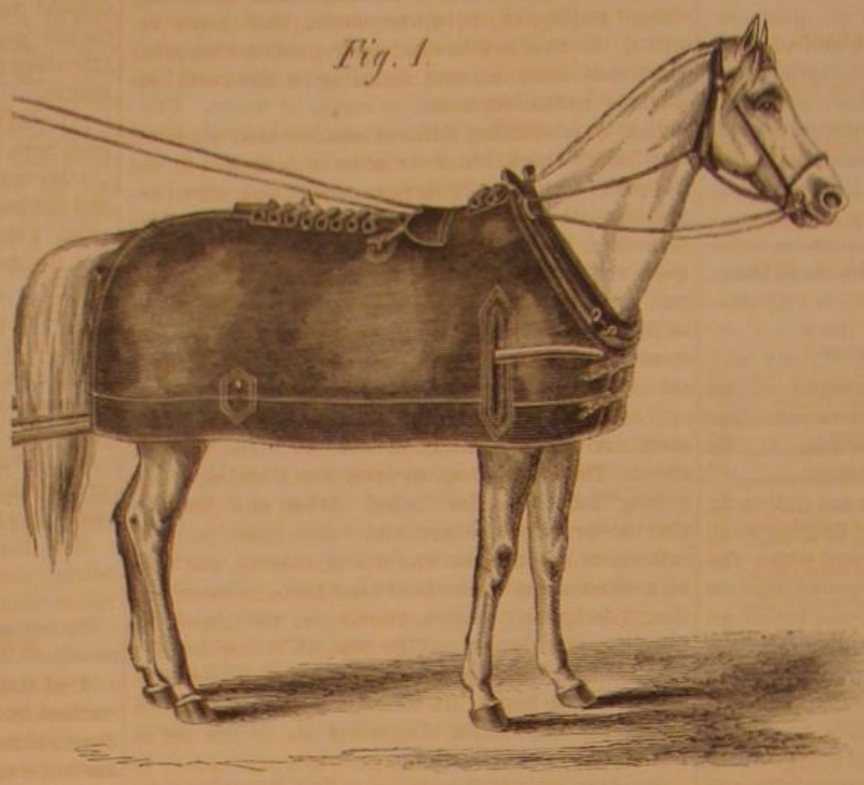
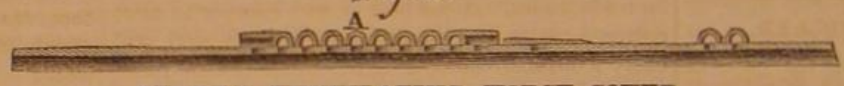


Fig. 2.



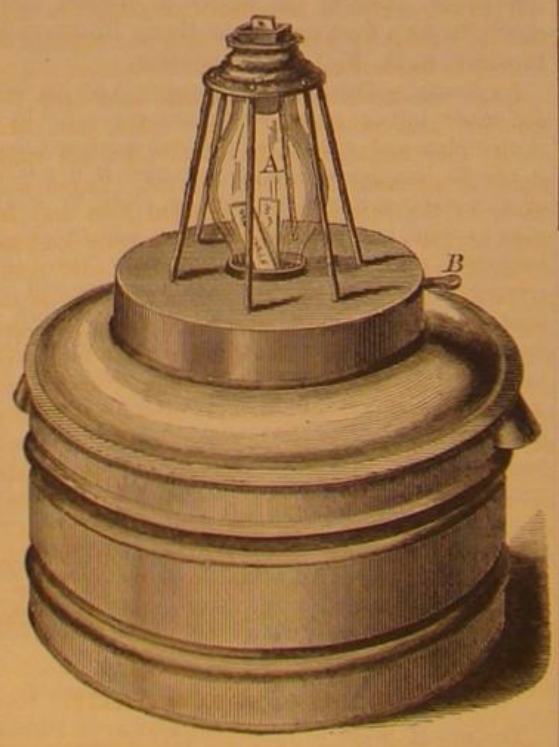
PERRY'S VENTILATING HORSE COVER.

Great Military Combinations.

The great plans of Lieut.-Gen. Grant, commanding our armies, are more clearly developed. We has exhibited a most heroic and enduring patience while each detail was being executed by his able lieutenants, not the least of whom is Gen. Sherman, and now is about to reap the reward of his well-planned combinations. He has out-maneuvered Lee in this the final stragetic combination, and has compelled him to commit the fatal error of defending his capital while its military supports were falling one by one around him. He has hemmed his adversary up in the State of Virginia, and will compel him there to fight or surrender. He has caused Sherman to sweep from Atlanta to Savannah and thence through South Carolina into the heart of the Old North State in such a manner as to penetrate the very vitals of the rebellion. Provident to a degree he has provided Sherman with a base by the timely capture of Wilmington, and enabled him to form a junction with the victorious army of Schofield, under circumstances which were in the highest degree encouraging to the gallant men composing his army. He, at a timely moment, dispatched Sheridan on a raid upon the enemy's channel of supply, and so thoroughly was the work done that Richmond was thrown into a panic, and fears for its safety were seriously entertained. He brought Sheridan back to the north bank of the James for the purpose of consultation, and now has him near his own headquarters, ready to undertake any movement that he may deem necessary to crowd his adversary to the wall. Thus he has swept Lee and Johnston into a position where either or both can be attacked with a very great probability of success. He has placed his left wing in such a position as to be in a very short time within communication with the extreme right wing of Sherman's army. He has literally barred all the avenues of egress by which the foe may escape to the south or west, and now awaits him with open arms. The crisis cannot be long delayed, and soon the crash of the decisive battle may be resounding on the plains of Southeastern Virginia. Thus, by a dramatic fitness, the final battle of the war will be fought upon the "sacred soil" of the State which drank the blood of the patriot heroes of July, 1861.

SELF-REGISTERING BALLOT BOX.

The object of this invention is to secure a self-registering ballot box, or one that would record, by an audible sound—such as ringing a bell—the actual passage of the vote into its proper place. To obtain this end the box is fitted with a transparent tube, A, resembling a lamp chimney externally. At the top is a narrow opening in which the ballot is placed,



and through which it descends to the compartment below; before it can pass through, however, there is a sliding door on which the vote rests, so to speak, which must be moved aside. This door is worked by means of the handle, B, and when actuated it rings a small gong each time, the gong being fastened inside out of the way so that it cannot be tampered with; the bottom of the box is locked up, and can only be opened by the proper key. This is a very neat arrangement to "preserve the purity of the ballot box." It was patented on the 24th of January, 1865. For further information address J. A. McPherson, patentee, 344 Congress street, Troy, N. Y.

The Constitution of Steel.

The London *Mining Journal* says:—"The scientific division of the Belgian Academy of Sciences having proposed to give a gold medal for the best essay on the constitution of steel, at the last meeting of the year on the 16th of December last, the prize was awarded to the paper bearing the device "*Citius emergit veritas ex errore quam ex confusione.*" This memoir is due to Capt. Caron, to whom the committee awarded 800 francs, in addition to the medal, as an extraordinary recompense for the superiority of the essay. Mr. Stas, the chairman of the committee appointed to examine the treatise, reports that the author, Mr. Caron, proves satisfactorily that Mr. Fremy's opinion of the essential presence of azote in steel is untenable, and demonstrates that iron, when passing into the state of steel, does not contain a particle of azote more than it had before the conversion, or more than is contained in the alkalies, through the intervention of which the carbon enters into the iron. He considers that the presence of azote in some steel is due to traces of the azotide, or the azoto-carburet of titanium, which is to be met with in both cast and wrought iron used in the manufacture of steel. That steel is essentially composed of iron and carbon; that it owes its good qualities or its defects to two different causes acting in unison—1st, to the state of the carbon in the metal; 2d, to the nature of extraneous substances which deteriorate it. When steel becomes bad after being heated several times, this proceeds from its carbon having been burned or separated from the iron, a separation which no tempering can remedy, and which is due to the presence of extraneous matter, principally silicium, which impedes the perfect union of the two substances, and gives to the steel different properties or defects, according to the nature or quantity of such impurity."

[This conclusion is in direct opposition to that of Mr. Binks, whose experiments are generally received as settling the point that nitrogen is an essential constituent of steel. But it seems that this vexed question is never to be set at rest.—Eds.

Lighting Gas by Page's Induction Coil.

It is quite probable that but for the death of the inventor, Mr. Arch. Wilson, his apparatus for lighting all the gas jets of a theater or other large building at the same instant by means of Ruhmkorff's—or more properly Page's—induction coil would have been by this time in general use. It is said to have been in constant use in the Music Hall at New Haven, and in Allyn Hall at Hartford, for about four years, and to have worked without failure and with satisfaction at all times. We learn that the patent is in the hands of Mrs. Arch. Wilson, of New Britain, Conn.

Wind against Tide.—A tidal phenomenon was observed at the Humber dock gate one day last week. About an hour before high water the tide ceased flowing, and fell from 20ft. 2in. to 20ft. It then began to flow again, and the tide rose about 8in. then stopped for about twenty minutes, and then flowed again about 4in. more. It was now high water, and for the next hour it did not fall more than two inches. A similar tide occurred about 1820, and was followed by a sudden and violent storm.—*Engineer.*

[This was doubtless caused by the wind blowing against the tide and piling up the water; at times, however, the force of the tide was greater than that of the wind, and the water then fell.—Eds.

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NEW YORK, SATURDAY, APRIL 8, 1865.

Contents:

(Illustrations are indicated by an asterisk.)

*Wisell's Lathe for Irregular Forms	223	Aniline Black	228
Mechanical Skill of English Burglars	223	Lost Patents Revived	228
Application of Glycerin	224	Recent American Patents	229
Useful Practical Receipts	224	The Rebel Patent Office	229
Iydonics	225	Steel Girder Bridge	229
Homes for Workmen	225	Markets For the Month	229
Polytechnic Association	276	Special Notices	229
Water-pressure Engine	226	Compliment to Commissioner Holloway	229
Effect of Coal Ashes on Wood Ashes	226	*Ventilating Horse Cover	230
Farmers' Club	227	Great Military Combinations	230
*Sanborn's Bandage Roller	227	*Self-registering Ballot Box	230
Strawberry Culture	227	The Constitution of Steel	230
New Petroleum Engine	227	Lighting Gas by Page's Induction Coil	230
An English Cure for Drunkenness	227	The Great Lock-out in England	231
The Blakely Ordnance Company	227	Machinery the Great Missionary	231
Kerosene as a Substitute for Fish Oil in Tanning	228	Inauguration of a New Society	231
Pyroligenous Acid in Chimneys	228	Mysterious Boiler Explosions	231
The Principles of flying	228	Patent Claims.....232, 233,	234
The Curious Action of a Glass Rod	228	Notes and Queries	235
To Preserve Maple Sirup	228	A Safety Money Drawer	238
Pleased With Prompt Action	228	Water Baths in Cooking	238
Tubular Boilers and Scale	228	Sailling of Prof. Agassiz	238
		A New Substitute for Coffee	238
		*Brockway's Stitching Horse	238

THE GREAT LOCK-OUT IN ENGLAND.

The manufacture of wrought iron in England is suspended. Saturday, the 6th of March, the works in North and South Staffordshire were closed, and a week afterward the example was followed by the manufacturers in the North of England and in Wales. By this step it is said that 70,000 men are thrown out of employment, $500,000 per week of wages are stopped, and 200,000 persons are deprived of their ordinary means of living.

This deplorable result is the crisis of a quarrel which has been for a long time growing up between the manufacturers and their workmen. A trades' union was first formed among the workmen throughout the kingdom for aiding those of any particular manufactory or district while on a strike. This organization by its great numbers was generally able to conquer in a struggle with any individual master, or even with the combined manufacturers of any small district. The iron masters of the kingdom therefore determined to form an association among themselves in order to oppose their combined power to the organization of the workmen.

There has been a decline in the price of iron and a consequent reduction in the wages of puddlers; but the puddlers in North Staffordshire determined to strike, sooner than submit to this reduction. The Workmen's Union gave its advice in opposition to this, and notified the North Staffordshire puddlers that they would not be supported in it. But the masters, suspecting that the North Staffordshire strikers would be supported by contributions from the workmen throughout the kingdom in their individual capacity, gave notice that if the North Staffordshire strike were not ended by the 4th of March, all the works would be closed on that day. The Workmen's Union protested against this measure as most unjust and cruel, stating that it would entail on great numbers of innocent and helpless men, women and children, an amount and degree of suffering compared with which the fires of Smithfield were merciful.

By our last English papers we see that this appeal was unavailing, and that on the 11th of March the example of the iron manufacturers in Staffordshire was followed by the North of England and Wales, and 70,000 workmen with their families were turned out in forced idleness to get their living the best they could.

MACHINERY THE GREAT MISSIONARY.

Few people reflect how much civilization owes to machinery. Not in countries already refined, not in the land where the sound of the church-going bell is heard, where the telegraphs and printing presses vie with each other in the dissemination of intelligence, but in those obscure quarters of the globe where the mind of the heathen is as dark as his skin, and the obscurity which shrouds his mind is as dense and opaque as the sky above when midnight storms overcast it; there it is that machinery performs its great mission of lifting up and restoring to the world regions and men lost to it.

It is an interesting and curious fact that whatever else barbarians fail to see worthy of imitation in the customs of more civilized races, they never fail to appreciate its machinery. When Commodore Perry undertook his famous expedition to Japan the stolid faces of the Japanese were unmoved while the tedious ceremonials of treaty reading and similar formalities were in progress, but when the circular railroad was put in operation, high and low trod on each others garments to get near it.

When gas was lighted for the first time in the streets of Algiers a crowd of bronzed Arabs followed the lighter exclaiming in awe-struck voice, it is a "djin," meaning an evil spirit. When our steamers first visited Chinese ports the prominent point of interest to the natives was the machinery, and foreign embassies of barbaric or semi-barbaric races visiting this country enjoy to the utmost the inspection of our manufactories. Why should it not be so? Where there is no machinery labor is cheap and the product of it small. In Mexico there are mountains of silver almost, but it is as worthless as the dirt in the streets, because although there are plenty of laborers to mine it, there are no railroads to transport it over, and no steamers to freight it to where it may be made useful. It has been found cheaper to carry cotton from India to England, spin it into cloth and carry it back to be sold again where it was raised than to weave it by native hand power. Ignorant as these barbarians are they welcome the advent of machinery, for whatever their motives, they know full well that where it is their bodies are clothed, their wages increased and regularly paid, and that from being atoms in the mass of humanity they become parts of a system, a plan, an organized industry with a tangible object, and they are humanized, civilized, and elevated accordingly. As the ax of the woodman lets sunlight into the forest, so the advent of machinery breaks down the prejudices of the uncultivated; where sloth was, industry is, and where only force had sway, reason enters.

It is curious also in pursuing this subject to note that the machinery breakers, or men who combine to destroy factories from the fear that their labor will be lost, are not heathen in the general sense, but the ignorant and debased of large cities, men who should know better, and who often do, but are stimulated to misdeeds by other persons. Vague and crude as the perceptions of ignorant men may be there are few so densely stupid as to remain long indifferent to the superiority of machinery over manual labor. It is not so much exemption from arduous tasks that commands respect for machinery from mankind as the scope, the endurance, the increased quantity, the comforts, and the quality of work done by it. The prices of all goods are determined by the supply; if we had no machinery we should have but little cotton; if we had little cotton the few would have used it while the many would wear tow cloth; we should have had few newspapers, books would have been dear, and the spread of intelligence obstructed beyond calculation. To that one machine—the cotton gin—may be directly traced immeasurable advantage.

INAUGURATION OF A NEW SOCIETY.

The New York Association for the Advancement of Science and Art was inaugurated at the large hall of the Cooper Institute, Wednesday evening, March 28th.

The meeting was called to order by Rev. S. Ireneus Prime, D. D., who introduced Joseph B. Varnum, Jr., one of the Vice Presidents of the Association. Mr. Varnum set forth the objects of the society at great length, and then introduced Mr. William Cullen Bryant, who made an exceedingly able, forcible, and graceful address. Mr. Peter Cooper was then introduced, and after reading a short and excellent paper, he remarked that he would mention one incident among the great numbers that were occurring to show that the purposes of the Cooper Union were being successfully accomplished:—

"A short time since I was walking along near my store when an intelligent-looking young man addressed me, and said that he wanted to thank me for the great advantage that he had derived from attending the free courses of instruction at this institute.

"I told him that I did not know that he had ever been here.

"He said he had attended three or four courses, and the instruction which he had received had enabled him to just pass an examination, and to obtain a commission in the engineer department of the navy.

"What gratified me most was, that he said he came from a tenement house where there were large numbers of young men, and had there not been this resource for his evenings he might have been led away with them into courses of vice and folly.

"I indulge the hope that this institution will confer similar advantages upon other young men for many successive generations."

Hon. Horace Greeley then made a few pointed remarks, and after two other speeches, the last one rather long and tedious, the meeting adjourned.

MYSTERIOUS BOILER EXPLOSIONS.

That steam boilers are long-suffering and endure neglect and abuse without destroying the authors of them, is amply proved by hosts of occurrences similar to those related below. By late English mails we learn that a boiler in Birmingham, England, which was worked from a puddling furnace, became so hot that, through want of water, the plates exposed simply bulged out and tore away like a sheet of pasteboard. No other results followed, and the damage ended with the rupture. In another case mud accumulated in a cylinder boiler which caused the plates covered by it to burn out, when the pressure within merely rent the metal, and extinguished the fire; no sooner was the plate replaced by a new one than a similar accident occurred from the same cause. Another injury was caused by reliance upon a float for ascertaining the hight of water, although there were gage cocks in addition; the float became jammed, and the water was evaporated until twelve feet of the boiler become red-hot, resulting in great expense for repairs.

If these boilers had been blown to atoms, if the surrounding buildings had been reduced to rubbish, if hundreds of human beings had been wounded and maimed for life, we should have the theory-tinkers on the stand again, and "ozone" would have been heard from. We should have been told that some mysterious agent, some unknown but tremendous force had been generated by the decomposition of the water, and was the sole cause. Saturated steam discharged from a sound boiler into the superheated atmosphere of the exploded boiler, might have been the cause. In short, there would have been repeated the same farce which is re-enacted whenever a casualty of like nature occurs.

In the cases above cited the boilers themselves knew more than the seekers after mystery do. The one burnt out gave way from a palpable cause, and the same neglect transpiring shortly after, it failed again, showing that it was simply impossible to exist under such a combination of causes. It is so with all boiler explosions. Nine out of every ten can be traced to actual deterioration from long service or misuse, and it is a disgrace to the engineering profession that they should countenance efforts made to shroud them in mystery. The result of such verdicts is simply to invite neglect, for if the engine tender is given to understand that a boiler will explode by causes beyond his control, he becomes a sort of predestinarian, and trusts to luck when he ought to be the personification of vigilance. All the mystery is the mystery of carelessness which might be prevented.

THE lining of tea chests makes a good solder for tin ware, being made of tin and lead in about the proper proportions.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING MARCH 28, 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.

46,980.—School Desk and Seat.—John P. Allen, Richmond, Ind.:

In the construction of school furniture I claim the piece, A, so constructed as to constitute a leg or support for the seat, E, and also a support, as well as a means of attachment, for the bookshelf or bottom, g, of the book box, substantially as set forth.

46,981.—Ratchet Drill.—Edward H. Ashcroft, Lynn, Mass.:

I claim in a ratchet drill having a removable extending screw, which works when the tool is in use in an opposite direction to the drill, making the drill in one piece between the movable cap and the drill socket.

46,982.—Writing Tablet.—George Asmus, Houghton, Mich.:

I claim a combined writing tablet, ruler and paper cutter, constructed as described, as a new article of manufacture.

[This invention relates to a writing tablet which can be used as a paper cutter and ruler, and which proves to be of great convenience for the purpose of holding blank paper to be used as a desk or in or about a factory or in the army or other operations for memoranda or notices. When made on a large scale it may also be used for holding and measuring drafting and other paper or prints, cloth, etc.]

46,983.—Treating Ores.—G. W. Baker, New York City:

I claim, first, The utilization of waste heat and vapors created in the treatment of pyrites containing the precious metals, in the manner substantially as and for the purposes set forth.

Second, The forming of sulphurous acid substantially as described for the purpose of treating the calcined ores whether containing only the baser metals or the baser metals with gold and silver.

Third, The use of sulphurous acid thus formed in treating the calcined ores for the purpose of converting the insoluble oxides into soluble sulphates, especially copper as described.

Fourth, The method of obtaining a highly concentrated solution of the baser metals by lixiviating with the acid, and submitting the weaker solution, obtained by lixiviating with water, to the acidulatting process as set forth

46,984.—Roasting and Desulphurizing Ores.—G. W. Baker, New York City:

I claim, first, A reverberating retort constructed and operating substantially as herein described.

Second, The use of steam as a blast to carry forward the vapors evolved from the ore and surround the latter with a constantly changing atmosphere.

Third, The blast chamber, A, boiler, B, arranged relatively with the fire chamber, C, substantially as shown, when said parts, thus arranged, are used in connection with a hot air pipe, K, leading from the ash pit of the fire chamber into the flue, I, which forms a communication between fire chamber, C, and one or more reverberating retorts, H, for the purpose herein set forth.

Fourth, The coil, D, in combination with the boiler, B, hot air chamber, E, flues, g, and steam coil, F, all arranged to operate substantially as and for the purpose specified.

Fifth, The annular passages, L, at the lower parts of the retorts arranged as shown to communicate with the smoke stack to form reverberating retorts.

Sixth, The conical feeders, M, arranged or applied to the retorts, substantially as and for the purpose herein set forth.

46,985.—Gate.—Franklin Ball, Cleona, Iowa:

I claim a gate constructed substantially as described, or in any equivalent way, so as to be capable of being opened and closed by raising or lowering it in a vertical plane, when said gate is hung so as to swing and open and close laterally, substantially as described.

I further claim the bar, D, pivoted to post, B, grooved at its under side to receive the upper ends of the pickets, d.

[This invention relates to a new and improved gate, and it consists in constructing the gate in such a manner that it will be balanced, or nearly so, on its hinges, open and close laterally like an ordinary hinged gate and at the same time be capable of being opened by elevating or raising it vertically, the latter mode being resorted to if snow, ice, or other obstructions of any kind should prevent it from opening laterally.]

46,986.—Mouth Piece for Cigars.—Jonathan Ball, Elmira, N. Y.:

I claim the wooden mouth piece herein described constructed with a cylindrical end, b, and a conical front, c, as specified.

46,987.—Mode of Preparing Inflamable Liquids so as to prevent Accidents.—Thomas J. Barron, Brooklyn, N. Y.:

I claim giving to explosive and inflammable oils and fluids, used for illuminating and other purposes, a bright distinct color, to plainly distinguish them from other oils and fluids, substantially as and for the purposes set forth.

46,988.—Process for Lining Barrels for Holding Oils, etc.—Julius Baur, New York City:

I claim, first, The above described process substantially as set forth, of lining or coating barrels and other articles designed to contain petroleum, benzine, oil, ground lead or paint, and other similar substances.

Second, The above described process, substantially as set forth, of lining or coating barrels and other articles designed to hold alcohol, wines, whiskey, and other substances which contain water.

Third, The above described process of lining or coating barrels or other receptacle designed to contain any of the herein before referred to articles, when the soluble glass employed in such process is dried thoroughly into the substance of the barrel or other receptacle substantially as set forth.

Fourth, The employment of soluble glass, whether alone or in union with other matters, to impregnate, or, as it were, petrify, any article which is designed to be secured against leakage or evaporation.

[This lining is particularly intended for preventing leakage in petroleum barrels or packages, but it can be used with advantage for barrels or kegs containing paints or oils of any other description and also for alcohol, whisky, etc.]

46,989.—Tobacco Smoke Purifier.—John Bavier, Newark, N. J.:

I claim a detached smoke purifier constructed substantially in the manner and for the purpose herein above specified.

46,990.—Water Meter.—John B. Benton, New York City. Ante-dated March 12, 1865:

I claim constructing a meter substantially as described to divide the entire flow of water in given proportions and measure only a portion of the water which passes through the machine.

I also claim the employment in combination with the measuring reservoir, of a siphon arranged to operate as specified and automatically discharge the contents of the reservoir as set forth.

46,991.—Slide Valves.—Chas. H. Brightly, Philadelphia, Pa.:

I claim the arrangement of the port box, D, box valve, B B, and brace, E, substantially as and for the purposes herein described.

The arrangement of the port box, D, box valve, B B, screws, h h, and screw threaded brace, E, substantially as herein described.

Third, The manner herein described of arranging the adjusting screws, h h, with the valve, B B, and port box, D, for the purpose set forth.

46,992.—Balance.—Henry A. Clum, Rochester, N. Y.:

I claim the use of a spiral spring in combination with the plunger and mercury in order to impart increased capacity to scales capable of determining light weights substantially as herein set forth.

46,993.—Machine for Cutting and Preparing hay for Baling.—Samuel Colaham, Cleveland, Ohio:

First, I claim the cylinders, F and F', in combination with cutter head, H and blade, J, when arranged as and for the purpuse set forth.

Second, I claim the carrier or apron, P, and guide, R, in combination with the cutter head and hopper as and for the purpose set forth.

46,994.—Cow Milker.—L. O. Colvin, Philadelphia, Pa.:

I claim the employment or use, in a device for milking cows, of a series of pumps, one for each teat of the cow, arranged in such a manner as to be operated simultaneously by a single lever and still work independently of each other substantially as and for the purpose herein set forth.

I also claim providing the pump aforesaid with check valves provided with openings in such a manner as to admit of the ready withdrawal of the teats from their tubes and still cause the latter to hug or retain the former to a necessary degree as described.

I further claim the combination of the pumps, pump valves, milk receptacle and discharge spout all arranged to operate in the manner substantially as and for the purpose specified.

[This invention consists in constructing a cow milking device with a plurality of pumps, one for each teat of the cow, and having said pumps operated simultaneously by a single lever, but each pump operating independently of the others, whereby the cow may be thoroughly milked from each teat, or in other words each teat milked comfortably dry.]

46,995.—Rotary Spader.—Cicero Comstock, Milwaukee, Wis.:

First, I claim the curved tine or tooth, widest at the point, with notch on the concave side of the head to embrace the fork-bar and stirrup or clamp, and sharpened at the point by being beveled on the concave side substantially as herein recited.

Second, Securing the tooth or tine to the fork-bar by the stirrup or clamp and key as herein recited.

Third, The combination of the fork-bar, clamp, key and tine or tooth having the notch as and for the purpose herein set forth.

Fourth, Securing by casting the lugs on the ends of the fork-bars to which to hang the friction roller or wheels.

Fifth, casting the handles or cranks on the fork-bars as and for the purposes described.

Sixth, Such a location of the handles or cranks on the fork-bars in reference to the main wheels that when the main wheels are keyed in place shall secure the forks in position, as herein named.

Seventh, Driving the keys which secure the main wheels to the axles towards the center of the machine so that the hubs of the cams bearing against the heads of the keys will prevent the keys from loosening or coming out.

Eighth, The arrangement of the collars and sockets set forth for excluding the dirt from the interior of the cam hubs.

Ninth, Alternating the tines as and for the purposes set forth.

Tenth, The spring on or near the back part of the cam for the purpose recited.

Eleventh, Making that portion of the central part of the cam which governs the action of the forks in the ground a separate piece so that the same may be replaced as herein stated.

Twelfth, The construction and arrangement of the links and levers for actuating the movable section of the cam and permitting the same to be self-actuating as herin described.

46,996.—Saw.—Rowland Cromelien, Washington, D. C.:

I claim the arrangement and combination of three saw blades, with their teeth filed and arranged at any angle required, and fastened firmly to a wedge or V-shaped back, as herein described and for the purposes set forth.

46,997.—Dancing Toy.—James M. Cromwell, New-York City:

First, I claim the employment or use of the lever, C, with arm, D, attached in connection with one or more rods, E, suspended to D, and figures, F, suspended to E, substantially as and for the purpose specified.

Second, The employment or use of a clock movement in combination with the figures, when the latter are operated from the former, in the manner substantially as set forth.

Third, The adjustable prongs or arms, i i, in combination with the lever, C, for the purpose of controlling or regulating the vibration of the latter, for the purpose specified.

[This invention relates to a new and improved toy composed of dancing figures, and it consists in suspending the figures to the operating mechanism and constructing the latter in such a manner that the figures will, when the device is put in operation, have the grotesque motions peculiar to the ordinary ethiopian or negro dancers.]

46,998.—Engine Head Light.—S. M. Davies, Chicago, Ill.:

First, I claim the use and employment of the semi-cones, D D D D, for the purpose and in the manner described.

Second, The use and the employment of the semi-frustums of cones, H H H H, in the manner and for the purpose described.

Third, The combination of semi-cones, D D D D, with the semi-frustums of cones, H H H H, in the manner and for the purpose described.

46,999.—Clothes Dryer.—J. H. Doughty, New York City:

I claim in combination with the bracket, A, constructed as herein shown and described, the radial arms, B B, pivoted within the said bracket so as to be expanded or folded together in a horizontal plane as specified.

47,000.—Horse Collar.—Samuel B. Edson, Kokoma, Ind.:

I claim as an article of manufacture the horse collar, A, in combination with the hocking clasp, c d, the whole constructed and operated substantially as described.

47,001.—Boring Drill.—Daniel R. Erdmann, Philadelphia, Pa.:

I claim the within described drill, having projections, d d, arranged in respect to the cutting edge of the said drill as and for the purpose set forth.

47,002.—Connections for Water Pipes.—Ransom Farr, Chesterfield, N. H.:

I claim connecting the sections of a water pipe together with a single connecting piece or casting laterally as well as longitudinally substantially as described.

47,003.—Propulsion of Steamboat.—Alfred Fellows, Maquoketa, Iowa:

First, I claim the application of endless propelling chains to the forepart of a boat constructed with a central water way, substantially as and for the purpose herein set forth.

Second, In combination with the boat of the construction specified, I claim a plurality of rudders hung centrally upon their shafts and mounted within or opposite to the water way, substantially as and for the purposes set forth.

47,004.—Connection of the Gaff to the Mast of Navigable Vessels.—Charles L. Fisher, Chelsea, Mass.:

I claim my improved mode of attaching a gaff to the mast of a vessel, the same being substantially in manner and so as to operate as and for the purposes set forth.

47,005.—Traction Wheels for Rotary Plows.—Lemue S. Fithian, Rahway, N. J.:

First, I claim a traction wheel or drum which is provided with beveled slats or bars extending obliquely across it, and operating substantially as described.

Second, Securing the slats of a ground propeller to the radial spokes of three or more wheels, which are constructed and braced substantially as described.

Third, The employment of metal face plates e e, in combination with the beveled and obliquely arranged slats, g, substantially as described.

47,006.—Ice Sandal.—Edward Fitzki, Philadelphia, Pa.:

I claim, First, An ice sandal made of two parts connected together by a slotted plate and springs, substantially as and for the purposes described

Second, The revolving longitudinally adjustable rods, f f, with points, g, in combination with the sandal, A, constructed and operating substantially as and for the purpose set forth.

Third, Making the creeper rods, f f, adjustable by means of buttons, i i, or their equivalents, substantially as and for the purpose specified.

Fourth, The cam, m, in combination with the creeper rods, f f, and sandal, A, constructed and operating substantially as and for the purpose set forth.

47,007.—Caster for Furniture.—Frederic G. Ford, Washington, D. C.:

I claim the socket or tube, B, with its circular recess, a a, in the disk, and its corresponding projecting ring, c c, on the swivel, C, in combination with the fastening screw, D, which forms the pivot, for the purposes herein set forth.

47,008.—Hanging Cultivator Teeth.—Joseph Fowler and F. M. Bacon, Watertown, Wis.:

We claim retaining the cultivator tooth by friction against a quadrant bearing substantially as specified, so that the said tooth can be in a vertical or in an inclined position and will yield to obstacles without injury to the tooth, as specified.

47,009.—Seeding Machine.—Joseph Fowler and F. M. Bacon, Watertown, Wis.:

We claim the slide, g, moving in the supports, h, in combination with the blocks, 2 and 3, bars, 4 and 5, and lever, i, to regulate the size of the seed cells, in the manner and for the purposes set forth.

47,010.—Boots and Shoes.—B. D. Godfrey, Milford, Mass..

I claim a boot or shoe having a construction substantially as here in described.

47,011.—Oil Ejector.—W. R. Greenleaf, Buffalo, N. Y.:

I claim the application and use of the conical cup or vessel, B, or equivalent device, to the induction pipe or openings of a pump, ejector or other instruments for raising liquids from wells or reservoirs, by which a perfect separation is effected of any gas which the well may contain from the liquid being raised and the gas thus prevented from entering said pump or ejectors, substantially as set forth

47,012.—Hydrogen Lamp.—Conrad Hagen and Frank Aurnhammer, New York City:

We claim the application of the arm, b, in combination with the plug, E, block of zinc, H, lever, G, and spring plug, f, all constructed and operating substantially as and for the purpose herein shown and described.

Also making the sponge adjustable toward and from the discharging end of the plug, as set forth.

[This invention consists in the application of an oscillatory arm secured to the plug of the cock which serves to admit the hydrogen gas to the platina sponge in combination with the block of zinc and with a suitable spring acting on the lever which serves to open the cock in such a manner that on depressing said lever, or on opening the cock, the zinc block is lowered into the acid contained in the jar and a sufficient quantity of hydrogen gas is evolved to produce the desired effect, and when the lamp is not used, and as soon as the lever is relieved from pressure, it flies back to its original position closing the cock and raising the block of zinc above the surface of the acid, and the evolution of an excess of gas is prevented.]

47,013.—Machine for Cutting Sheaf Bands.—Henry Haines, Farley, Iowa:

I claim the endless carrier in combination with the endless belt of knives, said parts being placed within a suitable frame connected with the thrashing machine, and all arranged to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and useful machine for cutting the bands of grain sheaves while the same are being fed to a thrashing machine. The object of the invention is to obviate the necessity of untying the sheaf bands preparatory to feeding the grain to the thrashing machine.]

47,014.—Process for Brewing.—Adolph Hammer, New York City:

I claim, First, Heating the mash in brewers' tuns by means of one or more chambers arranged above the chamber containing the mash, substantially as described, when the heated current of fluid passes down into the mash and heats the same gradually to the desired temperature while the said malt is compelled to float.

Second, The oblique pipe or pipes, E, applied in combination with the heating chamber, D, substantially as and for the purpose described.

47,015.—Car Axles.—John W. Hard, Decorah, Iowa:

I claim, First, The spring dogs, b b', and scolloped recesses, a a', in combination with the half axles, A A', and half couplings, C C', constructed and operating substantially as and for the purpose set forth.

Second, The annular oil reservoir, d, and radiating chambers, e, in combination with the half axles and couplings constructed and operating substantially as and for the purpose described

Third, The circular grooves, h h', near the outer ends of the half couplings, applied and operating substantially as and for the purpose specified.

Fourth, The wings, i, projecting from the peripheries of the half couplings, substantially as and for the purpose set forth.

[This invention relates to certain improvements in that class of car axles which are made in two parts, so that each wheel may revolve independent of the other.]

47,016.—Corn Cultivator.—John Harper, Salem, Iowa:

I claim, First, The frame, F F, adjustable on the segmental guide rods, C C, as specified.

Second, I claim the manner in which the front shovels are attached to the bar, B, turning them to or from the corn as may be required, in combination with the lever, L, substantially as and for purposes set forth.

47,017.—Cultivator.—John Harper, Hillsborough, Iowa:

I claim the slotted shovel standards, F, in combination with the lever, L, rope, O S, and stirrup, V, the several parts being constructed, arranged, and operating as and for the purpose set forth.

47,018.—Skate.—Wm. Hawkins, Birmingham, Conn.:

I claim so constructing a skate that the sliding heel clamp shall be held or retained vertically within the seat or bearing formed for it in the stock independently of the set screw, as and for the purposes substantially set forth.

47,019.—Wood-splitting Machine.—John Henry Hildebrandt, Brooklyn, N. Y.:

First, I claim the combination of the conductor, G, through which the blocks descend by their own gravity, and the inclined plane knife, F, constructed and arranged to operate as specified.

Second, The feeder, H, constructed substantially as herein specified, and operating in combination with the conductor, G, and knife, F, in the manner and for the purpose described.

47,020.—Sorghum Evaporator.—D. H. Iseminger, Heyworth, Ill.:

I claim the combining of the register, G, with the pipe, L, and furnace, C, all arranged substantially as and for the purposes set forth.

Second, I claim, in combination with the furnace, C, and pan, H, the longitudinally-divided pan, J, divided flues, B B, and dampers, D D, all arranged and operating as described.

[This invention relates to a new and improved device for evaporating sorghum, and it consists in a means employed for treating the juice preparatory to its entering the evaporating pan, thereby economizing in time.

47,021.—Cultivator.—C. M. Jenne, Young America, Ill.:

First, I claim the axle, A, arranged or applied to the draught pole, C, substantially as shown, to admit of a forward and backward play thereon, for the purpose set forth.

Second, In combination with the above, I claim the rods, D D, attached to the draught pole, C, and passing through the axle, A, with springs, a, on their rear ends, to operate substantially as and for the purpose herein set forth.

Third, The stirrup, H, applied to the draught pole, C, in combination with the bars, I I, rods, f, links, g, and axle, A, all arranged substantially as and for the purpose specified.

Fourth, The rods, M M, attached to the plow beams, J J, and connected by links, N N, with the adjustable plates, O O, on the draught pole, C, substantially as and for the purpose set forth.

Fifth, The bar, E, connected by a hinge or joint, b, with the rear of the draught pole, C, in combination with the rod, F, and adjustable plate, G, for the purpose specified.

[This invention relates to a new and improved cultivator, for plowing and cultivating corn and other crops which are grown in hills or drills, and it consists in a novel construction and arrangement of parts, whereby the plows may be adjusted laterally and vertically with the greatest facility, and, at the same time, a very strong and durable implement obtained for the purpose specified.]

47,022.—Hand-mowing Machine.—G. W. Jennings, Boston, Mass.:

I claim the internal teeth, d, of the wheel, B, the pinion, D, and bevel gears, E F G, in connection with the crank pin, g, of shaft, H, and the slotted lug, i, on the sickle bar, L, all arranged to operate in the manner substantially as and for the purpose set forth.

I further claim the caps, C C, on or over the wheels, B B, with the finger bar, M, and handles, D, attached thereto, substantially as described.

47,023.—Attaching Ornamental Heads to Picture Nails.—Albert D. Judd, New Haven, Conn.:

I claim attaching the ornamental head to a picture nail or other article, by means of the disk, d, collar, b, and lug or lugs, c, as specified.

47,024.—Wheat Drill.—Gideon King, Eminence, Ky.:

First, I claim the drill board, E, in combination with the plow, as specified.

Second, I claim the feed frame, O, in combination with the drill board, E, as and for the purpose set forth.

Third, I claim the shaft, q, for connecting the drill board, E, to the plow beam, as and for the purpose described.

Fourth, I claim attaching the drill board, E, to the forward end of the plow beam by means of the propelling rods, A and e, and staple, c, as and for the purpose specified.

Fifth, I claim the feed nut, Y, in combination with the drill board, E, and wheel, I, when constructed as and for the purpose set forth.

Sixth, I claim the adjustable wedge in the heel of the drill board, E, and in combination therewith, as and for the purpose specified.

Seventh, I claim the adjustment of the wheel, I, upon the shaft, J, in combination with the drill board, E, as and for the purpose described.

Eighth, I claim the stopper, Y, and temper screw, X', in combination with the feed nut, Y, as specified.

Ninth, I claim attaching the drill board, E, to the heel of the plow by means of the curved rod, K, as and for the purpose set forth.

Tenth, I claim the adjustable plate, S, at the rear end of the drill board, E, for the purpose described.

Eleventh, I claim depositing the seed between the last furrow plowed and the furrow being plowed, as herein specified, by means of the drill board, E.

47,025.—Vessel for Boiling.—Werner Kroeger, Milwaukee, Wis.:

I claim the copper band, B, applied in the manner described to tin vessels, used for heating or boiling, for the purpose explained.

47,026.—Signal Tower.—Benj. P. Lamason and Sidney D. King, Alexandria, Va.:

First, We claim the short arms, N N, the bolster, I, when constructed and used in the manner and for the purpose herein described.

Second, In combination with the above, and with the vertical iron screws, C C C C, we claim the spur wheels, D D D D, pinion wheel, E, verticle shaft, F, and bevel gear wheels, H H, arranged and operating substantially as and for the purpose herein specified.

47,027.—Apparatus for Treating Offal, Etc.—Adam W. Louth, Philadelphia, Pa.:

First, I claim one or more boilers, H and H', with their gates or doors, in combination with the building, B, oven, D, chimney, G, and its fire-place, the whole being arranged substantially as described, so that the fumes generated by the treatment of the offal shall, before escaping to the air, be thoroughly burned and disinfected.

Second, The closed building, B, with its trucks, M and N, in combination with one or more boilers, H and H', and the oven, D.

Third, The boilers, H, combined with the reservoir, J, and the steam pipes, f f' and g, or their equivalents, arranged substantially as set forth, so that the fat rising to the surface of the water in the boiler shall be discharged into the reservoir.

Fourth, The tank, K, with the discharge pipe, i, arranged in respect to the building, B, and boiler, H, substantially as specified.

Fifth, The truck, N, with its tilting frame, o, and trays, q, constructed and operating substantially as and for the purpose set forth.

47,028.—Saddle Valise.—Robert McMurray and James S. Topham, Washington, D. C.:

We claim the springs, F, in combination with a cylindrical saddle valise, constructed and arranged substantially as described.

47,029.—Combined Planter and Cultivator.—Ives W. McGaffey, Chicago, Ill.:

I claim, First, The slotted braces, C c, in combination with the beam, A, and handles, B, for the purpose of adjusting the latter, as set forth.

Second, The reversible bevelled blocks, K J and G, when arranged to operate in combination with the beam, A, and plow standard, for the purpose of adjusting the latter, as described.

Third, The hinged division plate, X, arranged to operate in connection with the seed hopper, as and for the purpose set forth.

Fourth, The adjustable spring, P, in combination with the seed plate, L, when constructed and arranged to operate substantially as herein described.

Fifth, The combination of rod, I, plate and spring, P, arranged to operate as and for the purpose set forth.

47,030.—Apparatus for Leveling Grain in a Vessel Hold.—George Milsom, Henry Spendelow and G. V. Watson, Buffalo, N. Y.:

We claim, First, Connecting a number of scoops or shovels, A, together, by an inflexible extensible rod or stretcher, C, for the purposes and substantially as described.

Second, Connecting the ropes or chains, C', by which motion is given to the scoops or shovels, A, to the connecting rod or stretcher, C, at points between the end scoops or shovels, substantially as and for the purposes set forth.

Third, A reversible scoop or shovel, Fig. VIII., constructed and operating on the rod, as and for the purposes set forth.

Fourth, A double-acting scoop or shover, Fig. XI., constructed and operating on the rod, as and for the purposes set forth.

Fifth, The combination of the windlass barrels, F, and changing levers, I, so located and connected that a person or persons stationed in the hold of a vessel where the grain is, and having full view of the moving scoops or shovels, shall also have control of said windlass barrels and shovels, to regulate and control the movements thereof, substantially as set forth.

47,031.—Coupling Tool for Drilling.—John Robert Moore, Brooklyn, N. Y.:

I claim the improved mode of coupling, substantially as described.

47,032.—Buck-saw Frame.—Wm. Morehouse, Buffalo, N. Y.:

First, I claim the combination of the parts, A B, clips, d d, screw rod, F, and screw nut, g, or their equivalents, substantially as described.

Second, I claim a sliding bar, D, for effecting the straining of the saw blade of a buck-saw, substantially as described.

47,033.—Automatic Track Layer.—John L. Nicolai, Chicago, Ill. Antedated March 10, 1865:

First, I claim the endless belts, G, provided with hooks or their equivalents, in combination with a vehicle to be moved upon a track, constructed substantially as described, and operating substantially as and for the purposes described.

Second, I claim, in combination with the above, the elastic arms, b d and e, or their equivalent, operating as herein set forth.

Third, I claim the combination and arrangement of the endless belts, G, the wheels, F and E, with the drums, C D, and truck wheels, A, operating in the manner shown and described.

Fourth, I claim providing the wheels, F, with the pins, f, when used in combination with the planks, L, provided with the pins, r, or the hinged pins, p, arranged and operating as and for the purposes shown and specified.

Fifth, I claim the arrangement of the springs, m, with the pins, r r, the flanks operating as and for the purposes herein described.

Sixth, I claim the combination of the belts, G, provided with hooks, as aforesaid, with the planks, L, provided with the pins, l, all arranged and operating as and for the purposes specified.

Seventh, I claim the combination and arrangement of the wedge-shaped point, e, with the depression, n, and pins, o o, as and for the purposes set forth.

Eighth, I claim the manner of constructing a truck herein shown, whereby the same is made removable by sections, as and for the purposes shown.

Ninth, I claim taking up said sections of the track from the rear of the machine, and depositing them in front thereof, by an automatic mechanism, attached to a vehicle moving over said track, substantially as herein shown and set forth.

47,034.—Oil Ejector.—F. S. Pease, Buffalo, N. Y.:

I claim, First, Raising oil or other liquids from wells and other deep places by intermittent pulsative action, or repeated vibration of a confined body of air or other fluid, substantially as herein set forth.

Second, I also claim the arrangement, substantially as herein shown and described, of a double acting air pump, and a compressed air chamber, and an exhausted receiver, in combination with an air conducting pipe, e, communicating with a well tube.

Third, I also claim the arrangement of the valve chamber, A', at or near the bottom of a well tube, either within the same or connected therewith with an upper and lower valve, each opening upward, the upper valve communicating with the chamber, A', by means of a tube, m', substantially as described.

Fourth, I also claim the valves, g n, of the valve chamber, A', operated by means of the vibrations of a column of air, alternately filling the chamber with air and exhausting the same, for the purpose of raising oil and other liquids from deep wells, substantially as described.

47,035.—Medical Compound.—Ebenezer Penfield, Oberlin, Ohio:

I claim the use for medical purposes of an extract of flax prepared substantially in the manner herein set forth.

[The inventor of this compound was born Feb. 26, 1773, and is consequently over 92 years of age. The invention relates to the employment or use of the gummy and resinous substances contained in the various parts of the flax plant, prepared in various ways, and applied either externally or internally as a remedy for various diseases, such as the ring worm, cuts, bruises, burns, corns, callous skin, contracted sinews or cords, or for cough, cold in the head, fever, looseness in the bowels, diarrhea, scrofula, etc. The extract is applied in the form of liquid, or in sirup form, or in the form of snuff, or it may be used externally as an ointment.]

47,036.—Hoisting Machine.—S. B. Phelps and C. A. Slack, Norwich, Vt.:

We claim as our invention the combination of the windlass, A', the ratchets, D D', pawls, E E', the levers, C C', the sliders, F F', the screws, G G', the screw boxes, H H', or their equivalents, and the gears for connecting the shafts, the whole being arranged and applied to the frame, B, and its projections, O O', and so as to operate together, substantially as specified.

And we claim the combination or the two pawl trippers, R R', or their mechanical equivalents with the said windlass, its ratchets, pawls, levers, sliders, screws, and the connecting gears thereof, the whole being arranged in manner and so as to operate substantially as set forth.

47,037.—Wool Presses.—John W. Phillips, Randolph Center, Wis.:

I claim, First, The combination and arrangement of the side pieces, A, provided with the hooks, X, and springs, S, the center piece, C, and the end pieces, B, provided with the strips, b, when constructed and operating substantially as and for the purpose specified and set forth.

Second, The combination and arrangement of the side pieces, A, provided with the hooks, X, and springs, S, the center piece, C, and the end pieces, B, when constructed and operating substantially as described.

47,038.—Washing Machine.—S. Safford Putnam, Dorchester, Mass.:

I claim the receptacle, A, with its slats, d, so arranged as to form a continuous rubbing surface, and a chamber, F, substantially as set forth, for the purpose specified.

47,039.—Wind Wheel.—Lewis Reese, Rolling Prairie, Ind.:

I claim the combination and arrangement of the radial arms, H H, and the friction blocks, K K, so as to operate in conjunction with a friction ring or plate, G, upon the wind wheel, A, substantially in the manner and for the purpose herein set forth.

I also claim the combination of a swinging lever, O, and attached cord and weight, P, with the rear end of the sliding shaft, B, of the wind wheel, A, when arranged substantially in the manner and for the purpose herein set forth.

47,040.—Method of Preventing the Corrosion or Staining of the Surfaces of Glass.—Wm. B. Richards, New York City:

I claim the mode herein specified of protecting the surface of glass, after it has been manufactured, from corrosion and staining, as set forth.

47,041.—Coal Screen.—John A. Robinson, Pittston, Pa.:

I claim the employment or use of screens, A B, arranged substantially as shown and described, for the purpose of screening coal in its discharge to the cracker and grading screen, as set forth.

I further claim constructing the upper screen, A, with movable or adjustable bars, arranged to operate substantially as herein described.

[This invention relates to a new and improved screen for screening coal, designed more especially for screening coal preparatory to cracking the same, and it consists in constructing the screen of fixed and adjustable or sliding bars arranged in such a manner that the screen may be graduated to let through lumps of coal of greater or less size as may be required, and the dust and fine coal not necessary to be cracked not allowed, as hitherto, to pass through the cracker.]

47,042.—Hay Fork.—Wm. F. Rundell, Genoa, N. Y.:

I claim the ferule, D, fitted on the handle, C, and provided with an end, a, which projects beyond the end of the handle, and has a square hole, b, made in it, in connection with the key or wedge, E, and screw on the tang, B, of the fork—all arranged substantially as and for the purpose specified.

[This invention relates to a new and improved manner of securing the fork to the handle or "stale," as it is frequently termed, whereby the fork may be firmly secured to the handle or "stale," and the latter not weakened but rendered sufficiently strong just where strength is required, to wit, at the junction of the fork and handle.]

47,043.—Machine for Making Earthenware.—Cyrus W. Saladee, Putnam, Ohio:

I claim, First, Constructing a machine in the manner described, or its equivalent, so as to form earthenware without the necessity of weighing or measuring the clay.

Second, The hollow forming plunger, B, or its equivalent constructed and operating in the manner and for the purpose described.

Third, The feeding cylinder, A, or its equivalent, constructed and operating in the manner and for the purposes described.

Fourth, The molds, C, when constructed and operating so as to open in halves vertically as described.

Fifth, The vent pin, Q, or its equivalent, constructed and operating as described.

Sixth, The mold table, D, or its equivalent, constructed and operating as described.

Seventh, Attaching the lining, Z, to the lap edges of the molds when the lining is composed of woolen or other non-elastic fabric, and closely conforms to the shape of the mold in the manner and for the purposes specified.

Eighth, The mode described, or its equivalent, of producing letters or designs upon the earthen ware.

47,044.—Fruit Gatherer.—A. Selover, Brooklyn, Ohio:

I claim a fruit gatherer constructed and operating as herein set forth.

47,045.—Cooking Range.—Charles J. Shepard, Brooklyn, N.:

First, I claim the use or employment of flanched sectional top plates, L, for the purpose specified.

Second, I claim the flue division or diaphragm, J, arranged as shown for the purpose set forth.

Third, I claim the back flue, H, operating substantially as described for the purpose set forth.

Fourth, I claim the use or employment of the top ovens, N, for the purpose specified.

Fifth, In combination with the flue division or diaphragm, J, I claim the slide valve, I, for the purpose specified.

Sixth, I claim the interior flue bricking, K, at the outer ends of the range, for the purpose specified.

47,046.—Placer Mining.—Cornelius H. Smith, Rock Island, Ill.:

I claim, First, Washing metalliferous earths and ores by currents of water forced by steam pumps or mechanical power and delivered in jets in contact with the earth or ores.

Second, I further claim forcing water by pumps or other mechanical means for washing earths and ores under such a system of water pipes and return channels that the water is returned to its reservoir for repeated use, substantially as set forth.

47,047.—Beehives.—Orlando Sprague, Fulton, Ill.:

I claim the use of corn cobs as a lining or covering for or in connection with beehives, substantially as and for the purpose set forth.

47,048.—Pole Propeller.—Arold F. Stelle, Crossingville, Pa.:

I claim the levers, K K H H, and the propellers, S S W W, in combination with the eccentric wheel, C, and the connecting rods, E F, when the same are constructed in the aforesaid combination for the purposes set forth.

47,049.—Fire Pot for Stoves, Furnaces, etc.—Philo P. Stewart, Troy, N. Y.:

I claim the employment of a fire pot, constructed, arranged and combined in the manner substantially as and for the purposes herein described and set forth.

47,050.—Apparatus for Raising Dough.—Thomas Stockton, North Chenango, Pa.:

I claim the employment of a hot water holder, A, in combination with the dough receptacles, C, supported by rods, B, above the level of the water, substantially in the manner and for the purpose herein shown and described.

47,051.—Automatic Steam Pump.—Eli Thayer, Worcester, Mass.:

I claim the combination of the coil or heater, K, including the globe valve, H, and the check valve, I, with the main tube, A, and the other valves and pipes connected with it, for the purposes and in the manner above described.

47,052.—Grate Bars for Boilers.—Eli Thayer, Worcester, Mass.:

I claim the hollow grate bars connected with the boiler through the pipes, b b' and c c', and adapted to be cleansed by the aid of the cocks, 1 2 3, arranged in the manner substantially as herein described.

47,053.—Steam Generator.—Eli Thayer, Worcester, Mass.:

I claim the arrangement of the several parts herein described, viz. the stop cock, g, the check valve, c, the vent cock, h, the tube or pipe constituting the grate, including its connections both with the boiler and the vent cock, h, and the screen which covers and protects the grate, in the manner and for the purposes above described.

47,054.—Steam Generator.—Eli Thayer, Worcester, Mass.:

I claim, first, the method of clearing the coils of sediment by reversing the steam in them, and,

Second, The false bottom or movable plate, D, to be used in the manner and for the purposes described.

47,055.—Cultivators.—J. H. Thomas and P. P. Mast, Springfield, Ohio:

First, We claim swinging the suspenders, I I, from the top of the standards, G G, for the purpose set forth.

Second, We claim the combination of plates, H H, suspenders, I I, and standards, G G, as described and for the purpose set forth.

Third, We claim so pivoting the rock shaft, O, from which the beams, E, are suspended as that when the handle, a, is turned up and thrown forward, it shall remain in that position, and thus keep the plow suspended, without the use of any catch or other device, substantially as set forth.

Fourth, The adjustable stop, k, in combination with the adjustable stretcher, K, and suspenders, I I, substantially as set forth.

Fifth, We claim the shaft and journals, j j, in combination with the braces, f, and drag bars, F F, whereby the supplemental tooth may be readily attached, maintained in position, and allowed to swing backward when the wooden pin, e, is broken substantially as described and set forth.

47,056.—Flour Sifter.—Howard Tilden, Philadelphia, Pa.:

I claim the combination of the equi-quadrilateral shaft, C, or its equivalent, having on two or more of its corners the rubber strips, i i, or their equivalent, with the sieve, B, and the box, A, substantially as described and for the purposes set forth.

47,057.—Valve for Steam Pipes.—A. R. Treadway and S. R. Warner, New Haven, Ct.:

We claim the hinged valve, C, combined with an inclined seat, B, so as to operate substantially as and for the purpose specified.

47,058.—Combined Desk and Work Table.—Joseph Trevor, Lockport, N. Y.:

I claim as a new article of manufacture, a convertible desk and work table, consisting of the pivoted cross frames, A A', falling top, E, pivoted slat, D, and flexible bag, G, arranged and combined substantially as described.

47,059.—Flask-pins.—Barnett B. Whaley, Brooklyn, N. Y.:

I claim an adjustable flask-pin constructed with two inclined planes so arranged that by moving one of the planes upon the other the spindle of the pin can be adjusted to fit its socket in the manner and for the purposes set forth.

47,060.—Operating Parts of a Fountain Ink Stand.—Wm. A. Wheeler, New York City:

I claim the use of a diaphragm made of two thicknesses as described for fountain inkstands, in combination with the double-headed button, h i', and screw, n, and cap plate, p, arranged and operating in the manner and for the purposes herein before set forth.

47,061.—Skate Sharpener.—Fred. R. Willis, Waltham, Mass.:

I claim a file for sharpening skate iron, having either adjustible or fixed guides, and provided with a burnisher, substantially as herein described and for the purpose specified.

47,062.—Washing Machine.—Benjamin Wright, Hudson, Mich.:

I claim the rubber, e, the arms, G, the adjustable latch, J, and the thumb screws, o, the whole constructed and arranged substantially as herein set forth.

47,063.—Photographic Printing Frame.—Nathan L. English, Hartland 4 Corners, Vt., assignor to himself and Joseph F. Ladd, New York City:

I claim the combination of clamps formed by hoops or clasps hinged to the ends of springs with a printing board or pad substantially as and for the purpose herein set forth.

46,064.—Wool Press.—Ransom Greene, (assignor to Joseph Briggs,) New York City:

I claim the hinged top piece in combination with the folding sides, ends and bottom, substantially as described and specified.

47,065.—Universal Timepiece.—A. W. Hall, (assignor to B. W. Robinson and S. P. Chapin,) New York City:

I claim, first, The employment or use of the dial of a clock or watch of two or more compound or double circles marked with different places, the two parts of each circle containing respectively the figures for the hour and minute hands calculated and arranged to correspond with the longitude of the places named on the circles substantially as herein specified for the purpose of allowing the ordinary hands of the clock or watch to keep the accurate time, at different localities.

Second, Making the circles of different colors, substantially as herein described, to aid the eye in tracing any given circle to any portion of the dial.

Third, The use of a supplementary adjustable minute hand in combination with the suppementary dial arranged on the face of the clock or watch substantially in the manner and for the purpose shown and described.

Fourth, So constructing the supplementary hand attached to and revolving with the ordinary minute hand, that it can be turned, or adjusted, as described without interfering with the ordinary minute hand or with the movement of the timepiece as described.

Fifth, Placing upon the different circles the names of other places than those for which the circles are calculated, at the same time naming the variations of said additional places from the circle, as and for the purpose set forth.

47,066.—Mop.—Joel and Henry R. Lee (assignors to themselves and W. C. Calkins), Galesburg, Ill.:

We claim, First, The forked ferrule, A, and the rods, B B, substantially as and for the purpose specified.

Second, The handle, C, spring, D, head piece, E, and stirrup, F, in combination with the forked ferrule, A, and rods, B B, substantially as and for the purpose specified.

47,067.—Wrench.—A. Y. McDonald (assignor to himself and John Morrison), Dubuque, Iowa:

I claim the elongated slot, d, in the bar, G, in combination with the screw, E, sliding jaw, D, projection, f, on bar, G, spring, H, of spiral or other form, and the holes, g, in the shank, A, substantially as and for the purpose set forth.

47,068.—Process for Removing Mineral, Gummy and Resinous Substances from Vegetable Fiber.—Antoni Meucci, Clinton, N. Y., assignor to Wm. E. Rider, New York City:

I claim the improved process of treating a vegetable material by treating it first in a dry state with gaseous substances produced by the action of nitro-muriatic acid upon carbonate of lime and iron, or their equivalents; second, in a wet state, with the same substances; and third, with a caustic alkali, substantially as set forth.

I also claim the process of treating the vegetable material which has been subjected to the first two operations above recited, with a mixture of caustic alkali and oil, substantially as set forth.

47,069.—Construction of Paper Boxes.—John W. Millett, Albany, N. Y., assignor to J. A. Sumner:

I claim, First, The method substantially as described of constructing the body and top of a paper box from one piece of paper without waste, as set forth.

Second, The method of stiffening the ends of a paper box made out of one strip of paper, substantially as described.

47,070.—Machine for Making Nails for Horse-shoes.—Silas Safford Putnam and Lucius H. Dwelley, of Dorchester, Mass., assignors to S. S. Putnam, & Co., Brooklyn, N. Y.:

We claim the drawing levers, c d e f, in combination with the movable patterns, h i j k, operating substantially as set forth.

Also the levers or jaws, c d e f, arranged in pairs, the patterns, h i j k, the motion of which toward or from the nail rod is controlled by the wedges, o p, and springs, m, or other suitable mechanical device, in combination with the cut-off, Q R, or its equivalent, operating substantially as set forth.

Also, We claim placing the ends of one pair of levers in advance of the ends of the other pair, and drawing them all simultaneously over the iron, substantially as set forth, for the purpose specified.

Also, We claim in horse-shoe nail machines the use of movable patterns or formers, operating substantially as set forth, for the purpose described.

47,071.—Machine for Making Horse-shoes.—Andrew J. Roberts, Boston, Mass., assignor to Benjamin F. Brown, Dorchester, Mass. Antedated March 13, 1865:

I claim, First, The use of the heavy drop hammer, I, for hammering the top of the shoe, arranged and operated by means of the devices herein above described.

Second, Holding, covering and uncovering the shoe, for the purpose specified by means of the projecting piece, x, of vertical bar, w, and plates, z z, arranged together and operated by the downward movement of the hammer, I, substantially as herein described.

Third, Flooding the shoe with cooling liquid before taking it from the machine, substantially in the manner and by the devices described, the same consisting in surrounding the mold block with the reservoir, h', filled, or nearly filled, with water or other suitable cooling liquid, which liquid is flowed at the proper times upon the shoe by means of the plunger, i', all arranged and operated substantially as described.

Fourth, The arrangement of devices for raising and lowering the punches, c' c', for the purpose specified, the same consisting of the wheel block, e', connecting and projecting arms, f' f', and rods, g' g', operating together substantially as described.

47,072.—Valve for Steam Engine.—James E. Thorpe, Providence, R. I., assignor to himself and Francis D. Ridder, Boston, Mass.:

I claim providing the valve with a single curved seat and a single corresponding bearing therefor, and with two chambers and a partition arranged in the valve, as described, and three ports leading from the seat, and with the area or width of the bearing surface of the partition greater than the mouth of the central port, the whole being substantially as hereinbefore described.

47,073.—Valve for Steam Pipe.—S. R. Warner (assignor to himself and A. B. Treadway), New Haven, Conn.:

I claim constructing a valve plate, as described, so that it may be set in pipes, in the manner and for the purpose specified.

47,074.—Filter.—Edouard Andries, Schaerbeck, Belgium. Patented in Belgium Feb. 20, 1864:

I claim the specific combination of the filtering media, arranged in layers, as set forth, the sponge at the end of the suction pipe and the receptacle below the sponge, for retaining the impurities.

47,075.—Pump.—Thomas Rider, Valparaiso, Chili:

I claim the mud box, E, applied in combination with the suction pipe, D, and foot valve, a, in the manner and for the purpose substantially as set forth.

(This invention consists in placing the foot valve on the top of a vertical pipe passing up through the bottom of what may be termed a mud box, or of a receptacle for the deposit of foreign matter, the specific gravity of which may be greater than that of water, said mud box being provided with an outlet at or near its bottom, in such a manner that the impurities which may be carried up by the current of water are prevented from interfering with the operation of the valve, and when the mud box is full it can be readily cleaned out with little labor or loss of time.)

47,076.—Fusible Plug for Boiler.—John Smith, Wentworth Road, Etc., Great Britain. Patented in England April 14, 1863:

I claim, First, The construction of fusible plugs, with recesses or grooves, for the purpose of increasing the power of the fusible metal to resist shearing, substantially as described.

Second, The construction of fusible plugs, with an additional part which may remain screwed into, or otherwise attached to the boiler, when the part containing the fusible metal is removed, as described.

47,077.—Construction of Fagots.—Francis William Webb, Monks Chippenhall, Crewe, Eng.:

I claim forming piles for the manufacture of steel-faced rails by the combination of old rails, puddle bars, and facing slabs of cast steel, the semi-crystalline puddle bars being interposed between the steel, the semi-crystalline puddle bars being interposed between the fibrous old rails and the crystalline steel slabs, so as to combine the materials of these two by a material which partakes of the nature of each, substantially as described.

I also claim forming the piles for the manufacture of steel-faced rails by the combination of iron bars with facing slabs of cast steel provided with intermediate projections on their inner surfaces for the purpose of facilitating the welding of the steel to the iron, substantially as set forth.

47,078.—Packing Projectiles for Rifled Ordnance.—Clifford Arick, St. Clairsville, Ohio:

I claim the annular key, a', in combination with an expanding disk, a, constructed, applied, and operated substantially as and for the purpose set forth

REISSUES.

1,911.—Straw Cutter.—DeWitt C. Cumings, Fulton, N. Y. Patented Aug. 7, 1857. Reissued Nov. 8, 1859.

I claim, First, Operating the adjustable lower feed roll by means of a spur wheel hung in a vibrating frame or yoke, the axis of which is connected with the said roller by means of an universal coupling, when said roller is supported on springs so as to be elastic or yielding, substantially as and for the purpose described.

I also claim the employment of a cylinder, provided with a knife or knives which have an upward cylindrical cut, when the same is arranged with two independent feed rollers, the lower one of which is supported on a spring or springs, substantially as and for the purpose herein described.

1,912.—(Div. 1.)—Horse Rake.—Chas. Mason, Robert W. Fenwick and DeWitt C. Lawrence, Washington, D. C., assignees by mesne assignment of Harvey W. Sabin, Canandaigua, N. Y. Patented Dec. 3, 1850. Extended seven years from Dec. 3, 1864:

We claim, First, An oscillating horse hay rake, which discharges its gathered load by the draft or power of the team, substantially as described.

Second, A wheeled horse hay rake, both capable of discharging its gathered load upon the ground by the draft of the team, and automatically resetting itself to gather a fresh load, substantially as described.

Third, An oscillating horse rake (the teeth of which do not rotate with their shaft), so constructed that its teeth may either be elevated by the draft of the team or by the attendant, substantially as described.

1,913.—(Div. 2.)—Horse Rake.—Chas. Mason, Robert W. Fenwick and Dewitt C. Lawrence, Washington, D. C., assignees by mesne assignment of Harvey W. Sabin, Canandaigua, N. Y. Patented Dec. 3, 1850. Extended seven years from Dec. 3, 1864:

We claim, First, Arranging rake teeth directly on the axle of the carriage wheels, and so that they can articulate upon said axle, for the purpose set forth.

Second, Arranging an oscillating bar for raising rake teeth, directly on the axle of the carriage wheels, and so that it can articulate on said axle, for the purpose set forth.

Third, Arranging an oscillating bar for exerting pressure upon rake teeth, upon the axle of the carriage wheels, and so that it can articulate on said axle, for the purpose set forth.

Fourth, Arranging an oscillating pressure lever, or a coupling lever on the axle of the carriage wheels, and so that either or both can articulate on said axle, for the purpose set forth.

Fifth, Arranging a clearer to rake teeth directly upon the axle of the carriage wheels, said axle extending entirely across the carriage frame, and so that it can articulate or oscillate on said axle, for the purpose set forth.

1,914.—(Div. 3.)—Horse Rake.—Chas. Mason, Robert W. Fenwick and DeWitt C. Lawrence, Washington, D. C., assignees by mesne assignment of Harvey W. Sabin, Canandaigua, N. Y. Patented Dec. 3, 1850. Extended:

We claim, First, The application of pressure, at the will of the operator, to metallic spring rake teeth, which are so constructed as to have a spring action within themselves from their gathering ends to the point, or forward thereof, where the pressure is applied, to hold them down to their work, substantially as herein described.

Second, The combination of independently articulating rake teeth, which are springs within themselves, and a pressure contrivance, which is under the control of the operator, substantially as and for the purpose herein described.

1,915.—(Div. 4.)—Horse Rake.—Chas. Mason, Robert W. Fenwick and DeWitt C. Lawrence, Washington, D. C., assignees by mesne assignment of Harvey W. Sabin, Canandaigua, N. Y. Patented Dec. 3, 1850. Extended:

We claim arranging rake teeth on articulating tubular, laterally-bracing and vertically-supporting eye bearings, so that the attaching end of each tooth shall cross or intersect a vertical plane passing longitudinally through the axis of the bearings, substantially as described.

1,916.—(Div. A.)—Die for Carriage Bolt.—Wm. J. Clark, Southington, Conn. Patented Aug. 2, 1864. Antedated Feb. 2, 1864:

I claim the combination and use of metallic dies, for the purpose of giving an angular shape or form to a portion of a cylindrical bolt, by compression laterally, leaving the remaining portion of the bolt in its original round form, and which dies also serve the purpose of an anvil, upon which the head of the bolt is formed, by upsetting a projecting portion thereof, substantially as described.

1,917.—Bolt.—Wm. J. Clark, Southington, Conn. Patented Aug. 2, 1864. Antedated Feb. 2, 1864:

I claim a bolt made from a round rod or bar, a portion of which bolt shall be square or angular, and a portion round, as in the rod or bar, and so that the sectional areas of the square and round portions shall be similar, the diameter of the round greater than the distance from face to face of said square portion, and the distance from corner to corner diagonally of the square portion be greater than the diameter of the round, substantially as described.

1,918. Rendering Artificial Light the same as Daylight.—Noah H. Gillet, New York City. Patented January 19, 1864:

I claim rendering artificial light the same color or effect as daylight, by an intervening glass of the color specified.

And in combination therewith, I claim the employment of a reflector, substantially as specified.

1,919.—Hominy Mill.—R. E. Richardson (assignee by mesne assignments of J. B. Gowdy and J. A. Welsh), Xenia, Ohio. Patented Aug. 11, 1857.

I claim, First, Constructing a hominy mill with a series of chambers or compartments, placed one above another, substantially as specified.

Second, In combination with a series of compartments, as described, I claim the central openings for the passage of the grain, substantially as set forth.

Third, I claim the beaters, f, when arranged to operate in connection with a series of chambers, as herein described.

Fourth, I claim the tubular shaft, C, arranged to operate as set forth.

Fifth, I claim the deflecting flanges, e, or their equivalents, when arranged and operating substantially as herein set forth.

1,920.—Fruit Can.—Wm. W. Lyman, West Meriden, Conn. Patented June 10, 1862:

I claim, First, The combination of the can with a stopper of such size relatively to the neck of the can as to admit between the neck and stopper an elastic packing ring of the requisite thickness to permit the introduction of a pin at its side, substantially as set forth.

Second, The combination of the said can and the stopper with a flange, substantially as set forth, to prevent the skewing or displacement of the packing ring when the stopper is applied to the can

Third, The combination of the stopper of the jar with a flange situated beneath the position of the packing ring, substantially as set forth.

Fourth, The recess in the flange to permit the introduction of the pin at the side of the packing ring which is overlapped by the flange, substantially as set forth.

1,921.—Horse Rake.—Gideon Peirce, Ercildown, Pa. Patented Nov. 29, 1859. Reissued March 22, 1864:

First, I claim a toothless revolving axle supporting the main frame, and provided at any point between the ground wheels with a wheel or roller for raising the rake teeth, when used in combination with teeth pivoted in the rear of the said axle, and drawn up by leverage, substantially as herein described.

Second, I claim the vertically adjustable bar, G, extending partially or wholly across the machine, supported upon guide pins, g g, and provided with vertical mortises through which the teeth pass, substantially as set forth.

Third, I claim the combination of the rocking frame, d, the rack, e, and the lever, I, for raising the teeth by the power of the horse, substantially in the manner described.

1,922.—Process for Extracting Tanbark.—S. W. Pingree, Lawrence, Mass. Patented March 1, 1864;

I claim, First, The within described process of extracting tanbark by first swelling the bark with water or weak tan liquor and heating it with steam, and afterward steeping with cold water or weak tan liquor, substantially in the manner set forth.

Second, Introducing steam into the bark contained in a leach at different points through a pipe, D, in the manner and for the purpose substantially as described.

1,923.—Hulling and Scouring Machine.—Oliver P. Stevens, Cleveland, Ohio. Patented July 1, 1856:

I claim, First, The use or employment of perforated revolving fans or beaters for the purpose of hulling or scouring grain, seeds, etc.

Second, Lining and arming the fan or beater wheel casing with teeth, substantially as described, for the purposes set forth.

Third, The arrangement of the upper section of the fan or beater wheel casing, c, in relation to the chimney, O, in combination with the fans or beaters, f g, and guides, l' l', combined as described, and operating in the manner and for the purpose herein before described.

Fourth, The adjustable guides, l' l', combined as described, and operating in the manner and for the purpose herein before described.

Fifth, The air passages or chambers, B B, arranged in each end and on top of the fan or beater wheel casing, in combination with the vertical trunk, B', as herein described, and for the purposes specified.

Sixth, The valve, F, operated in the manner described, in combination with the chimney, O, for the purpose specified.

Seventh, Pulverizing friable substances by means of revolving beaters, surrounded with a casing, substantially as described.

1,924.—Amalgamator.—Thomas Varney, San Francisco, Cal. Patented Dec. 16, 1862:

I claim the curved plates, constructed substantially in the manner and for the purpose set forth.

DESIGN.

2,040.—Standard or Bullion Scale.—Lindsay J. Howe and John V. Bouvier, New York City.

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-THIRD 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 *seventeen 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 the three last 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.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

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.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many

millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

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, &c., 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 F 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 VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars 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. 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.

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.

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 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.

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	$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

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 assignments 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.

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 thing 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 no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars 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.

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.

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.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

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 at 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.

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.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

A. M. B., of Pa.—Elastic sandals such as you propose have been in use for years.

W. H. H., of Cal.—We shall publish your interesting letter. Vol. XII., No. 4, is out of print, as are also several back numbers of Vol. XI.

J. C. B., of Wis.—Matches are made with stearine the same as those with sulphur. The flame of phosphorus is not sufficiently hot to set wood on fire, and sulphur is therefore used to perform this office, but paraffine or stearine may be substituted. Binoxide of lead is sometimes employed to furnish oxygen for the combustion.

Y. C., of N. Y.—To obtain pure oxide of zinc place some zinc in one crucible and cover with another, luting the joint with clay. Then place in a furnace and heat red hot.

W. L. Z., of Pa.—Cocoa-nut oil is soluble in alcohol, benzole, and in the fatty and essential oils.

A. E. S., of N. Y.—At a guess we should say a three-bladed screw, eighteen inches diameter and thirty inches pitch, would be ample for your engine, but you have not sent any dimensions either of your boat or the size of the cylinder. The size of a screw can only be determined by the area of the immersed midship section, and the pitch by the work to be done—by this is meant, whether speed or hard work, such as towing, is desired. An engine of one-horse power means nothing; any cylinder from two to ten inches may be one-horse power. If you tell us the size of your cylinder and length of the stroke we shall be bet er able to judge whether a boat twenty feet long is too large or too small.

G. F. M., of Mo.—Address J. E. Stevenson, No. 200 Broadway, for a turbine wheel.

N. S., of Mass.—Suppose the base line in measuring a degree were measured by a stick cut by chance at any length, when the number of times that this stick was contained in an arc was known, could not the 1-10,000,000th of the arc be ascertained? For seventy years the world of science has been engaged in long-winded discussions of the comparative advantage of the foot and meter as units of measure; in our opinion the question is settled by the meter being the unit in the decimal system of so large a part of the civilized world. Practically the standard is not the fraction of an arc, but the measures in general use.

C. E. S., of Tenn.—The ball would return to the earth with the same force with which it left.

C. B. D., of Conn.—Your belt will work with a half twist. You may set the center of both pulleys in line, or a little above or below it; if the pulleys have a full rounded face the belt will keep its place, even if the centers do not coincide.

J. McD., of Vt.—It will cost $25 to have the sediment from the hair oil analyzed.

C. H. M., of Vt.—Files re-cut with sulphuric acid are worthless. The first rub grates the teeth all off.

J. R. W., of Ill.—You had better try the twist drills you speak of. We have found them superior tools. We refer you to our advertising columns for further information.

E. K. C., of Me.—If you will look in our advertising columns you will see an advertisement of the Delaware Literary Institute; by corresponding with the teachers you will learn more than we can tell you.

P. H. C., of Conn.—We know of no silver-plating fluid good for anything. These generally attack the copper when used on brass, and leave a thin surface coat of tin, which is soon worn off.

F. H., of Ill.—It is customary to cover iron rods with brass by drawing a thin coating or tube over the rod.

E. J., of C. E.—A six-inch belt is ample to transmit six-horse power. Five inches will answer if the speed is high.

J. C., of Mass.—The article of Baron Liebig for invention was taken from the *Irish Agricultural Review;* we know nothing further concerning it.

T. P. H., of R. I.—The eccentric is always in one position with reference to the crank, no matter what the kind of engine, upright or horizontal.

C. A. S., of Conn.—Cast-iron sustains 100,000 pounds pressure to the square inch without disintegration; brick sustains 562. You can judge which is best for a column.

A correspondent from Montpelier, Vt., sends us a sketch of an improved grate for sugar arches, which appears to be novel and useful, but he failed to sign his name to his letter, therefore we cannot correspond with him on the subject.

James Emerson writes to us from some unknown place and sends a model of a projectile. We should write to Mr. Emerson if we knew where to address him.

J. R. M., of Tenn.—You can probably get your gutta-percha scraps into a single mass by dissolving them in benzine, rolling into a thin sheet, and drying.

S. S. W., of Pa.—We have published all the facts in relation to magnesium. The claim of the British to the discovery of anasthæsia is ridiculous.

W. S., of N. Y.—According to the experiments of Morin the friction on a long axle is the same as on a short one, provided the size of the axle and the load or aggregate pressure are the same in both cases. In reply to your question, "Which of two truck journals would run the easiest—one of the present style of construction, with the wheel tight on the axle journal, 2¼ inches in diameter by 5½ inches in length, with the bearing on the top of the axle and a wheel 33 inches in diameter; or one with the wheel loose on the axle, with a journal 3½ inches in diameter by 15 inches in length, with the bearing on the bottom—diameter of wheel 33 inches?" we should say there would be no difference in the friction.

E. J. C., of N. Y.—If a south wind melts ice faster than a heavy rain we suppose it must be because the wind is warmer than the rain.

D. S., of Mass.—It is very singular that Messrs. W. D. Andrews & Co. could not tell you where oscillating engines are used in steamboats, since they are now putting in a pair in a small boat 90 feet long, just launched on the Harlem River. There are hundreds of oscillating engines in this country in tug boats and steamboats of all classes. If you can get on any of the new revenue steam cutters you will see some fine ones. There must be a number of them in Boston also.

R. W., of U. S. N.—No person in Government employ, except persons holding office at the Patent Office, are, by reason of such employment, prevented from taking out patents. We are constantly taking out patents for officers and men in the army and navy.

G. W. S., of C. W.—Messrs. T. Kingsford & Son, of Oswego, N. Y., are manufacturers of starch on a large scale. There are also five manufactories in Stowe, Vt. You can get the address of the proprietors by writing to the postmaster.

F. D. S., of Wis.—The little article on the appearance of the sun at the north pole was written in this office by one of the editors, and if you wrote the same article it is a very extraordinary coincidence.

T. B., of Mo.—You will find a small turbine better for your purpose than a Barker mill. Write to some of the manufacturers.

Geo. F. Warren, of Boston, Mass., wants to correspond with some one who can raise a vessel sunk in 42 feet water.

A. E. T., of Ohio.—You will find an admirable treatise on electricity in Silliman's Philosophy, published by H. C. Peck and Theo. Bliss, of Philadelphia.

G. H. M., of N. Y.—You can remove iodine from cloth with alcohol if you apply it promptly.

F. D., of N. Y.—At the level of the sea, water can be raised by suction about 34 feet; the valve, therefore, attached to your pump rod cannot be at a greater hight than this. The hight to which the water may be lifted above the valve is limited only by the strength of the materials.

A. J., of Md.—The discovery of a practical cure for rancidity of butter would be a fortune.

W. A. M., of Pa.—To prepare the surface of paper so that by moistening it it will adhere to other paper unprepared, you have only to wash the surface with British gum or mucilage and let it dry.

A. B. K., of Mass.—India-rubber can be dissolved to a soft paste in petroleum naphtha or benzine. In thin sheets it is transparent when it first exudes from the tree, but becomes opaque by exposure to the air. We do not know Geo. B. Brayton's address.

F. G., of R. I.—It is not new to bevel the inside edges of window bars so as to cause the moisture to run off.

J. C. M., of Pa.—We don't know any queensware manufactory in this country.

R. M. V., of Md.—We have not been able to find a reliable receipt for enameling artificial legs.

G. D. C., of Conn.—"Glazing" knife blades, as we understand it, refers to giving them the final polish on a buff or crocus wheel. Dana's Mineralogy is the book you want. Address D Appleton & Co., N. Y.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

SPECIAL NOTICE TO INVENTORS.

The money receipts on account of patent business, which have heretofore been published in this column, and the notification of cases sent to the Patent Office, will for the present be discontinued. The receipt of specifications and money from inventors will be acknowledged promptly by mail.

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 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

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."

VOLUME IV., AND VOLUME XI., (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., VII., 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.

F. B. HUNT'S HOOSIER FODDER CUTTER—PATENTED in the United States and Europe; the most popular cutter in use; it cuts with equal facility hay, straw and corn fodder; is simple and durable, and can be worked with ease by a boy of ten years, having the most simple and complete change of feed, cutting any length desired. This machine was patented Jan. 5, 1864, and was exhibited at twenty different State and County Fairs, at which it took 18 first and 2 second premiums. In each case of failure to get the first premium the committees were divided—self-interest controlling the majority. Seldom has there anything become so suddenly popular and profitable as the Hoosier Fodder Cutter. All who have had any real experience or observation in the matter pronounce it a fixed fact—a success beyond all controversy. Although it has been but a short time since this machine was introduced, it has been conclusively proven that the fodder from an acre of corn cut or chaffed by this machine is worth the entire cost of making the crop. Machines and shop rights to manufacture for sale by TOBIAS, LANE & CO., Richmond, Ind. 15

WATER WHEELS.—J. E. STEVENSON, NO. 200 Broadway, N. Y., Hydraulic and Mechanical Engineer and Manufacturer of the HELICAL TURBINE WATER WHEEL. Particular attention paid to the improvement of Water Powers and Mill Sites. Surveys made; Plans, Specifications and Estimates furnished. General Agent for the purchase and sale of all kinds of Mill Property and Machinery. Contracts for furnishing Turbines, Mill Gearing, Shafting, Pulleys and all Iron Work for Cotton, Woolen, Grist and Saw-mills. 15 3*

VALUABLE DISCOVERY.—IT HAS BEEN ASCERTAINED that Railroad Ties may be preserved for a great length of time by the application to them of a composition discovered and lately patented by B. S. FOREMAN, Architect and Builder, at Morrison, Ill. 15 6*

I WISH TO DISPOSE OF ONE-FOURTH OR ONE-HALF of my Improved Magazine Fire-arm; fires 23 shots; cal. 54, and is operated by the hammer alone. Now in process of being patented. Address A. M. CONNETT, Box 648, Madison, Ind. 1*

NEEDLES.—LAND'S NEEDLE CO., MANUFACTURERS of Machine Spring Needles. These needles are made by patented machinery, and consequently we claim a uniformity of spring which cannot be obtained in the ordinary way of making. Address, with two samples inclosed, LAND'S NEEDLE COMPANY, Laconia, N. H. 15 tf

MACHINIST'S TOOLS AND BUSINESS FOR SALE, in Springfield, Mass., now doing a large and profitable business. For full particulars address Box 1066 P. O., Springfield, Mass. 15 4*

FOR SALE—A ROTARY STEAM POWER PUNCHING and Raising Press, with eight sets of dies complete, for tin box and can work. Address Box 848 Post-office, Philadelphia. 15 6*

NEW STEAM ENGINE FOR SALE—250 H. P., HORIZONTAL; cylinder 6 feet stroke, 30 inch diameter. Built at the Burdon Iron Works, Brooklyn, N. Y., where it may be seen. Apply to A. & P. ROBERTS & CO., Philadelphia, Pa., WILLIAM LILLY, Mauch Chunk, Pa., THOMAS BARBER, Allentown, Pa., or HUBBARD & WHITTAKER, Brooklyn, N. Y. 15 12

CAN I OBTAIN A PATENT?—FOR ADVICE AND instructions address MUNN & CO., No. 37 Park Row, New York, for TWENTY YEARS Attorneys for American and Foreign Patents. Caveats and Patents quickly prepared. The SCIENTIFIC AMERICAN, $3 a year. 30,000 Patent Cases have been prepared by M. & Co.

RARE CHANCE.—VOLS. I., II., III., IV., V., VI., complete, new series, SCIENTIFIC AMERICAN, bound with morocco, back and tips, and marbled paper covers, illuminated, for sale reasonable. Address with return postage stamp, U. L. S., No. 37½ Washington avenue, Albany, N. Y. 1

GREAT INVENTORS—FULTON, STEVENSON, Davy, Gottenburg, Archimedes, Daguerre, Morse, Whitney, Arkwright, Watt, with Portraits and descriptions. Also, Maj.-Gen. Terry, Miss Butt, Baron Cuvier, Sir John Herschel, Newton, Buffon, Howard, Buxton, Combe, Eustache, Gottfried, Burnett in his Comic Physiognomy, with 18 illustrations, P. Benson, Sr. EYE GLANCES ON BROADWAY—Illustrated; Color of Eyes, Blue, Brown, Black, Hazel; Size of the Eye; Place of the Iris; Curves of the Eyelids; Eyelashes. CHOICE OF OCCUPATION, or Pursuits in Life; What can the Boys do Best? Hippocrates and the Temperaments; Crazy Phrenologists RELIGIOUS—The "Still Small Voice;" Skepticism; Veneration; The Law of Progress; Color Blindness; Noses. REPORTERS AND REPORTING, with Portraits of MEMORY WOODFALL and JAMES PERRY. PSYCHOLOGY—A Lunatic's Experience; Chaos in the Brain; Longing to go up; Ride among the Stars; Visiting Jupiter; Coming to himself; Body Life and Soul Life. ETHNOLOGY—Nature in History; Climate and Vegetation; Climate and Color; North and South; Mixing the Races; How the Races die out. OUR SOCIAL RELATIONS—Matrimony; Let Girls be Girls; A Lesson for Wives; Marrying for show. With 57 engraved illustrations. PHRENOLOGICAL JOURNAL for APRIL. A Double Number. Only 20 cents by first post, or $2 a year. Newsmen have it. Address Messrs. FOWLER & WELLS, No. 389 Broadway, N. Y. 15 2*

CHIEF QUARTERMASTER'S OFFICE, }
No. 1139 Girard street, Philadelphia Depot March 27, 1865. }

SEALED PROPOSALS WILL BE RECEIVED AT this office till TUESDAY, April 4, 1865, at 12 o'clock M., for delivering at the Schuylkill Arsenal, in merchantable packages (cases to be made to conform to specifications at this office):—

Wool Blankets, army standard.
Haversacks, do.
Canteens, do.
Cavalry Guidons, do.
Cavalry Standards, do.
National Colors, Infantry, do.
Regimental Colors, Infantry, do.
Artillery Trumpet Cords and Tassels, do.
⅛-inch Dark Blue Worsted Lace, do.
½-inch Dark Blue Worsted Lace, do.
1⅛-inch Dark Blue Worsted Lace, do.
⅛-inch Yellow Worsted Lace, do.
⅛ inch Yellow Worsted Lace, do.
1⅛-inch Yellow Worsted Lace, do.
⅛-inch Scarlet Worsted Lace, do.
1⅛-inch Scarlet Worsted Lace, do.
⅛-inch Sky-Blue Worsted Lace, do.
⅛-inch Scarlet Silk Lace, do.
Ax Handles, do.
Hatchet Handles, do.
Regimental General Order Books, do.
Regimental Letter Books, do.
Regimental Descriptive Books, do.
Target Practice Books, do.
Great Coat Lining, sample required.
Sack Coat Lining, do.

Parties offering goods should make separate proposals for each article offered, and must distinctly state in their bids when they will commence their deliveries, the quantity they propose to furnish each week, the price (*which should be written both in words and figures*), and conform to the terms of this advertisement, *a copy of which should accompany each proposal.*

Standard samples of the articles required may be seen at this office.

Samples, when submitted, must be marked and numbered to correspond with the proposals; and the parties thereto must guarantee that the goods shall be, in every respect, equal to army standard, otherwise the proposals will not be considered.

Bids will be opened on Tuesday, April 14, 1865, at 12 o'clock M., and bidders are requested to be present.

Each bid must be guaranteed by two responsible persons, whose signatures must be appended to the guaranty, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.

All proposals should be made out on the regular forms, which will be furnished on application at this office.

The right is reserved to reject any bid deemed unreasonable, and no bid from a defaulting contractor will be received.

Indorse envelope "Proposal for (here insert the name of the article offered)" and address Col. WILLIAM W. McKIM,
1 Chief Quartermaster, Philadelphia Depot.

CHIEF QUARTERMASTER'S OFFICE, }
No. 1139 Girard street, Philadelphia Depot, March 31, 1865. }

SEALED PROPOSALS WILL BE RECEIVED AT this office till MONDAY, April 10, 1865, at 12 o'clock M., for delivery at the Schuylkill Arsenal, in merchantable packages (cases to be made to conform to specifications at this office),

3-4 Canton Flannel for Drawers, army standard.
Stockings, do.
Pegged Boots for Cavalry, do.
Pegged Bootees for Infantry, do.
Hospital Tents and Flies, do.
Forage Caps, do.

Samples of the standard articles required may be seen at this office.

Parties offering goods should make separate proposals for each article offered and must distinctly state in their bids when they will commence their deliveries, the quantity they propose to furnish each week, the price (*which should be written both in words and figures*), and conform to the terms of this advertisement, *a copy of which should accompany each proposal.*

Bids will be opened on Monday, April 10, 1865, at 12 o'clock M., and bidders are requested to be present.

Each bid must be guaranteed by two responsible persons, whose signatures must be appended to the guaranty, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.

All proposals should be made out on the regular forms, which will be furnished on application at this office.

The right is reserved to reject any bid deemed unreasonable, and no bid from a defaulting contractor will be received.

Indorse envelope, "Proposals for (here insert the name of the article offered)," and address Colonel WILLIAM W. McKIM, Chief Quartermaster,
15 2 Philadelphia Depot.

Q. M. GENERAL'S OFFICE, WASHINGTON, March 30, 1865.

ARMY SUPPLIES.—SEALED PROPOSALS WILL be received at the office of Army Clothing and Equipage, New York City, until 12 o'clock M., on WEDNESDAY, April 5th, for furnishing by contract at the Depot of Army Clothing and Equipage, New York,

One Hundred and Fifty Sets Six-mule Wagon Harness Complete, in Good New Boxes, to be made according to specification, which can be seen at the Office of Army Clothing and Equipage, New York City.

Bidders will state the quantity they propose to furnish, and the shortest time in which they can deliver.

All proposals should be accompanied by a proper guaranty for the faithful performance of a contract.

The right is reserved to the United States to reject any part or the whole of the bids that may be deemed objectionable.

Proposals should be indorsed "Proposals for furnishing Harness," and addressed to Bt. Brig.-Gen. D. H. VINTON,
1 D. Q. M. Gen., New York City.

LABORATORY OF INDUSTRIAL CHEMISTRY—Advices and consultations on Chemistry applied to Arts and Manufactures, Metallurgy, Etc., Plans of Factories, Drawings of Apparatus, Analysis and Commercial Assays. Address Prof. H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1

PETROLEUM.—PLANS OF OIL FACTORIES, PROCESSES to Manufacture, Purify, Refine, Deodorize and Discolorize Petroleum Oils, Recipes to Prepare Lubricating Oils, Paraffine, Benzine, Colors of Coal Tar, Examination of Oil Lands, and Analysis of Raw Material, Etc. Address Prof. H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1

INCRUSTATION.—WINANS' POWDER REMOVES and prevents scale—a certain remedy at trifling cost; beware of imitations. References everywhere. H. N. WINANS, N. Y. 15 4*

PLATINA—WHOLESALE AND RETAIL—FOR ALL purposes. H. M. RAYNOR, Importer, No. 748 Broadway, New York. Platinum Scrap of any sort purchased. 15 4*

PLATINA PLATE AND WIRE—BEST FRENCH IMPORTED, by SAML. S. WHITE, No. 658 Broadway. 15 4*

THE ADVERTISER, WHO HAS HAD A LENGTHY business experience, purposes shortly to visit the cities of Europe, and will assume charge of the introduction of a few American manufactures—patent rights, etc., which may be entrusted to him. Communications, stating particulars and address, may be addressed P. M. F., Box 1232, P. O., New York. 15 2

HORSE-SHOES.—JOHNSON'S PATENT HORSE-SHOES attached to the hoof without nails are the best shoes for an interfering or cutting horse. Illustrated in SCIENTIFIC AMERICAN, Vol. XII., No. 14. For particulars address JOHN M. JOHNSON, Station D, New York. 15 2*

WANTED—A FOREMAN IN A FOUNDERY AND Manufacturing Establishment. Address P. O. Box 367, Cincinnati, Ohio. 1*

THE UNION MOLDING MACHINE—BEST IN USE.—For circulars address H. A. LEE, patentee, Worcester, Mass. 15 4*

PHILOSOPHY.—WOULD LIKE A SITUATION TO teach Mental and Natural Philosophy. If I do not teach better than any other man can I will not ask anything for my services. Address J. SPEAR, M. D., Royalton, Boon Co., Ind. 15 2*

W. BAILEY & CO., PROVISION BROKERS, NO. 40 West Fourth street, Cincinnati. Orders for Provisions, Lard, Tallow, Grease, Oils, Etc., carefully and promptly filled. 1

THE TURBINE FAN BLOWER—A NEW INVENTION—Patent applied for. The best Fan Blower ever made for Steamers, Forges, Founderies, or for any purpose requiring a strong blast of air; does not require a high speed; is more durable, and can be driven with much less power, than any other Fan Blower now in use; costs not much more than other kinds. Manufactured by MARVIN SMITH, New Haven, Conn. Send for circular. 14 5*

BABBITTONIAN PENMANSHIP.—"THE MOST beautiful and scientific of systems. * * Magnificent, and worth $5 instead of $1 50.—[Jour. and Mess.

"The latest invention and the best. By its aid any one twelve years old can make a first-class penman without schools or teachers."—[Chris. Herald.

"Beautiful copies for practice. The whole art of penmanship is fully explained and illustrated. To all mechanics and young men whose opportunities are limited this system will be found highly valuable, while for family use among children it is most useful. By its aid we think that almost any one may learn to write in good style, without an instructor."—[Scientific American.

"The best-arranged and most scientific system extant."—M. J. Francisco, Pres. Business College.

Gold medals to be awarded in July for the greatest improvement from these copies. The system complete, consisting of 90 copies, on card board slips, illustrated by 60 wood cuts and a chart, sent, postpaid, for $1 50; 36 beautiful Babbittonian Pens, prepaid, for 50c.; one gross for $1 50, or the Penmanship and 72 pens for $2. Unequalled inducements to Agents and Teachers. Address BABBITT & WILT, No 37 Park Row, N. Y. 1*

FOR SALE.—ENGINES, ONE 14 BY 36, WITH TUBULAR Boilers, 16 by 36; 3 heavy Cylinder Boilers, 18 by 42, with 4 heavy Cylinder Boilers, Shafting, Pulleys, Hangers, Belting Saws for sawing marble. Any part for sale cheap, at DAVIS'S MACHINERY YARD,
14 2* Nos. 17 and 19 Morris street, Jersey City.

JOSEPH A. MILLER, MANUFACTURER AND PATENTEE. Improved fire fronts for boilers, superior to any others in use. Improved Argand furnace; saves from 20 to 40 per cent in fuel; burns smokeless; indestructible grate bars for steamship, steamboat, locomotive and other furnaces. Office 20 Broadway. 14 4*

WARDWELL SUPERIOR PATENT SAW BENCHES, made by J. Goodrich, licensee, Fitchburg, Mass. Circulars free. 14 3*

PATENT EXCHANGE, NO 229 BROADWAY, NEW YORK.—Patents and manufactured articles introduced and sold on commission. (14tf) THOMAS G. ORWIG & CO.

ATTENTION, DEALERS IN WHEEL STOCK.—THE Jacobs Wheel Company are prepared to buy seasoned Wheel Stock, of prime quality, for cash, in any quantity, such as hubs, spokes, fellies, bent rims, hickory swamp, etc. Address the JACOB WHEEL COMPANY, No. 90 Wall street, or 145 and 147 Bank street, N. Y. 14 3*

IMPORTANT TO METAL WORKERS.—THE STANDARD Twist Drills sold by us cannot be made by individuals at anything like the price we sell them for. A trial will convince all. They are now used in the U. S. Navy Yard, and in the largest machine shops. All sizes from 1-32 to 1½ inch; straight and taper shanks. Small sizes sent by mail. Also sockets to match.
Address MANHATTAN FIRE ARMS CO.,
13 3* Newark, N. J.

WANTED—A SITUATION TO LEARN THE MACHINIST TRADE—the manufacture of steam engines preferred. Address F. L. STONE, Stoughton, Mass. 13 3*

FOR SALE—A WROUGHT-IRON SHAFT—BEST quality—hammered; whole length twenty and one-half feet; eleven and one-half inches diameter. Bearings (at each end) fourteen inches long, ten inches diameter, with pillar blocks and boxes. PEASLEE & CARPENTER,
13 5* Copake Iron-works, N. Y.

SOLID EMERY WHEELS, SILICATE OR VULCANITE, of every size, promptly made or shipped from stock. N. Y. EMERY WHEEL CO., No. 94 Beekman street, New York. 13 4*

CLARK'S PATENT FERULES FOR LEAKY BOILER TUBES.—Illustrated No. 9, Vol. XII., SCIENTIFIC AMERICAN.
12 8* E. CLARK, No. 321 Spring street, New York.

FOR SALE—RIGHTS FOR PORTER'S REST AND Blacking Box. Illustrated Vol. XI., No. 21. Address J. H. PORTER, No. 415 Hudson street, N. Y. 14 3*

THE PYRO PNEUMATIC FURNACE, FOR MALT Kilns, Drying Rooms, Dessicating Cotton, Woolen, Hat and Print Works, Laundries and Sugar Refineries. Gives perfectly dry heat with half the fuel; is cheaper and better than steam. JOSEPH A. MILLER, C. E., No. 200 Broadway, N. Y. Combustion, Heat, Drying and Ventilation Specialities. 14 4*

FAN BLOWERS.—DIMPFEL'S, ALDEN'S, POTTER'S and others, of all sizes, on hand, for sale, by LEACH BROTHERS, No. 86 Liberty street, New York. 13 3*

MALLEABLE CASTINGS, GREY IRON CASTINGS, Galvanized Castings of every description to order.
JAMES L. HAVEN & CO.,
10 10* Cincinnati, Ohio

PARTIES IN AMERICA HAVING VALID LETTERS Patent for Great Britain, and wishing to dispose of the same, or negotiate for royalty, may address CHARLES POMEROY BUTTON, Nos. 142 and 143 Cheapside, London, England.

N. B. The object of this advertisement is to obtain control of a few meritorious inventions already patented in Great Britain, and no application from inventors will be entertained except their invention shall have been provisionally protected prior to the publication of the invention in America.

For references apply to any Mercantile Association or Trade Protective Society in Great Britain. 12 12*

WANTED—TO CORRESPOND WITH SOME PERSON or Manufacturer who has for sale or manufactures Rivet-making machines, which can be used to make rivets from 3-16ths 3-8th inch. Address R. H. W., P. O. Box 132, Reading, Pa. 12

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, whatever kind, can have their inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. It is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN.
No. 37 Park Row, New York City

OFFICE A. A. PROVOST-MARSHAL-GENERAL, AND SUP'T VOLUNTEER RECRUITING SERVICE SOUTHERN DIVISION OF NEW YORK, NEW YORK, March 20, 1865.

THE FOLLOWING CIRCULAR IS PUBLISHED FOR the information of those concerned.
RICHARD I. DODGE, Major 12th Infantry, A. A. P. M. General.

WAR DEPARTMENT. PROVOST-MARSHAL-GENERAL'S OFFICE, WASHINGTON, D. C., March 11, 1865.

CIRCULAR No. 6.—In conformity with the proclamation of the President herewith published, all officers and employees of this Bureau are instructed to give prompt attention to the receiving and forwarding of such deserters as present themselves in accordance with its provisions.

"BY THE PRESIDENT OF THE UNITED STATES OF AMERICA:

"A PROCLAMATION.

"Whereas the twenty-first section of the act of Congress, approved on the third instant, entitled 'An act to amend the several acts heretofore passed to provide for the enrolling and calling out the national forces, and for other purposes,' requires, 'that in addition to the other lawful penalties of the crime of desertion from the military or naval service, all persons who have deserted the military or naval service of the United States who shall not return to said service, or report themselves to a Provost-Marshal within sixty days after the proclamation hereinafter mentioned, shall be deemed and taken to have voluntarily relinquished and forfeited their rights of citizenship and their rights to become citizens, and such deserters shall be forever incapable of holding any office of trust or profit under the United States, or of exercising any rights of citizens thereof; and all persons who shall hereafter desert the military or naval service, and all persons who, being duly enrolled, shall depart the jurisdiction of the district in which he is enrolled, or go beyond the limits of the United States with intent to avoid any draft into the military or naval service, duly ordered, shall be liable to the penalties of this section. And the President is hereby authorized and required forthwith, on the passage of this act, to issue his proclamation setting forth the provisions of this section, in which Proclamation the President is requested to notify all deserters returning within sixty days, as aforesaid, that they shall be pardoned on condition of returning to their regiments and companies, or to such other organizations as they may be assigned to, and serve the remainder of their original terms of enlistment, and, in addition thereto, a period equal to the time lost by desertion.

"In testimony whereof, I have hereunto set my hand, and caused the seal of the United States to be affixed.

"Done at the City of Washington, this eleventh day of March, in the year of our Lord one thousand eight hundred and sixty-[L. S.] five, and of the independence of the United States, the eighty-ninth.

"ABRAHAM LINCOLN.

"By the President: WILLIAM H. SEWARD, Secretary of State."

The records and returns of these deserters will be made up in the same manner as is provided for in other cases by existing regulations, except that it will be noted on the book of deserters arrested, opposite the name of deserter, the fact of his having voluntarilly surrendered himself in conformity with the President's Proclamation; and the number; thus surrendering themselves to be separately stated on the report to this office.

The Secretary of War directs that no reward be paid for the arrest of deserters who may be arrested subsequent to the receipt of this order by the District Provost-Marshals.

14 3t JAMES B. FRY, Provost Marshal-General.

FOR SALE—TO PARTIES INTERESTED IN MINES in Mexico and Lower California—Plans and specifications of a Smelting Furnace and a combination of cheap chemicals for fluxing, for reducing gold and silver ores that cannot be worked by any other way than fire treatment; works cheap and quick; a patent right can be had; one-quarter interest is reserved; none but responsible parties need apply. Address C. S. F., Box 1,412 Post-office. 14 5*

MACHINERY FOR SALE.—TWO 15-HORSE STEAM Engines, with cylinder boilers; one "Kirk's" Steam Hammer; one large Trip Hammer; seven Slide Lathes; two Iron Planers; one Bolt Cutter; two Upright Drills; two Fan Blowers; one pair heavy Shears; two large Heating Furnaces; one Foundery Cupola, Oven, Etc.; two Water Tanks; 6,000 pounds Anvil and Trip-Hammer Dies; Pumps; Gifford's Injector; Anvils, Vices, Shafting, Pulleys, Etc., and Tools for Axle work. Address CHAS. H. SMITH, No. 135 North Third street, Philadelphia. 14 3*

ESTABLISHED 1826.—WORLD'S FAIR AND AMERICAN Institute Prize Medal Turning Lathes for Foot and Steam Power, manufactured by JAMES STEWARTS SON, No. 252 Canal street, New York. Amateur's Turning Lathes made to order. 14 8*

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A VALUABLE WORK FOR INVENTORS PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them——Importance of the Specification—Who are entitled to Patents—What will prevent the granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

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A SAFETY MONEY DRAWER.

It is a common occurrence in this and other cities for money drawers to be rifled of their contents by some adroit *till thief*. If the proprietor turn his back for a moment, possibly the customer who only entered for the purpose, reaches his hand over and dexterously abstracts the change. This practice is very easily stopped by the application of a simple detective apparatus which is perfectly invisible outwardly and is very ingenious in construction.

The machine itself is very simple and is no larger externally than the works of a clock. It is difficult to describe without the aid of an illustration, which we have not room to produce at present, but an idea may be formed of its principle when we say that a number of small iron finger plates project below the bottom of the drawer, (where it is caught for the purpose of pulling it open) which must be pressed before the drawer can be pulled out. These plates connect with a series of small latches inside the drawer which lock it each time so that it cannot be opened unless the proper plate is pressed by the finger, but on being pressed the drawer slides open without ringing the alarm bell. No noise occurs when the drawer is properly opened by those who are in the secret of its operation. Thirty changes can be made in the arrangement of the latches so that even if a dishonest person should find out one movement it would be of no advantage, as the checks could be altered every day in the month. When meddled or tampered with by ignorant persons the drawer locks itself completely and gives the alarm so that a key must be used to set the latches or checks free again.

The price of the drawers with patent alarm lock varies from $7·00 to $10·00 according to the kind of wood used in their manufacture. All orders must be addressed to Thomas Turner, Willimantic, Conn.

WATER BATHS IN COOKING.

"A smoky chimney and a scolding wife," was a proverb applicable to the old days of open fire-places, but the trouble *from* smoke has been pretty effectually overcome by the general use of stoves. In these days, the temper of cooks and housewives is probably more frequently disturbed by the burning of milk or other article on the sides of the kettle, than from any other cause. This difficulty is completely overcome by the use of a water bath.

A water bath may be improvised by simply setting a smaller kettle into a larger one. In boiling milk, the milk may be put into a porcelain or earthen pitcher, and the pitcher set into a kettle of boiling water.

Double kettles for water baths are manufactured and may be found in the markets, and generally those who have once used them would sooner give up any other utensil than part with them. They are so entirely effectual in preventing any substance from burning on the sides of the vessel, and they deliver their contents so white and clean, it is a luxury and satisfaction to use them. The time will come when a water bath will be deemed as indispensable in the kitchen, as it is now in the chemical laboratory.

SAILING OF PROFESSOR AGASSIZ.

Professor Agassiz and his companions, twelve in all, sailed from this port on the 30th of March, for Rio Janeiro, Brazil. Mr. Thayer, a wealthy citizen of Boston, having heard that Professor Agassiz would like to visit South America to make some observations on glacial action, wrote him a note asking him how many companions he desired and what would be the expense. Prof. Agassiz replied, that a company of eight would be sufficient, and that it would cost them about $2,500 apiece. Mr. Thayer told him to go forward and send the bills to him. The Pacific Mail Steamship Company tendered to the party a free passage on their fine steamer, the *Colorado*, and they are now on their way to South America.

A New Substitute for Coffee.

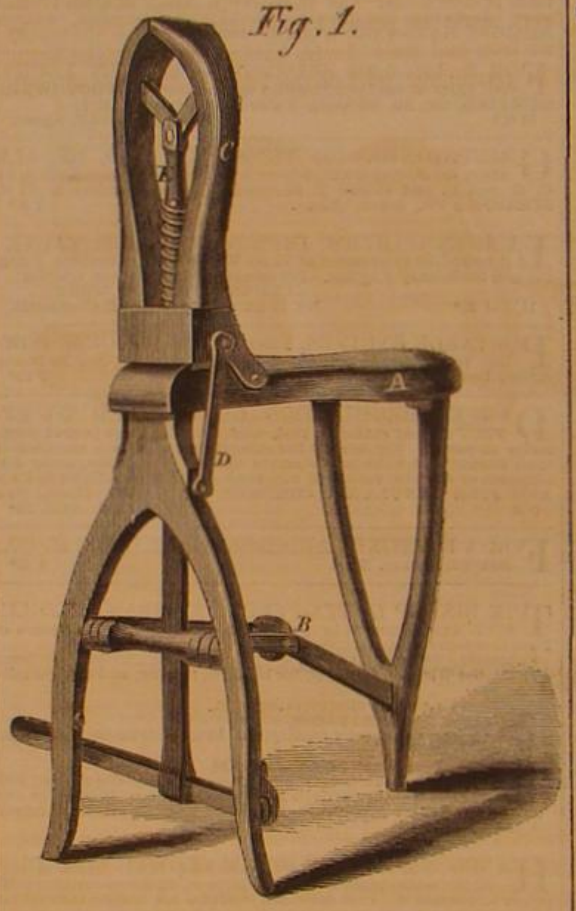
We received some time since a bag of seed from Mr. Earl Flint, of Granada, Nicaragua, which he averred to be so nearly allied to coffee in flavor, as to be undetected therefrom by most persons. We have, accordingly, roasted and ground the seed and find it to be a good *substitute* for coffee, as it possesses both the flavor and odor of the poorer brands of the genuine article. Many persons are not judges of coffee, and to such this seed might prove palatable and economical at the present prices for pure Java.

Our correspondent says this is called *Singua Pajaro* in Spanish, which sounds very much like bird seed, when translated, and the plant is very troublesome, (in what respect is not stated,) growing wild all over Nicaragua; the seed is easily harvested and two crops a year may be obtained. Such abundance and its palpable resemblance to coffee, might make it of some use commercially, if it should be found innoxious to the system.

BROCKWAY'S STITCHING HORSE.

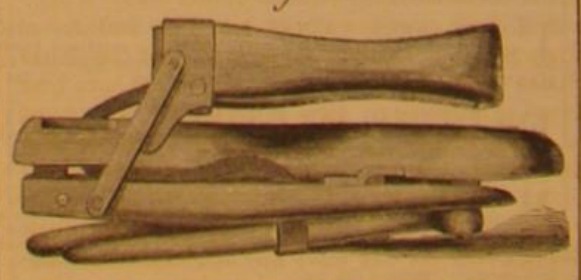
In saddle and harness-makers' shops, where there is sometimes but little room, the stitching horse, or that appurtenance which is used for holding leather straps, while they are sewed, occupies a great deal of space which could be used for other purposes.

Fig. 1.



The object of this invention is to produce a stitching horse that can be easily folded up when not in use, so that it will appear as in Fig. 2, thus rendering it portable, so that it can be used for army purposes and conveniently stowed away when not wanted. The construction of the horse is as follows—the legs are hinged to the seat, A, so that they can turn up toward it, and the reach, B, is so contrived that it will allow the legs to approach the seat in the manner shown in Fig. 2. The clamp, C, also turns

Fig. 2.



down, and has an iron strap, D, which keeps it rigid when in use. The jaws of the clamp are provided with a toggle joint to which is connected a rod, E. This rod works the treadle, and by depressing the latter the work is held fast as in all others. There are no other peculiarities about this arrangement, and the engravings give a clear idea of its principal object. It was patented through the Scientific American Patent Agency, on the 16th of December, 1864, by Geo. F. Brockway, of the U. S. Army. For further information address L. Allen, Webster, N. Y

School of Industrial Science.—A gentleman whose name and residence are not given, has appropriated one hundred thousand dollars to constitute a fund for the support of a school of industrial science in Worcester, Massachusetts, on condition that the citizens of that place furnish the means for purchasing a lot of ground, and erecting suitable buildings thereon. It is understood, says the *Spy*, that this institution will afford instruction to persons intending to enter upon practical life, such as manufacturers, farmers, mechanics, or to pursue various branches of commercial business. The school will be free to the inhabitants of the city and county of Worcester.

A good thing is attributed to Hugh McCulloch, the new Secretary of the Treasury. A frightened speculator was asking him to arrest the downward tendency of gold. "Well, my good friend," was the Secretary's reply, "if you can get Grant, Sherman and Sheridan to let the rebels whip them, you will be gratified; but I am afraid they won't oblige you."

Mr. E. F. Shindel of Tamaqua, Pa., wishes to procure paper-making machinery.

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this latter department being very full and of great value to Farming and Gardeners; articles embracing every department of Popular Science, which everybody can understand.

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will, as heretofore, form a prominent feature. Owing to the very large experience of the publishers, Messrs. Munn & Co., as Solicitors of Patents, this department of the paper will possess great interest to Patentees and Inventors.

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$3 PER ANNUM (IN ADVANCE.)

Improved Water Motor.

Manufacturers have of late made frequent inquiry for a small water motor which should be capable of doing a fair amount of work, be easy to regulate, and not liable to derangement or accident. Printers, in particular, where steam is not available, find such machines useful if water is at hand, and in mining districts they are also employed for driving stamps and pumps or other machinery. They are chiefly intended for application to the pipes of city waterworks; and when thus applied furnish an advantageous and economical power. They are particularly adapted to situations where it is desired to obtain a moderate amount of power; and for driving printing presses, sewing machines, elevators, dentists' and jewellers' lathes; also for hotels where washing, ventilating and pumping machinery is used. They are perfectly safe to use, and require no attendance whatever; they occupy but little room, may be attached to any pipe, and use water only when doing work.

As may be seen, by referring to the engraving, it is simple in detail and within the capacity, as to attendance, of the most unmechanical person.

The section of this engine, Fig. 2, shows the internal arrangement; there are three pistons sliding in the disk, A, having rollers, B, which work in the cam groove, C. This groove regulates the action of the pistons so that they present a fair surface to the action of the water, and the chamber or channel formed by the pistons, and the head permits the water to escape freely at the outlet without undue friction or pressure upon it. The diaphragm, D, divides the chamber into two parts.

By examining the piston shown isolated at E, two water channels, F, may be seen. The water circulates through these channels to the back part, as at G, in Fig. 2, so that the piston is perfectly balanced in its movement and requires no forcing from the cam grooves, C, to make it work properly up to the face of the cylinder; the rollers, therefore, wear a long time without requiring adjustment, as do also the pistons which preserve a regularity of working surface not before attained in engines of this character. This engine was patented by M. Stannard, on the 20th of August, 1861, and is manufactured by Messrs. Pratt, Whitney & Co., Hartford, Conn., of whom all further information can be had.

Fig. 1

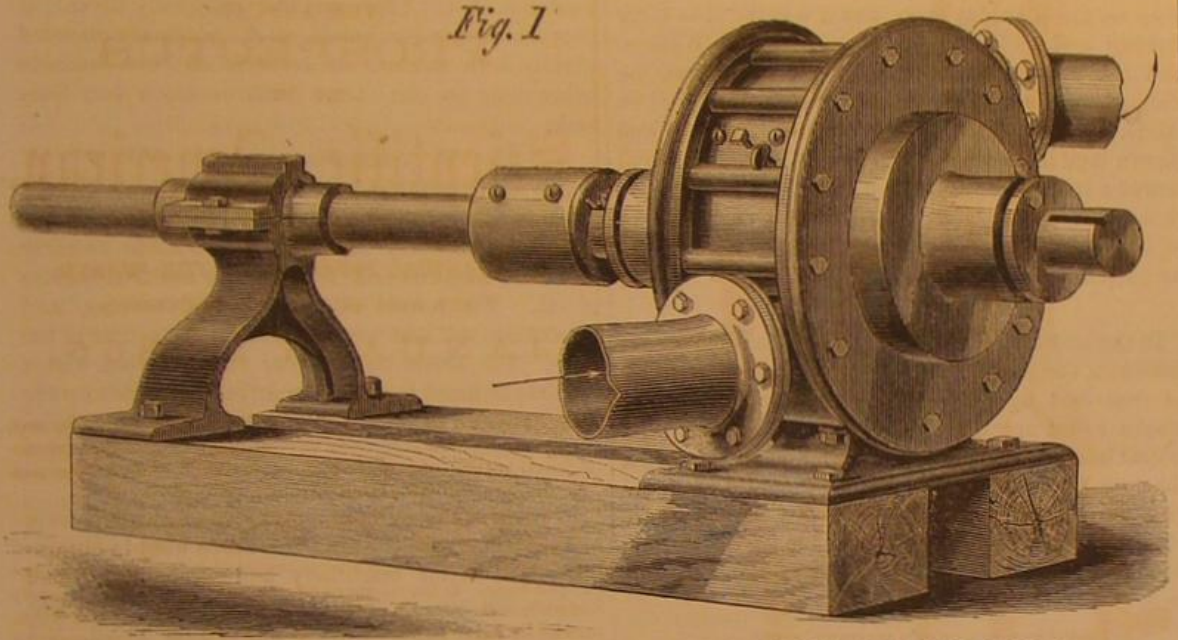
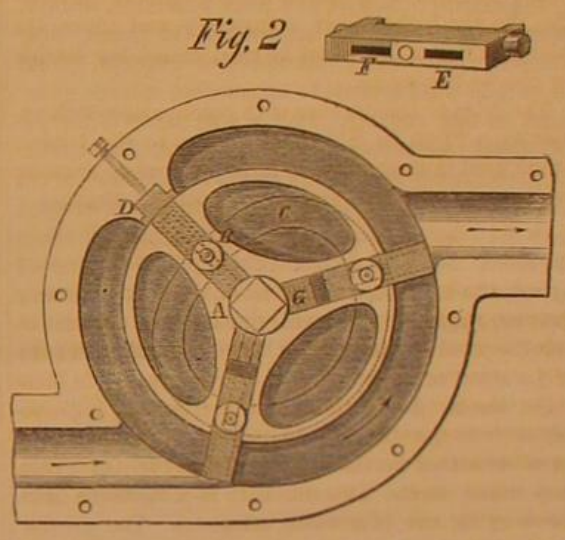


Fig. 2



STANNARD'S WATER MOTOR.

Rosin for violins should be melted with a little vinegar.

A Strong Room.

Some particulars of a strong room, for cash and securities, recently constructed for a London bank, may be of use to some of our readers:—The walls are 2 ft. thick, of hard bricks, laid in cement, and with strong hoop-iron in the courses. In the interior there is placed a fire proof Chubb's safe, weighing thirteen tuns. This is 10 ft. long, 8 ft. high, and 8 ft. deep, made of plates 1 inch thick, and secured by two iron and steel doors, having twenty-eight bolts. The remaining part of the brick room is lined with iron, half an inch thick. The whole is again further secured by an iron and steel door, having ten bolts, let into the center of the brickwork; and there is a gate for ventilation in the daytime. A large alarum is fixed in the bedroom of a clerk on the second floor which goes off whenever the outer door is opened, and a porter who sleeps in the office, and whose bed is in front of the door, can also, by pulling a trigger, set the alarm going. The whole of the ironwork, we should mention, was executed by Messrs. Chubb and Son. Mr. P. C. Hardwick is the architect under whom it was set up.—*Builder.*

Genuine Diamonds Found in California.

Stones known as California diamonds have been used by jewellers during the past ten years but it is now ascertained that the genuine diamonds are to be found in the mountain streams of that State—a number of these precious stones have been sent to San Francisco, and Boston—the only place in the United States where diamonds are polished—and have been found to be genuine. Most of these stones were found at Cherokee Ravine, in Butte county; several came from North San Juan, Nevada county, and one was found near Placerville.

The average value was perhaps seventy five dollars, the largest one being worth one hundred and twenty-five dollars. They were found in sluices, or pudding boxes used for placer mining. Several of the miners who found these diamonds in their sluices, stated that they had repeatedly seen similar stones while mining, but supposing them to be worthless had thrown them away.

California granite is of light gray color, bright and clear, and easily worked. It splits almost equal to slate, and thus requires very little labor in dressing. It is like marble when dressed. Its light color gives a building a bright appearance, as well as avoids discoloration by dust.

Scarcity of Furs—Better Traps Wanted.

The catch of furs this year, says the *North Western Times* has been very little more than half what it was at the same period last season. Mink, which were so plentiful last year, and on which handsome profits were realized, seem to be pretty much a failure all over. This is believed to be the result of the late droughts, and the extermination of the mink by the small American traps now coming into general use. The wooden traps of other days allowed some chance to these unfortunate animals with the coveted fur, but the steel traps now put in requisition, are certain death, and so the catch will yearly diminish. Despite all the modern improvements in traps which have proved so fatal to the mink, foxes are said to be flourishing and on the increase. They are getting too wary to be trapped in any considerable numbers, it would seem; and indeed their foxships are rather independent this year in consequence of the ease with which they can procure an abundant supply of rabbits; foxes will be fully as numerous next year. Marten are also said to be very numerous in some quarters; but are less plentiful than last year. Buffalo robes must, we believe, be included in the list of partial failures, for very few are offering.

A Locomotive with a History.

Among the locomotives secured by General Terry in his overland movement from Wilmington to Goldsboro', is one that possesses some historical interest, the engine "Job Terry." The "Terry" first came into the possession of the United States military authorities by the occupation of Alexandria, Virginia, in May, 1861; was re-captured by Stonewall Jackson at Front Royal in the famous Banks retreat down the Shenandoah, in the summer of '62; re-captured soon after by the Union forces near Martinsburg, and found slightly damaged; was, however, soon put in running order; ran for us but a short time, again falling into rebel hands at Warrington Junction, Virginia, at the time of Pope's disastrous campaign, doing the rebels service till repossessed for Uncle Sam, a short time since, by her namesake, General Terry. It is fair to assume that the military vicissitudes of this locomotive are at last over, and that while there is steam in her iron lungs it will be respired for the exclusive benefit of the United States Government.

Edward Harris, the largest woolen manufacturer in the country, intends to build thirty or forty cottages in Woonsocket the coming summer, each one to have a garden, and offer them to industrious mechanics for sale. Who will follow this excellent example?

FACTS ABOUT PETROLEUM.

The most celebrated oil-wells as yet discovered and operated on the American continent are located in the western part of Pennsylvania, principally in Venango, Crawford, and Warren counties. The wells next of note are found in Western Virginia and Eastern Ohio; and recently wells have been opened in the States of New York and Michigan, also in Canada.

OIL CREEK.

Oil Creek, which has become celebrated as the site of the richest oil-producing region on earth at the present day, is a tortuous mountain stream, taking its rise in the northern part of the State of Pennsylvania, near the south line of Erie County, and, with its tributaries, waters Crawford and Warren counties, and after a course of about thirty miles through these counties empties into the Alleghany River seven miles above the town of Franklin. The valley through which Oil Creek takes its course is narrow, and flanked on each side by high and rugged hills, on the top of which are broad fields of excellent farming land. The scenery on Oil Creek at one time, no doubt, was quite picturesque; but now the bottom lands are dotted with tall derricks, wooden engine-houses, and iron smoke-stacks, out of which columns of black smoke roll upward to the clouds. The pines and hemlock are cleared from the mountain sides, and all is busy life.

WHERE THEY FIRST STRUCK "ILE"

The extensive lumber saw-mills of Messrs. Brewer, Watson, and Co. were located on Oil Creek, near Titusville, the present metropolis of Petrolia. Near those mills oil first made its appearance in large quantities in this country. Half a mile below Titusville Oil Creek meets its principal confluent, Pine Creek, more commonly known now as the East Branch of Oil Creek; and the delta of these two streams is covered with old oil-pits, which occur at intervals all along the creek below Titusville. These pits are supposed by some to have been the work of the French during their occupancy of the country in 1759, on account of being located almost directly between the French forts of La Bœuf and Venango.

Petroleum, under the name of "Seneca oil"—so called from the tribe of Indians of that name who once inhabited the country—became early of great importance to the settlers, both as a medicine and for burning and lubricating purposes. The greater portion of oil was obtained from two natural springs. One of these was in the immediate neighborhood of Titusville, on the lands now owned by the "Watson Petroleum Company" of New York, on the spot where now stands the old "Drake Well." The other spring was on the farm of Hamilton M'Clintock, within four miles of the mouth of Oil Creek.

HOW OIL WAS FIRST OBTAINED.

During the year 1853 Dr. F. B. Brewer, of the firm of Brewer, Watson, and Co., conceived the idea of collecting surface oil by means of absorbing it in blankets, and wringing the oil out. Great quantities were collected in this novel manner, and used for burning purposes in the lumber mills of the Oil Creek region. The oil produced from the oil springs became so necessary and useful as to suggest the formation of an oil company in 1854 called the "Pennsylvania Rock-Oil Company." This was the first Oil Company ever formed. This was prior to the sinking of any well, or before such a thing was suggested.

THE PIONEER AT WELL-BORING.

Although Professor Silliman, of New Haven, had in 1854 analyzed the rock-oil, and pronounced upon its properties, no further developments of any importance took place until the winter of 1857, when Colonel E. L. Drake, of Connecticut, arrived at Titusville, and was the first man who attempted to bore for oil.

He first informed himself thoroughly on the subject of boring, and visited the salt-wells on the Alleghany River for that purpose, where, after some difficulty, he employed a man who agreed to sink wells for the Seneca Company; but he and others to whom he had applied failed to keep their engagements, and it was not until the following spring that he could obtain a suitable person to commence the well.

INVENTOR OF THE DRIVING PIPE.

In sinking the well it was supposed necessary to dig to the first rock; but in consequence of the earth caving in on the workmen so frequently, Colonel Drake invented the iron driving-pipe and mode of driving which is now in universal use, not only in the oil regions, but among the salt borers. He was obliged to go fifty miles to a machine-shop every time his tools needed repairing; but after many delays and accidents, on the 29th day of August, 1859, at the depth of 69 feet 6 inches, he struck a vein of oil, from which he afterward pumped at the rate of thirty-five to forty barrels per day. This is now known as the Drake Well, and was the first well ever sunk for oil, and the first petroleum ever obtained by boring.

EXCITING SCENES.

Now commenced a scene of excitement beyond description. The Drake Well was immediately thronged with visitors arriving from the surrounding country, and within two or three weeks thousands began to pour in from the neighboring States. Every body was eager to purchase or lease oil lands at any price demanded. Almost in a night a wilderness of derricks sprang up and covered the entire bottom lands of Oil Creek. Merchants abandoned their store-houses, farmers dropped their plows, lawyers deserted their offices, and preachers their pulpits. The entire western part of the State went wild with excitement.

FIRST FLOWING WELL.

In June, 1861, A. B. Funk sunk a well 470 feet deep on the M'Illheny farm, which was the first large flowing well. Then followed the Brewer, Watson and Co. Well on the G. W. M'Clintock farm, the Phillips Well on the Tarr farm, the Willard Well on the H. M'Clintock farm and the Rouse, Mitchell, and Brown Well on the Buchanan farm. This latter well flowed a stream of oil without pumping equal to one thousand barrels per day. Thousands of barrels of oil flowed into the creek before suitable tanks could be prepared to receive it.

WELL ON FIRE.

In the midst of the excitement, from some cause unknown, the gas and oil from this well took fire, and, as described by an eye-witness, columns of black smoke rolled upward into the air, the blazing oil leaped heavenward, and, falling over on all sides from the fiery jet, formed a magnificent fountain of liquid fire. The sight was awfully grand, but, sad to relate, nineteen human beings were burned to death. Among them was Mr. Rouse, one of the proprietors of the well.

THREE THOUSAND BARREL WELL.

The next large flowing well opened was the Empire, in the vicinity of the Funk Well, that flowed 3000 barrels per day. The Sherman Well was opened in April, 1862, then the Noble and Delemater Well in May, 1863. This celebrated well was commenced in 1860, and was bored to the depth of 167 feet and abandoned. Mr. Noble went further down the creek and became interested in other wells on the Tarr farm, but in the spring of 1863 he recommenced the work on his old well, and went down to the depth of 471 feet without having any indications of oil. At that depth he concluded to tube and pump, abandoning the idea of obtaining a flowing well, but to the great astonishment of himself and every one else, after pumping a very short time, suddenly the great Noble Well commenced to flow. Long before the opening of this well petroleum had become so plenty that most of the pumping wells were abandoned. Every person wanted a flowing well.

FIRST OIL REFINER.

Samuel M. Kier, of Pittsburg, was the first man who refined the crude oil, and to him we are indebted for this discovery. W. H. Abbott, of Titusville, erected the first large refinery at that place, which was before the days of railroads in that region.

Brewer, Watson, and Co. were really the great pioneers in the introduction of petroleum in large quantities. This enterprising firm expended the sum of $740,000 in cash for barrels alone before they realized one cent of profit. All they required was the actul cost of the barrel. They have lived to reap a rich harvest from the arduous efforts in the introduction of petroleum, and have been handsomely repaid for the hardships and trials through which they have passed.

The only pumping wells opened at an early day, and not abandoned but worked until the present time, are the celebrated Economite Wells, located opposite the town of Tidecute, on the Alleghany River, in Warren County, Pennsylvania. These wells are four in number, and are each now pumping 30 barrels of oil per day. Many persons at the present time, in passing through the oil regions, wonder at the number of abandoned wells to be seen. These wells were not abandoned because the borers failed to discover oil, but simply because it did not pay to operate them when oil was so plenty and cheap and so great demand existed for it.

VALUE OF TRADE.

The importation of merchandise, etc., during the year 1863, over the Oil Creek Railroad, was 70,000 tuns, and the exports of oil alone equal to 750,000 barrels. It is estimated that the export from Titusville will amount this year to over $18,000,000 and the imports will largely exceed those of last year, at least the local trade has kept even pace with the improvements in the way of building.

Oil in quantities having recently been procured north of Titusville, the entire line of Oil Creek above that place, as far as Oil Lake, is now occupied, and numerous wells are in process of drilling, causing great excitement in that region.

Oil City, at the mouth of Oil Creek, is situated at the base of a mountain under a bluff, and for want of room can never become a very large city. The town consists of only one street, winding down the west side of Oil Creek and the Alleghany River. It contains five or six hotels, all of which are crowded nightly with anxious oil seekers. All the business being done on one street the town has a very busy look.

MARKETING OIL.

The oil from these wells on the Alleghany River is taken to Irvine in tow-boats drawn by horses. These boats are built very stanch, and are made to carry from one hundred and fifty to two hundred barrels of oil. The horses often cross and recross, and sometimes pull and tug up through the centre of the river. The driver has regular fords to cross, and it requires as much judgment to drive tow-horses up the Alleghany as to pilot a steamboat down the Mississippi.

BETTER MACHINERY WANTED.

In passing through the oil regions of Pennsylvania one is struck with the primitive mode used in obtaining oil. Inferior machinery and exceedingly small engines are used in most cases, with hardly sufficient power to raise the sucker rod out of a deep well. Yet wells are worked in this manner, only producing from one to three, or perhaps five, barrels of oil. Often they entirely fail to get a drop of oil. In such cases the wells are abandoned as worthless. At the same time, if the proper machinery had been applied with more powerful engines, twice or thrice the yield might have been obtained. The air-pump is a great improvement, and its application will no doubt add at least thirty per cent to the yield of all wells to which it is applied.

OIL REFINERIES.

The oil regions are dotted here and there with refineries where the crude oil in distilled and prepared for burning purposes. Many changes have taken place, and vast improvements made, in the refineries of oil since the first were erected. The most extensive establishment for this purpose, now in operation in the immediate vicinity of the oil regions, is at the town of Correy, in Crawford County, Pennsylvania, a new and thriving place, situated at the crossing of the Atlantic and Great Western and Philadelphia and Erie Railroads. The building is entirely of brick, and was erected by Samuel Downer, one of the pioneers in the business, at a cost of $150,000, including machinery. Upward of 200 workmen are here daily employed, and when the works are operated to their greatest capacity 300 barrels of crude oil are daily required.

VARIOUS MATTERS.

New oil lands have recently been discovered in Adams and Sciota counties, on the Ohio River, about ninety miles above Cincinnati. The surface indications are very promising—such as oil on the water in the marshes and water-courses, the upheaval of the sand rock, and hills of shale saturated with petroleum, one tun of which has produced by distillation fifty gallons of oil.

In sinking a well for oil many curious and wonderful discoveries have been made. On the lands belong-

ing to the Story and M'Clintock Petroleum Company, of New York, located on Caldwell's Creek, near Tiiusville, in sinking a well in October last the drillers passed through a log eighteen inches in diameter.

Oil wells are put down to a variety of depths, from 100 to 1100 feet.

In boring a well a correct journal is kept, showing the different kinds of rock and earth passed through, and the exact points where water-courses, gas or shows of oil are found. If a large vein of oil is struck, the well is immediately tubed with a 2 or 2½-inch iron pipe, put together in sections. The water from water-courses and the surface water is prevented from flooding the well by means of a leathern bag, called a seed-bag, filled with flax-seed, which is placed on the outside of the tubing and within the earth chamber below the water-courses. When the flax-seed becomes saturated with water it swells, and completely shuts off all communication with the bottom of the well on the outside of the tubing.

Preservation of Steam Boilers.

Engineers will appreciate the following information given in the *Mechanics' Magazine* by an English chemist, Mr. Blockly:—

"I have read with great interest your articles on this and its kindred subject, and feel that I only speak the sentiments of the manufacturing community in saying much gratitude is due for the able manner in which the matter has been treated by you. I trust you will allow me to state that the use of 'muriate of ammonia,' or 'sal ammonia,' or 'chloride of ammonium," is not new. The present state of chemistry is such that every known substance has several names. Seven years ago I found it was in use to prevent incrustations, and only for its expense would have been more largely used then. I found also a gentleman of no mean pretensions as a chemist had used a mixture of sulphate of ammonia and common salt, which answered the purpose admirably, forming in the boiler chloride of ammonium and sulphate of soda; the boilers once incrusted did not appear to be cleaned by its use, but incrustation was effectually prevented, only a sludgy, sandy sediment being formed—easily cleaned by blowing off.

"Some localities are furnished with water of a different character, and for a number of years past the use of alkaline preparations has been adopted. Some of these compositions are made by boiling soda ash and lime together in water until the preparation is stiff. Others separate the lime, and stiffen with farina. I can positively assert that the use of alkaline substances is very old. One firm I know of use caustic soda ash regularly, and find it to answer perfectly, and there is a large dyer in this town whose boiler is always free from solid incrustation—the water is of a peculiar character, and contains a large amount of caustic soda as one of its ingredients. The composition you allude to to-day seems to lay claim to novelty—if so, the novelty cannot be from its possessing an alkali as one of its constituents. I have no connection whatever with any firm using boiler power or selling composition, and I would suggest to all users of steam power to try the use of caustic soda ash, a far cheaper material than most of the compositions, which I happen to know are often sold under the recommendation of the foreman or engineer, who gets a 'per centage,' or some other consideration. If this simple remedy does not succeed, I would suggest an examination of the water, and any chemist would undertake to provide some means as effectual as any composition. No one preparation can be expected to, nor does, answer under all circumstances."

A MINING INCH OF WATER.—To machinists and miners in California an inch of water has a specific meaning, as water is sold by the Ditch companies to the mines by the inch, that is, the quantity that will be discharged through an inch opening with a six inch head measured from the center of the opening is called a miner's inch of water. It is nearly equivalent to and is intended to be 1000 gallons passing a given point in an hour.

GEN. SCHOFIELD has levied a contribution of 100,000 rations of meat and flour upon the citizens in the vicinity of our armies at Goldsboro, N. C.

Bitumenized Paper Pipes.

At the late session of the Institute of Engineers, in Scotland, the subject of bitumenized paper pipes was discussed. We extract the mode of their manufacture, and their failure for intended purposes, as reported in the *London Engineer:*—

These pipes consist of a composition of bitumen and paper, and the process of manufacture is as follows:—Paper is made of a breadth equal to the required length of the pipe; a cylinder of the required length and bore of the pipe is selected; upon this cylinder the paper is rolled up, having previously passed through a cistern of molten bitumen; in concert with the cylinder which forms the bore of the pipe, another heavily-weighted cylinder revolves outside, by means of which the pipe in process of manufacture is subjected to great pressure, insuring an equal distribution of the bitumen, and compactness throughout the structure of the pipe. By this mode of manufacture it is evident a pipe of any required thickness can be made by continuing the process for a sufficient length of time. After the pipe is taken out of the rolling machine, and the cylinder forming the bore withdrawn, the inside is coated with an insoluble water-tight composition, which protects the paper and forms a very smooth surface, and consequently diminishes the resistance of friction—a matter of much importance in water pipes. The outside of the pipe is coated with a composition of bitumen and sand, which, besides protecting the material of the pipe from injury, renders it secure against those evils to which iron pipes are liable, either under ground or exposed to the atmosphere.

Mr. W. Simons had seen those pipes laid in France, and knew that many thousands of pounds had been spent in laying paper pipes in Paris, some of them 2ft. in diameter. Mr. Maquet could, perhaps, inform them to what extent this had been done.

Mr. Maquet could not decidedly answer the question; but he had seen them laid in Paris for the supply of gas.

Mr. Copland, borough engineer, Paisley, said he had a line of 4-inch paper pipes laid; and he found great difficulty in getting the pipes jointed, and the service pipes connected with them. These pipes were supplied by the Patent Bitumenized Water, Drainage, and Gas Pipe Company, Limited, who proposed to join the service pipes by drilling holes in the ordinary way. Where the service pipes were connected bitumen was run over to make all tight; but the pipes were not in six months till they required so much repairing that they were glad to get rid of them at any price. They were still under ground, and he had intended to look at them before the meeting, but had been prevented from want of time. He had, however, examined them before, and scarcely found a tight joint in all the 100 lengths laid. The pipes had become quite soft near the joint with the iron pipes—in fact rotton. With the simple pressure of his hand upon a spade he cut in a 4-inch paper pipe at the point of junction with the iron pipe. The pipes were continually leaking at the joints, and they were obliged to send to England for a workman to see if he could do any good to them; but he did not succeed, and they were compelled to lay down a length of iron pipes in their stead. The paper pipes were not jointed like the specimens exhibited, but were entirely fitted with thimble joints, scarcely one of which were tight. The pressure on the 4-inch pipe would be about 10 lb., but at the top of the street it was reduced to 2 lb., and even then it was scarcely possible to get a perfect joint.

Savannah Cotton.

Simeon Draper, Esq., Collector of the port of New York, has made a full report of all the facts connected with the cotton captured by Gen. Sherman at Savannah. The report shows that the total number of bales of cotton taken at Savannah was 38,500; 6,000 bales of which was Sea Island; it had been gathered in from various Confederate States, partly to prevent its falling into the possession of United States forces, but mainly to enable it to be easily shipped by the blockade runners. The greater portion of it belonged to the Confederate Government. Soon after Gen. Sherman took possession of the town many persons went into the warehouses on their own account and secretly marked a large number of bales. Many of these marks represented parties who were dead. The persons who thus marked the bales and professed to be genuine claimants of the cotton were not the legitimate living representatives of the former owners. This cotton is now subject to the order of the Secretary of the Treasury and will soon be offered for sale at public auction.

Machine Molding in Lead Works.

Messrs. Bead and Dent, of Newcastle-street, Strand, have lately introduced a very important improvement into the plumber's art. Hitherto syphon traps have been made by hand, as it was impossible to cast them on loam cores with profit, and apparently no means existed of extracting any other core because of the peculiar form of the pipe. Accordingly, the traps of this kind were always made by beating up two half pipes from sheet lead and soldering the edges together with soft solder; a very good workman and his laborer could produce, on an average, four of these traps per day. The system is open to many objections, of which we may name one; the galvanic action between the lead and the solder leads to the rapid destruction of the metal. Under the new system the cores are formed of gun metal or of cast iron, according to an invention patented by Mr. Lowe, an American, some four years since. Without drawings, it would be impossible to give any idea of the complete machine, for it is nothing else. The traps, whatever their shape, so long as the pipe is circular or nearly so in cross section, are cast entire and of any thickness required, with the most perfect accuracy. Four men can turn out eighteen 3-inch traps per hour, so that the price of production is considerably reduced. The machine is capable of effecting a complete revolution in this branch of the trade, as the work produced is immeasurably superior to anything turned out by hand. The value of the machine is only equalled by its extreme beauty. We know of nothing in the iron or brass trades even distantly approaching it in simplicity and fitness to the required end, and some of the chair molding machines recently introduced are sufficiently elegant.—*Engineer.*

A New Detergent.

A new natural product of California possessing detersive properties is thus described by a contemporary:

"A few months ago, some persons engaged in making turpentine, in Plumas county, tapped some pine trees of a species new to them. The fluid flowed abundantly, but it had a peculiar odor, and when taken to the turpentine stills in the neighborhood, nothing could be done with it. At last it fell into the hands of a man who managed to distil the liquid, which proved to be a new discovery. Instead of the disagreeable odor of turpentine, it has a fragrance like citron, and is free from all resinous matter. Ten gallons of it weighs as much as six gallons and three quarters of pure water. It dissolves all animal and vegetable oils and leaves no stain of its own, nor does it affect any of the colors used in dyeing, and thus it is an excellent substitute for benzine, without the odor which makes the latter substance so offensive. It is also much cheaper than benzine. The new liquid is called 'Erasine,' because of its value for cleansing It evaporates rapidly, and burns well, but is more expensive than coal oil. This novel product of California is now in market."

Perpetual Motion.

Correspondents frequently inquire if our Congress or some foreign scientific or legislative body has not offered a large prize to the discoverer of perpetual motion. No such offer has been made, so far as we know, though in our judgment it would be safe to offer any amount, since there is not the slightest probability that such a discovery will ever be made, It is a waste of both time and money to attempt to get up a self-moving machine. It may be very ingenious in contrivance, but after all it won't go unless force of some kind is applied to it. Every machine must of necessity have a motive power.

ENTERPRISING INVENTOR.—A man down east has recently patented a new boot which he has such faith in that he authorizes dealers to give new pairs where a radical and original defect appears in the stuff or make, provided the same has not been worn to an unreasonable extent before the defect is found out.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening March 30, 1865, the President, S. D. Tillman, Esq., in the chair.

A FEAT IN CASTING.

Mr. Norman Wiard described a novel method adopted by him for casting an iron tunnel. When the preparations for casting his great gun were nearly completed a need was discovered for a broad flat tunnel some ten feet in diameter. Not having conveniences at hand for making it of boiler plate, it was necessary to cast it, and as there was not time to make a pattern, he determined to cast it flat, and attempt to shrink it into dishing form as it cooled. He swept an open mold and filled it with molten iron. The center was first cooled, and as the edges began to harden levers were placed under opposite sides, and weights were hung upon their ends, tending to pry up the edges while the center was held down. Thus the rim was started up a very little, and then as it cooled and shrunk around the previously hardened center, it arose ten inches, giving this depth of dish to the tunnel.

TANNING.

The regular subject of the evening being tanning, the President explained that this is a simple chemical process. Raw hide is composed to a large extent of gelatin, which is soluble in water and is subject to decay. If gelatin is brought in contact with tannic acid the substances combine to form a new compound, which is insoluble and very permanent. The action is instantaneous, but when tannic acid is applied to raw hide it causes the fibers to contract, thus closing the pores and preventing the acid from penetrating the interior. Hence the necessity for soaking the hides several months in the liquor.

Mr. Smuhl, a retired leather dealer, gave a brief history of tanning in this country. Most of the improvements have been mechanical, improved arrangements of the vats and apparatus to save labor in pumping the liquid and handling the hides. As the tannin combines with the gelatin, the weight of the hide is increased by tanning; 100 lbs. of dry hide can be made into 180 lbs. of tanned leather, and 2000 lbs. of bark are required for the operation. Formerly the manufacture was conducted mostly in this city, and Colonel Edwards was the first who adopted the plan of carrying the hides to the bark, instead of transporting the bark to the hides.

Many efforts have been made to concentrate the tannin extracted from the bark, and by bringing that to the city, save the great expense of transporting the hides back and forth. But none of these efforts have proved successful.

A patent has recently been taken out by Mr. Pinkery for extracting a further quantity of tannin from the spent bark by means of steam, and the right for this State has been sold to one of our shrewdest tanners for $25,000. The plan is simply to saturate the spent bark with steam till it gets as hot as the steam, and then drench it with clean water. There is a notion that leather is improved by lying in the vat many years. This is a mistake. Provided the leather be thoroughly tanned the more quickly it is tanned the better. As good leather is made in this country as is made in any part of the world, but it is not as universally good as the English leather.

It may interest some of our citizens to know that New York is the largest market for sole leather in the world. More sole leather is bought and sold in this city than in Liverpool, London, and Paris combined.

From such facts as I can gather, I estimate that about 10,000,000 hides are tanned annually in the country. This would require about 700,000 cords of bark, and as the average yield is about 10 cords to the acre, there must be not far from 70,000 acres of hemlock forest cut down every year. As hemlock does not sprout again we are rapidly diminishing the area of our bark producing forests. The principal growth of hemlock is in Maine, New York, Michigan and Iowa, and I estimate that the area of hemlock forest in these states is not less than 40,000 square miles, 25,600,000, acres which would furnish 70,000 acres a year for 366 years.

A STEEL wire may be made from an iron one by plunging it into melted cast-iron.

FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its Room at the Cooper Institute on Tuesday afternoon, April 4, the President, N. C. Ely, Esq., in the chair.

From the several subjects discussed we select the following:

IMPROVED PLAN FOR TAPPING MAPLE TREES.

Mr. N. Smith, of Delhi, Carrol County, Ind., sent a communication, saying that he had found in tapping maple trees that a tin tube turned round a seven-inch wire and inserted in a gimlet hole in the tree would yield as much sap as could be obtained from an augur hole. This small hole will not injure the tree, and the plan enables very much smaller trees to be tapped.

PRESERVING LEAVES WITH THEIR NATURAL COLOR.

Solon Robinson read a letter inquiring the best plan for preserving leaves with their natural color.

Mr. Dodge replied that the best method is to wet the leaves well, and then iron them with a hot flat in precisely the same way that linen is ironed.

Mr. Robinson said that dipping the leaves in gum-arabic or glycerin has been recommended.

THE EASIEST WAY TO PULL STUMPS.

Mr. Carpenter, in reply to an inquiry, said that he had tried several plans for getting rid of stumps, and the one that he found the cheapest and most satisfactory is to let the tree pull its own stump at the time it is felled. Instead of chopping off the tree above the surface, the ground is dug away, and two or three of the principal roots are cut off at a sufficient depth to escape the plow; then the first moderate wind blows the tree over, stump and all. I think the expense is no greater than that of chopping the tree in the usual way, and I get an increased yield of wood.

SHEEP DESTRUCTIVE TO FLEAS.

Mr. Collins, of Otsego County, N. Y., said that it is well known that sheep occupying barns or premises will soon rid them of fleas. He supposed the fleas get entangled in the wool and perish.

CHEDDAR CHEESE.

Mr. Collins exhibited a sample of cheese made by him in imitation of the famous cheddar cheese of England. He said the most interesting thing in relation to it is the fact that it brings forty cents a pound by the case in this market. The essential points in the manufacture are, first, not to scald the milk; the milk is warmed about 90°, and the rennet is introduced at this temperature; then the curd is handled with so much care that the butter globules are not broken, thus preventing the butter from being washed away in the whey.

The French Ammonia Engine.

They are discussing just now in Paris a proposal for propelling omnibuses and other vehicles by means of ammonia. The engine which it is proposed to apply to this purpose is the invention of Mr. Tellier, and is a very simple and ingenious contrivance. A brief description of it will enable the reader to judge for himself how far it is likely to prove of practical value. Ammonia, under ordinary conditions, is a gaseous body, but there are various methods by which it can be readily condensed into a liquid, when in which state, unless it be restrained by sufficient pressure, a temperature below that of the freezing point of water is sufficient to convert it into gas again. Mr. Tellier takes advantage of this property of that body as follows:—He places liquefied ammonia in a suitable vessel, connected by a pipe and stop-cock with a cylinder having a piston fitted to work in it. When the stop-cock is opened, a portion of the liquefied ammonia becomes converted into gas, which rushes into the cylinder and raises the piston. When the gas has thus forced the piston to the top of the cylinder, a little water is admitted under the piston. Water and ammoniacal gas having a most eager affinity for each other, this water instantly absorbs all the gas, thereby causing a vacuum under the piston, and so enabling the pressure of the atmosphere to force the piston back to its original position. When the piston is once more at the bottom of the cylinder, the stop-cock in the pipe communicating between the cylinder and the vessel containing the liquefied ammonia is again turned, more gas is thus admitted beneath the piston, and all proceeds again as before. For obvious reasons, there should be at least two cylinders—M. Tellier prefers three—to each engine. The quantity of liquefied ammonia required per horse power per hour is stated not to exceed three gallons, weighing twenty-two pounds. The water used to absorb the ammonia, after it has re-assumed the gaseous form and in that state has done its work under the piston, is not thrown away, but is saved for the recovery of the ammonia from it,—which may be effected by simple evaporation, with certain precautions,—in order that the recovered ammonia may be re-condensed and so used over and over again.

For use in this way ammonia possesses great advantages over air. In the state of gas, ammonia occupies more than twelve hundred times the bulk which it occupies in the liquid state, and yet liquefied ammonia, if the vessels containing it be surrounded by some frigorific mixture, which need neither be costly nor difficult to prepare, will not exert against them a pressure of more than a few pounds per square inch, whereas, if it were practicable to compress air to the same extent, the air so compressed would exert against the vessels containing it a pressure of more than three-quarters of a tun per square inch,—a pressure, of course, which no vessel of any considerable size could possibly be made capable of bearing. In practice, however, it would not be possible to compress air to anything like the same extent as ammonia. It would probably be difficult, working on the great scale, to condense air much beyond the point at which it would press with a force of a hundred pounds on every square inch of the interior surface of the vessels containing it, at which degree of condensation it would be just two hundred times more bulky than the quantity of liquefied ammonia capable of doing the same amount of work, while it would be much more than two hundred times less portable, since the vessels used to store it in, while having two hundred times the aggregate capacity of those used for storing the liquefied ammonia, would have to be capable of bearing on every inch of their enormously greater surface a pressure twenty times greater than the vessels containing the ammonia need be capable of bearing per inch. Moreover, a force-pump worked by a steam engine would be the only practicable means of condensing air on the great scale; but ammonia can be condensed by a much more simple method. A steam engine is simply a machine for converting into mechanical force the heat developed by the combustion of the coal used under its boiler. The force exerted by the steam engine all comes from the coal burnt; it is, in fact, the heat given out by the coal in burning, in another form. In condensing air by means of a force-pump, worked by a steam engine, we employ the heat obtained from coal to convert water into vapor, and employ this vapor to drive machinery which shall work the piston of the force-pump, and so compress the air. Gaseous ammonia may be condensed in the same way; but it may also be condensed without the intervention either of a steam engine or of any piston-and-cylinder apparatus whatever. A common laboratory and lecture-room experiment consists in placing at one end of a bent tube some compound capable of giving off ammonia under the influence of heat, applying heat at that end of the tube, and keeping the other end of it cool,—both ends of the tube having been carefully sealed. Gaseous ammonia is given off at the heated end of the tube, and by its own pressure becomes converted into a liquid at the other end. Ammonia admits of being condensed on the great scale on precisely the same principle as in this experiment. Altogether, therefore, M. Tellier may be regarded as having fairly found in liquefied ammonia what inventors have sought so long, and so vainly, in compressed air,—a cheap and convenient method of storing up mechanical power, so as to admit of reservoirs of it being transported to a distance from the spot at which it was generated, and of the stored-up power being there applied useful to do work by means of light, simple, cheap, and safe machinery. We shall be surprised if it do not prove that the ammonia engine has much good work to do for the world in many ways besides that of propelling carriages.—*Mechanics' Magazine.*

FATS and vegetable acids may be cooked in hot copper sauce-pans without danger, since the metal is not attacked by them except when cold.

Artificial Limbs.

The engravings published herewith represent artificial limbs which have novel features not heretofore obtained in them. India-rubber is largely used in their construction, the feet and hands particularly being constructed of this substance.

No. 1 presents a full length leg standing erect, to be applied in all cases where amputation occurs above the knee joint.

No. 2 represents a leg to be applied where the leg has been amputated below the knee joint, and the stump is flexible enough, and sufficiently long, to enable the wearer to use it in walking. It also represents the leg with the heel compressed, and in its position after taking the step, and when firmly planted on the ground.

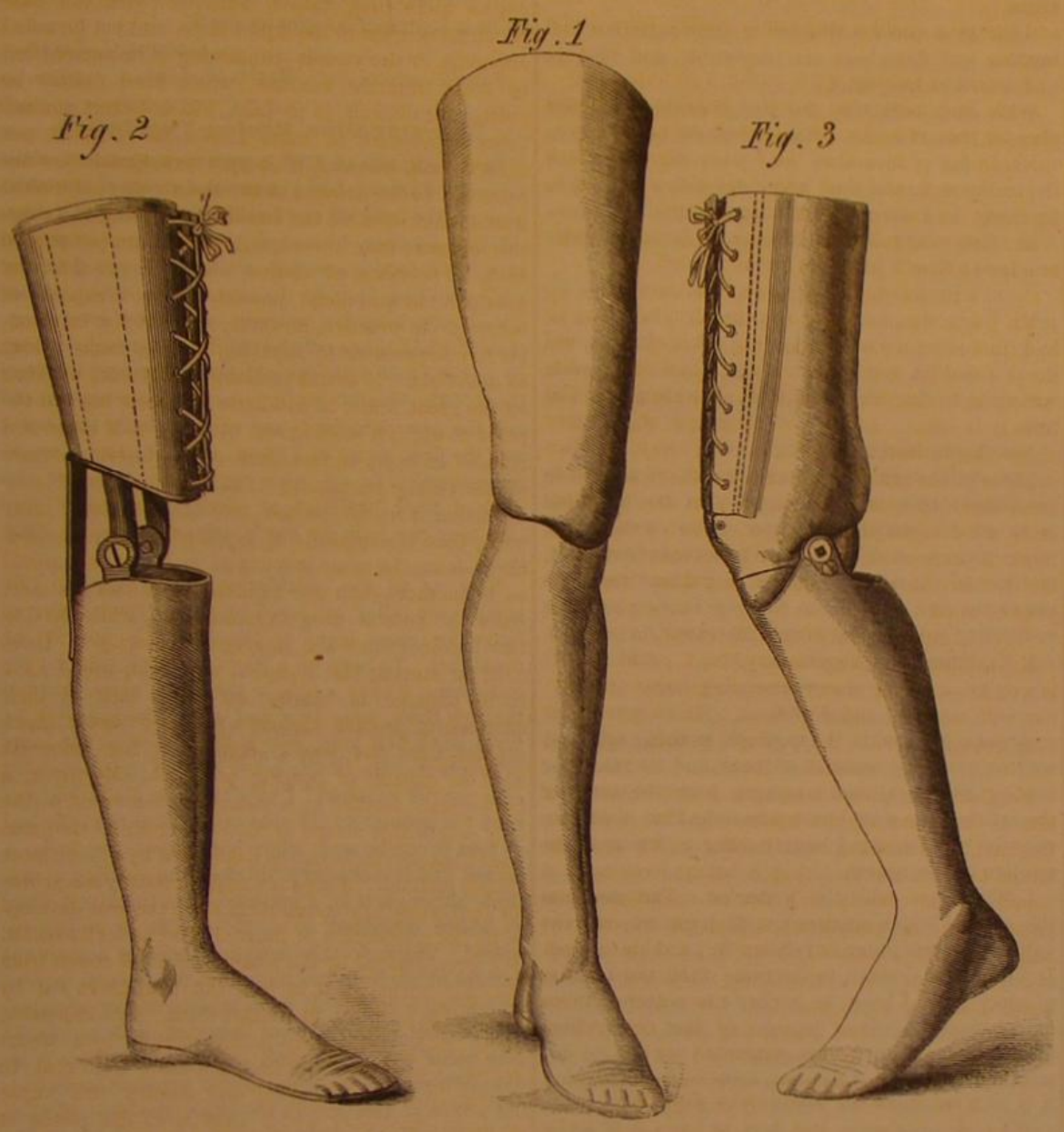
No. 3 is termed a knee bearing leg; it is to be applied where amputation takes place below the knee, and where the stump is too short, or contracted at right angles, so the knee joint cannot be used in walking. This figure represents the leg slightly bent at the knee, and bearing well upon the toe, as in the act of lifting it to take the next advance step.

No. 4 is a view of the India-rubber foot before being applied to the leg. This rubber foot constitutes the main feature in the legs shown in the figures. This foot is made mostly of india-rubber of a very spongy, light and elastic character. A piece of willow wood, nearly filling the rubber heel at the top or surface, where the leg rests, runs down about one-fourth of the distance towards the lower part of the heel; also forward and downwards to the joint at the ball of the foot, as shown by the dotted line. This piece of wood is the base upon which the foot is built, and is also the medium whereby the foot is joined firmly to the leg. The leg itself is made of light, tough willow, in all cases except the thigh piece shown in figure 2, and the front part of the thigh piece in figure 3, which are both made of leather. The entire leg and foot in all cases is covered with fine buckskin, neatly coated with a life-like water-proof finish, making it both light and strong.

It will be seen that there are no movable ankle-joints in these limbs the necessity for which being entirely obviated by the elastic rubber foot, which gives all the motion required in walking, and also the ease, firmness, elasticity and reliance absolutely necessary in a perfect artificial leg.

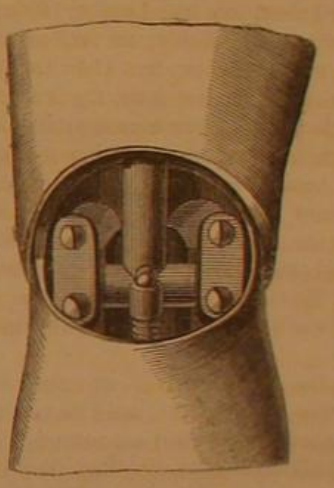
It would seem at first sight that no one could walk well on any artificial leg without the moving, flapping ankle joint, but practice proves this to be erroneous.

The rubber foot, also, gives all the required lateral motion to the foot when stepping upon sidling or uneven ground. This leg dispenses with all machinery of whatever character, and has been in use for the last two years giving great satisfaction.



MARKS'S ARTIFICIAL LIMBS.

Figure 5 gives a rear view of the knee joint of the long leg, (Figure 1,) the T joint is fastened to the upper part or thigh piece of the leg, and the gudgeons of the T are held in adjustable, oblique boxes which are easily set at any time by the screws passing through the caps into the main leg, and operating upon the spiral spring, so as to throw the foot forward when bent in walking, and so as to hold the foot under when bent at right angles in a sitting position. This feature has been secured by a separate patent, dated March 7, 1865. Figure 6 shows a rubber hand, made same as the foot, of which there can not be as much said, as of the other inventions. It corresponds, however, with the others, in its characteristic features of simplicity and durability, and wholly dispenses with machinery, giving a softness to the feeling and an elasticity which is very desirable. It is as useful as any hand yet invented, which is not probably saying much in its favor, as no art yet shown, if it ever will, can compare with "nature's handiwork." A patent for this hand has also been obtained, as in fact have all of them, through the Scientific American Patent Agency. These inventions have caused a great change for the better in the appearances of those who have lost natural limbs, and must give great relief to the maimed. The inventions, in dispensing with so much machinery, reduce the expenses of repairs very greatly, as there is no complicated gearing to get so often out of order. For further information address the inventor and manufacturer, A. A. Marks, 575 Broadway, N. Y.



Manufacture of Varnish.

Some attentton has been given to the use of acetone in the manufacture of varnish, by M. Wiederhold, according to whom acetone rendered anhydrous by rectification over chloride of calcium readily dissolves cold copal which has been previously heated to the point of fusion. Only 2·8 of acetone are required for 1 of copal, and a copal varnish is thus obtained which dries almost instantaneously, leaving a hard, brilliant and durable coating. A more concentrated and almost syrupy solution is obtained, without separating any copal, by expelling part of the acetone by distillation. Evaporated to dryness, the remaining copal is more soluble in acetone than when in its original state. The solubility of gum lac in acetone varies according to the species of the gum; 1 part of artificially bleached gum lac required only 1·5 of acetone to form a thick solution like syrup; another, a colored specimen of gum lac, was almost insoluble; and a third required 3·5 times its weight of acetone to dissolve it. Acetone dissolves with especial facility, and in considerable quantities mastic and sandarach; dammar, yellow amber, and india-rubber are, on the contrary, almost insoluble. The solution of acetone and mastic produces a very beautiful and brilliant varnish. M. Wiederhold is of opinion that acetone might be employed for the restoration of oil paintings deteriorated by the alteration of the varnish which often becomes opaque from the effect of a molecular modification, and which, from a vitreous and transparent state, becomes crystalline or pulverulent. By carefully applying acetone the opaque varnish may be momentarily dissolved, and will then redispose itself, but in a vitreous state.—*Mechanics' Magazine.*

A METHOD of exhibiting diagrams of apparatus, etc., by which lecturers may be saved the expense of the large drawings generally used, has been suggested by M. Thiblerge, of Versailles. His plan is to make a small sketch of the apparatus on a plate of glass, and with a large lantern to throw a magnified image on a screen. The lantern he illuminates by an ordinary gas burner with twenty-four holes, and with two silvered reflectors finds the light sufficient even to give a well defined image of the electrolysis of water.

Correspondence

Rules for Screw Cutting.

Messrs. Editors:—At several times, during a few months past, I have seen in your valuable paper directions for calculating the relative proportion of the teeth of wheels used in cutting screws in engine lathes. I have taught a great many persons to make these calculations, and I know that a large majority of machinists need some very simple process by which to make them. The last rule which you published I think is the best one for single gearing, and the one which I always use, but I have not seen a plan for getting at the combination in double gearing which is simple enough. Lathes are very easily made to use either double or single gearing for screw cutting, and it adds very much to their usefulness to make them so.

I have a lathe here which I made last fall in that way, and also to cut scrolls with the same gears in the same positions except one gear which is changed, that is to say, if gears are put on to cut a screw of ten pitch, by moving one gear a scroll of ten pitch can be cut.

My plan for calculating the number of teeth to be used with double gears is the following:—Suppose the leader to be 10 pitch; we want to cut a screw of 50 pitch; our gears range from 20 teeth increasing in number by 4 up to 80. I begin with the leader and the largest gear, say 80. Leader, 10×gear, 80=800.

Multiplying the pitch of the leader by the number of teeth in gear, the product I divide by the number of teeth in a smaller gear, say 20. 800÷20=40. The quotient (40) I now regard as the pitch of a new leader and proceed as in single geared lathes, my practice being this, for convenience: Leader, $40\times1\frac{1}{5}=48$; Screw wanted, $50\times1\frac{1}{5}=60$. On inspection we find that the gears are ranged thus: 80 goes on the leader; 20 goes on the stud and meshes with 80; 60 goes on the stud with 20, and 48 goes on the spindle, or the arbor which the spindle drives, and meshes with 60.

Where the spindle drives an arbor at a different velocity from its own this must be taken account of, and we must be governed accordingly, but there are but few builders who make them so; I know of but one (Putnam Machine Co., of Fitchburgh, Mass.) As I had to use a fraction in this example I will change it a little: Leader, 10; screw wanted, 40. Gear, 80×10=800; this dividend by 40, the number of teeth in gear to run with 80, gives 20, which, as before, is our new leader, and we go on as thus: Leader, 20×2=40; screw wanted, 40×2=80; position on lathe similar to the foregoing example. It is necessary to keep the head clear in determining their positions when the right gears are found.

I have been so minute because I know that a great many do not understand the rules as generally given. In one establishment where I have worked, where about two thousand men and boys are employed, I did not find one who could make the calculation for cutting screws with double-geared lathes.

Wm. A. Chapin.

White River Junction, Vt., March 16, 1865.

Drying Grain for Market.

Messrs. Editors:—In your issue under date of April 1 you have a short article under the head of "damp corn," and editorially ask "Why does this happen?" etc. I will answer so much of the question as relates to the dampness of corn stored through the winter embargo. It is this: Farmers think best as yet to store their grain at home rather than risk it in large cities. This home storage is of necessity where the grain can receive little, if any, treatment in the way of handling or airing, consequently it heats, and loses a certain per centage of its value. This is the reason why so much damp corn comes to market on opening of navigation. It is no new thing, but, on the contrary, is as old as the business. When the winter has been of a certain kind, more dampness shows itself than at other times. Accumulation of moisture is rather a rule than an exception.

It is not for the interest of the farmer, all things equal, to keep his grain at home, but rather to hasten it to market the moment the crop is gathered and ready to move. Could this be done, he saves interest money, and at the same time has his grain where it can be used as a capital to help on the next crop, or, if necessity requires it, for quick sale.

The remedy for this complaint of dampness is plain. Build, in New York City especially, a class of storehouses that will induce the farmer to store here over and above his out of the way places at home. These buildings must be strictly fire-proof, and of such materials as to be *sanitary* with reference to keeping the grain cool and dry, also free from the depredations of rat and weevil.

Fire proof means a building that has no wood in it, consequently will not burn or in any way risk its contents.

Sanitary means constructed of such materials that heating and dampness are impossible, and that rat and weevil cannot exist.

With such buildings the farmer could store here cheaper than at home. Here he would be free from the hard tax of insurance, and from the losses and depreciation consequent upon dampness and waste by insect and vermin. The depreciation by dampness alone would often pay more than six months' storage at New York rates.

Could a thoroughly fire-proof system of storage for grain be instituted here, the farmer would not be long in finding his interest in it, for New York is the great financial and export depot, where his grain will always bring the most money, either for loan or sale.

Wm. S. Sampson.

New York, March 30, 1865.

[An obvious remedy for damp corn is to store it in ventilated cribs, so constructed that the heat and moisture can ascend from the center of the mass, where it heats most. All grain is not sent to market, and farmers lose as much on that stored for home use as on that sold where heating takes place. A ventilating crib can be found illustrated on page 49, vol. X., Scientific American.—Eds.

Peat.

Messrs. Editors:—As so much is being said and written upon the subject of peat and its value for heating purposes, and inasmuch from the tenor of the articles one would naturally infer that it was an entirely new thing, I beg to offer a few remarks relative to the matter.

I fully agree with the writer of an article upon this subject which appeared upon page 100, current volume, of your paper in relation to its value for fuel. In Barnstable County, in the State of Massachusetts, of which place I have the honor to be a native, there exist extensive beds or deposits of peat, from which large quantities have been extracted for fuel for domestic uses from, I might say, time immemorial; and it is with emotions not certainly bursting with pride that I look back upon the days of my youth, when your humble servant might have been found toiling to increase his worldly resources at the rate of about twenty cents per day at the not particularly inviting occupation of "turning peat." It usually sold for from $5 to $8 per cord, oak wood selling at about the same price—the peat possessing the advantage that it required no sawing or splitting in order to prepare it for use. On the other hand, however, there is a good deal of waste from crumbling. Especially is this the case with peat from some localities, while from other locations it is very firm and hard, scarcely crumbling at all.

The process of manufacturing is as follows: The peat is dug with a kind of long spade made especially for the purpose, and is spread upon the ground in beds of five or six inches thick, from one to a dozen rods long, and from six to ten feet wide. It has to be tempered with water sufficiently to make it pliable enough to spread it easily, after which it is cut into blocks or cakes about five or six inches square, for which purpose a knife is used, which is usually made by fastening an old scythe to the end of a pole of suitable length. It is then allowed to remain for a week or ten days, according to the weather, or a time long enough to enable it to dry sufficiently to admit of its being "turned," which operation consists in separating by hand, and turning each block upside down, and placing them far enough apart as to admit a free circulation of air for the purpose of drying thoroughly, which generally takes two or three weeks, according to the weather, after which it is ready for housing for use.

For domestic uses, not the least important part is to have it thoroughly dry; if so, it usually burns very freely, leaving no cinders, and making very little smoke. The smoke it does make, however, has a very disagreeable odor, which pervades the whole house.

The ashes were never considered to be of any value—not at all to be compared to wood ashes.

As I have already remarked, there used to be large quantities manufactured every year, but of late, owing to the cheapness and general use of coal, its manufacture has been in a measure discontinued, and the peat bogs have nearly all been converted into cranberry patches, which I believe have proved to be a source of far greater profit.

George C. Paine.

San Francisco, Cal, March 13, 1864.

Re-shingling Roofs---Ventilation.

In the summer of 1863, says a correspondent of the *Canada Farmer*, I had occasion to renew the shingles on the roof of my dwelling. Instead of taking off the old ones, I covered them with mortar, and then, with nails about half an inch longer than the common ones, I put on the new, a plan which makes a roof safer from fire, warmer and better every way, than if I had taken off the old, as is generally done, or put the new upon the old without mortar between them. The idea of putting mortar between the old and the new shingles is not original with me, but I was the first, so far as I know, to do it; and I would recommend it to all who require to renovate the roofs of their dwellings, as there is no other way that they can gain so much advantage at so little cost.

Now as to the ventilation of bed-rooms. One small room full of air, used by two or three pairs of lungs, for some eight or ten hours, is not fit for breathing. To keep up a supply of fresh air in my bed-rooms, I have a hole in the stove pipes, passing through them, some two and a half inches wide by three and a half long, with a slide valve, on the same principle that the sliding cover is fixed to the opening of a powder canister. I have the hole about six feet from the ground on the side of the pipe next the bed so that it can be seen when lying upon the bed. I do not find it necessary to close the opening at any time, although it is, I presume, best to have it fixed as above described, so as to be able to do it if required. Through this opening there is a constant current of air from the room into the pipe, as is seen by holding a candle to it, or a piece of rag or paper. The current of air is never reversed, and no sparks ever come out of the pipe, consequently there is no danger from fire, as some might suppose, from having a hole of this size in the pipe, and the effect is that a constant supply of fresh air is kept in the room, and I know of no way in which thorough ventilation can be so easily obtained.

A New Microscope of Astonishing Power.

A foreign contemporary says:—It is not many months since one of the most eminent of living microscopists expressed his conviction that in the production of object glasses with a one-twenty-fifth of an inch focus the microscope had reached its utmost attainable limit of perfection. He added that "it appears impossible to separate or define lines more numerous than ninety thousand in an inch, on account either of the decomposition of light, or some other cause. It therefore seems beyond our power ever to discover more of the ultimate composition of bodies by means of the microscope." It is always foolish to use such "thus far and no farther" language in reference to any department of scientific research, but it is not often that its fallaciousness has been demonstrated within so short a period as in the present case. The above extract is taken from a journal dated December 10, 1864; and yet, already, the one thing which microscopists are now talking about is an object-glass with one-fiftieth of an inch focus, recently made by Messrs. Powell and Lealand, which was described to the Royal Society by Dr. Lionel Beale the other day, and was exhibited at the annual conversazione of that Society a short time since. This object-glass possesses double the power of the one which we were so lately told, and by so

great an authority, was the most powerful we must ever expect to possess, and defines with wonderful distinctness particles which the latter cannot render visible at all. It magnifies three thousand diameters, with the low eye-piece, or, with a Number Five eye-piece, fifteen thousand diameters—that is to say, in popular parlance, one thousand five hundred and seventy-five millions of times! It must immensely increase our knowledge of the lower organisms, and may even aid our researches into the ultimate constitution of matter. And who shall say that even its powers may not be exceeded in time?

MISCELLANEOUS SUMMARY.

Spectacles for Horses.—The United States *Gazette* relates the following incident: A gentleman had an old and valued horse whose sight was defective. For some time past the quadruped evinced a tendency to stumble, and to strain his sight at objects close to him, in a manner that set the kind-hearted owner to devising a remedy. The gentleman judged that, with a pair of spectacles, the horse would do as well as when in his prime. An optician ground to order a pair of pebble glasses, about the size of the object glasses of a large sized lorgnette. They were fixed in a frame over the horse's eyes. That animal is now a horse in spectacles, and not an elderly gentleman ever yet showed greater appreciation of the convenience. When in the stable the spectacles are removed.

To Keep Eggs.—M. Burnouf recommends, in *Le Belier*, a French journal of agriculture, the following method of preserving eggs:—Dissolve in two-thirds of warm olive oil one-third of bee's-wax, and cover each egg completely with a thin layer of this pomade with the end of the finger. The egg-shell by degrees absorbs the oil, and each of its pores becomes filled with the wax, which hermetically seals them. M. Burnouf affirms that he has eaten eggs kept two years in this manner, in a place not exposed to too great extremes of temperature. He thinks also that the germ may in this manner be preserved for a considerable time.

A Novel Mode of coal-selling.—An exchange says: In London and Liverpool coal is delivered in bags, and some of the Philadelphia dealers, acting upon this hint, have established a new mode of delivering anthracite. The coal, carefully screened, is placed in square iron boxes, each holding about seventy-five pounds. These, to the required number, are placed in appropriately constructed wagons, and the boxes being delivered over the open sides of the vehicle are conveyed directly to the bin without dust or dirt either in the street or within doors. The new plan seems to us to possess many advantages over the old system.

Aluminum ethide and methide were recently described by Dr. Odling, at the Royal Institution, as colorless liquids. The ethide boils at 149°, and does not freeze at —18°. The methide boils at 130°, and solidifies at a little above 0° into a beautiful crystalline mass. Both liquids take fire on exposure to air, and explode violently by contact with water. They are produced from mercuric ethide and methide respectively, by heating these compounds for some hours in a water-bath, with excess of aluminum clippings

The Paris correspondent of the *Chemical News* refers to the following scientific curiosity. If a crystal of sulphate of copper or sulphate of iron be put into a very dilute solution of silicate of potash, a sort of mineral vegetation grows up of the same color as the sulphate. In fact, a miniature forest may be obtained at the bottom of a jar, and by placing the crystal on the top of a layer of well-washed sand colored with a little bichromate of potash; the appearance is given of an artificial soil greatly resembling a natural gravely deposit.

Car Brakes.—Mr. A. I. Ambler, of Detroit, who has secured several patents through the Scientific American Patent Agency is about to apply his improvements in car brakes to the Michigan Central R R Mr. Ambler has made this subject a protracted study, and we wish him much success in his efforts to introduce his improvements, which we hope soon to illustrate in our columns.

Long Journey for a Letter.—Recently a number of the old-fashioned, worn-out mail pouches, from some of the western post-offices, was received at the Washington post-office. In one of them a letter was found postmarked "Vandalia, Ill., March 2d, 1836." It contained information in regard to a lawsuit before "a justis," upon which an appeal had been taken, requiring "twenty days' notice," and came to light twenty-nine years and twenty-three days after it was mailed, having been carried about all that time for ten cents.

Blakely Guns Made in Massachusetts.—The Putnam Machine Company have completed at their manufactory in Fitchburg a couple of 11-inch cannon, of the Blakely pattern, which weigh upwards of 43,000 pounds apiece. The breech is clad with a thick steel jacket, and this jacket is encircled with steel rings, making a thickness of about 12 inches of solid steel around the castings. They are for the defence of Boston harbor, and cost about $25,000 each.

Value of Rhubarb for Domestic Wine-making.—The cultivation of the rhubarb wine plant is attracting some attention at Fentonville, Mich. Last year two gentlemen procured 1,000 plants and set them out upon half an acre of ground 3x4 feet apart, and from the shoots they manufactured 440 gallons of wine, worth in this and Eastern markets $3 per gallon. It is called American sherry, and is said to possess valuable medicinal qualities, besides being a fine rich-flavored beverage.

Arrival of Choice Seeds.—The Commissioner of Agriculture has just received another lot of choice seeds, such as he has uniformly received and distributed. Among them are fine specimens of barley, oats, buckwheat, Alsike clover, varieties of bush beans or runners, pearl or round Turkey peas, Brussels sprouts, early short-horn carrots, turnip-rooted celery, large white kohl rabi, and varieties of white and red cabbage.

Government Employment of Women.—There are about 700 female clerks employed in the Treasury Department, and selected from almost all the States in the Union. Many of them have been rich but are now poor. Their chief business is in cutting and counting new legal tender and national bank notes, and in counting and destroying old ones. Their pay is $720 per annum each, for about six hours close work per diem.

An Egg Carrier Wanted.—Eggs are usually packed for market in oats, that grain having been found the best for the purpose. They are apt to get musty, however, and the eggs do not always arrive in good order, by any means. The oats also take up a good deal of room that might be economized, besides being very dear at the present time. Here is an opportunity for the ingenious. Time and money would be saved by a suitable egg carrier, both for market and family use.

Rebel Patent Office.—In our last number we alluded to the operations of the rebel Patent Office for the year 1864. Judging from the events of the past few days we presume that the business at that office has come to a stand still. Commissioner Rhodes, we presume, has gone off with his master Jeff to parts unknown.

Relative Density of Population.—Ireland still supports 184 souls to every square mile, France only 178; Spain supports only 80 souls to the square mile, Austria only 148, Prussia only 172, Bavaria only 161, Sweden and Norway only 19, European Russia 32. Only Italy, England, Holland, and Belgium are more thickly populated than Ireland.

It is announced that an inventor residing in Pittsburg, has challenged Sir William Armstrong to a trial in November next; each piece to be fired two hundred consecutive times.

Having a poor opinion generally of Sir William's gun we do not think our countryman would gain much renown by achieving a victory.

High Winds in England.

They have some high winds in England, as may be seen by the following lines cut from the *London Engineer*:—"It may be interesting, in connection with the north-eastern district, to note the fact that a railway train was stopped near Jarrow, last week, by the force of a furious north-west wind."

New Application of Spectrum Analysis.

The *Chemist and Druggist* says: There seems to be no end to the applications of spectrum analysis. With the wedge of glass, chemists, astronomers, and physiologists are opening Nature's safes, and disclosing things of inestimable value. Now, a new metal is brought to light; now, the constitution of the sun's burning atmosphere is revealed; and now a problem respecting the nature of the celestial nebulæ is solved.

In a paper, recently brought before the Royal Society by Dr. Henry Bence Jones, the latest application of spectrum analysis is described. It occurred to the author that it might be possible to trace the passage of substances from the blood into the textures of the body by the aid of the spectroscope, and, with the assistance of Dr. Dupre, he has obtained some very remarkable results.

The metal lithium, which can be readily detected, when in extremely minute quantities, by the spectroscope, was selected as the substance to be traced, and guinea-pigs were generally used for the experiments. Usually, no lithium could be found in any part of their bodies; but when half a grain of chloride of lithium had been given to a guinea-pig for three successive days, the metal was detected in every tissue of the body. Even in the non-vascular textures, as the cartilages, the cornea, the crystalline, lithium was found.

Two animals of the same size and age were taken; one was given three grains of chloride of lithium, and was killed eight hours afterwards; the other, which had no lithium given to it, was also killed. A piece of the lens, 1-20th of a pin's head in size, taken from the former, showed the lithium spectrum distinctly, proving that the metal had penetrated to the very centre of the lens. When the whole lens of the other animal was burnt at once, no trace of lithium could be detected.

A patient, who was suffering from diseased heart, took fifteen grains of citrate of lithia thirty-six hours before her death, and the same quantity six hours before death. The crystalline lens, the blood and the cartilage of one joint were examined for lithium: in the cartilage it appeared very distinctly; in the blood exceedingly faintly; and when the outer lens was taken, the faintest possible indications of lithium were obtained.

Another patient took ten grains of carbonate of lithia five hours and a half before death; the lens showed very faint traces of lithium when half the substance was taken for one examination; the cartilage, however, showed lithium very distinctly.

The importance of these results cannot be questioned. Our most valuable medicines, like the salts of lithium, belong to Graham's class of crystalloids, or diffusible substances; and their rapid action upon the system can now be partially understood. We trust that Dr. Bence Jones will continue his investigations, for the results already arrived at lead us to believe that spectrum analysis may do much for Therapeutics.

The National Debt.

The official statement of the public debt on the 31st of March shows that the amount outstanding bearing interest in coin is $1,100,361,241, the interest being $64,016,631. The amount bearing interest in lawful money is $751,055,128, the interest being $38,819,899. Debt on which interest has ceased, $349,420. Debt bearing no interest, $515,189,287. Total amount outstanding, $2,366,954,077. Total interest in lawful money and gold, $102,836,531.

The following is the amount of legal tender notes in circulation:—

One and two years five per cent notes	$69,522,350
United States notes, old issue	492,104
United States notes, new issue	432,668,465
Compound interest notes (act of March 3, 1863)	15,000,000
Compound interest notes (act of June 30, 1864)	141,477,650
Total	$659,160,569

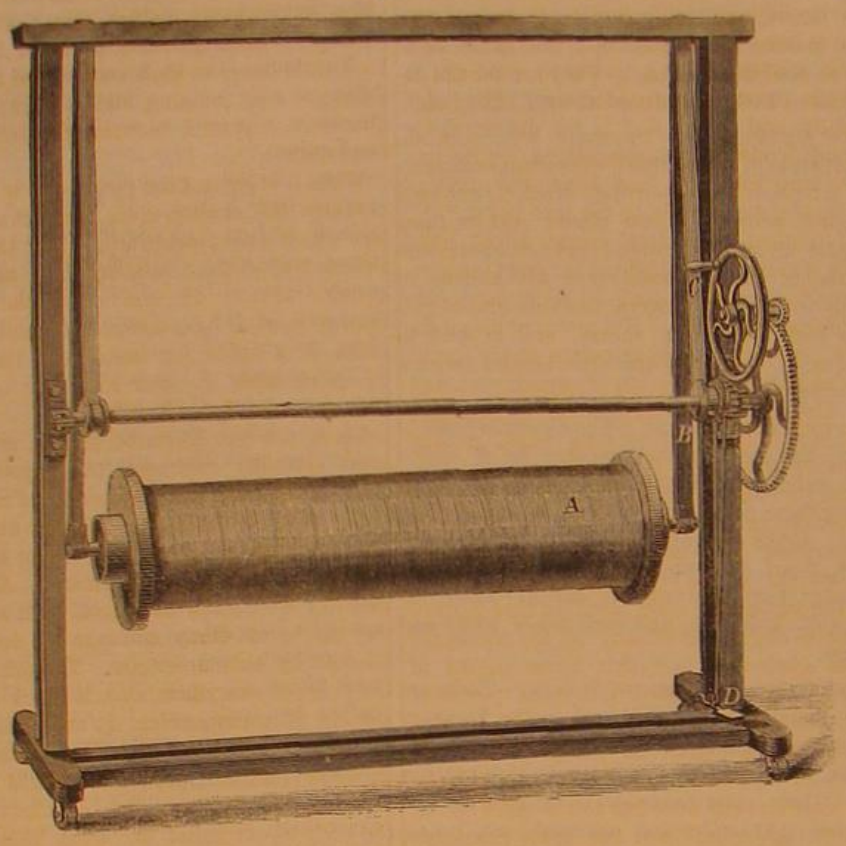
The amount of fractional currency is $24,254,094. Unpaid requisitions, $114,256,549. Amount in the Treasury, $56,481,925.

Precision.—Precision is a good trait of character. A writer in a late number of an agricultural contemporary says that 24 days, 12 hours, 43 minutes, and about 62 seconds is the turkey's natural time to sit.

Warp Beam Elevator and Transporter.

The value of this machine can readily be seen by the practical manufacturer. In the dressing department, heretofore, the necessary qualification in the helper has been strength instead of intelligence, and at times the overseer has been seriously troubled to obtain men who were strong enough to handle the beams, particularly on heavy work; very few men could be found who would not break down under this severe, constant labor. With this machine this difficulty is entirely obviated, while the labor of at least one man is dispensed with. Any person of ordinary intelligence can operate it. Being mounted on casters it can easily be moved in any direction and

Fig. 1



SAUNDERS'S WARP BEAM ELEVATOR AND TRANSPORTER.

quickly adjusted, relatively, to the warper, dresser or drawing-in frame, for the purpose of receiving or depositing the beam. The warper, dresser or drawing-in hands can easily change their own beams, without loss of time in waiting; oftentimes this will prove a great convenience aside from the absolute saving of time.

The operation is simple; the journals of the beam are inserted in the loops of the straps, and the power is applied to the handle on the balance-wheel; a ratchet gear on the main shaft, with a pawl attached to the frame prevents the beam from running down while being raised; this pawl is connected by a wire to a treadle, D, by means of which, the pawl can be held out of gear, while the beam is being lowered into its required position. This machine is in successful use in some of the best mills in the country. It was patented on the 16th of August, 1864. For further information address the manufacturer, A. H. Saunders, Nashua, N. H.

CAMP NELSON WATER WORKS.

A correspondent sends us a description of the water works constructed for the supply of Camp Nelson, Ky., under the direction of Capt. T. E. Hall, formerly of General Burnside's staff. The only thing that we discover in it worthy of note is the hight to which the water is forced at a single lift, this being 478 feet, measured vertically. As the water in the river rises and falls at its various stages 60 feet, the engine was placed on trestle work 75 feet above the river at its lowest stage. A simple lift and plunge pump is employed, with a pump rod of 3-inch iron 75 feet in length. The pipe through which the water is forced up into the reservoir is of cast iron 8 inches in diameter, and 60,000 gallons are raised every twenty-four hours, supplying a camp of 10,000 men and 12,000 animals. The water is distributed throughout the camp of 4,000 acres in service pipes, and the whole cost of the work was $35,000. The works are very creditable to Capt. Hall's engineering skill.

SAUNDERS'S IMPROVED BOBBIN.

The object of this improvement is to avoid the waste which usually results from the manner of attaching the yarn to the ordinary bobbin during the process of doffing, or applying it to the spinning frame. With the ordinary bobbin the yarn is wound a few times around the barrel until there is sufficient friction to hold it securely when the full one is broken off, invariably leaving the end of the yarn flying; this flying end will get crossed and entangled in the first layer of yarn, and in unwinding, on the spooler or warper, or in the shuttle, the yarn will break, leaving more or less on the bobbin, constituting waste, which, at the present or even at the old prices of cotton, forms no inconsiderable item in the cost of manufacturing; very much of this waste is not apparent as yarn-waste, as the short pieces are unwound and thrown upon the floor, and appear in the waste account as sweepings.

Fig. 1

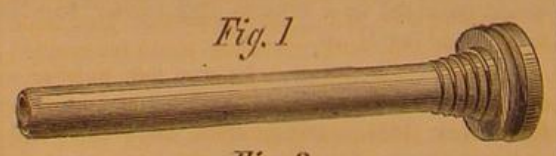
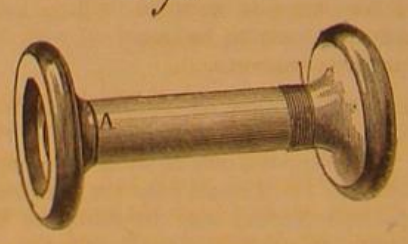


Fig. 2

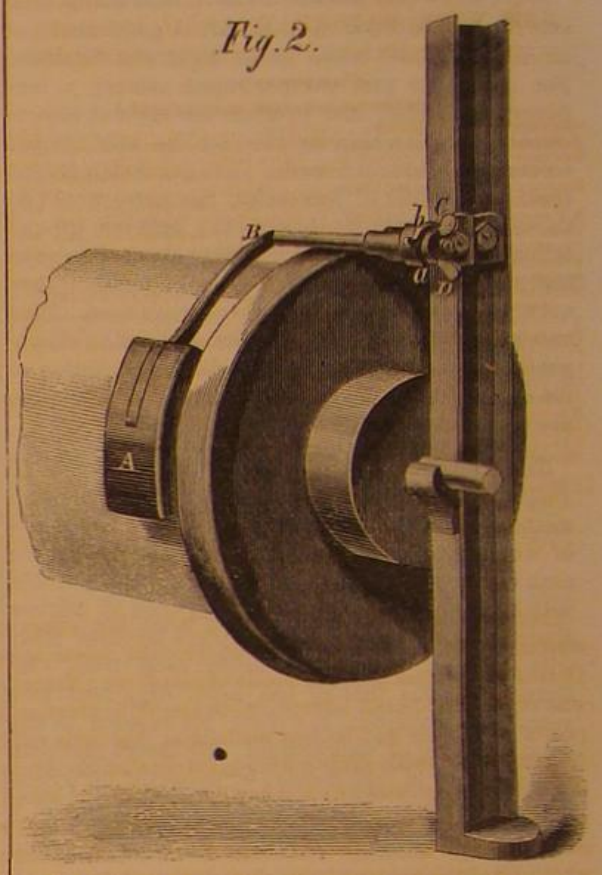


This improved bobbin has an angular or V-shaped groove, A, cut into and extending entirely around, the barrel, at the foot of the taper of the head; the doffer has only to wind the yarn once, or at most twice, around the barrel of the bobbin, in this groove (the taper of the head serves as a guide to the yarn, without any particular care on the part of the doffer), break off the full bobbin close up to the groove, a habit easily and naturally acquired, and the end of the yarn is secure; the drag of the bobbin only serves to hold it more securely. The inventor guarantees that not a particle of waste will be made by leaving yarn upon this bobbin; it takes less time to doff; every end is securely fastened by the first attempt, so that the frame starts up at once, without any subsequent stopping to secure the loose and flying ends. This hitching groove can readily be made in any ordinary warp or filling bobbin; in fact, the inventor prefers to apply his groove to them, as the wood is harder and smoother after they have been used. Patented August 25, 1863. For further information address B. Saunders, Nashua, N. H.

SAUNDERS'S FRICTION WEIGHT FOR BEAMS.

This invention has been made with the view to obtain a friction on the beam that will give a uniform tension on the yarn, and thereby prevent breakages in the loom. To obtain this the inventor uses a weight, A, which rests upon the yarn on the section beam, near its head; this weight is held by an arm, B, to which it is attached in such a manner that it

Fig. 2.



will conform to the surface of the yarn; this arm passes through a stand, C, which is bolted to the dresser frame, fitting so that it will readily turn in the bearing; on the end of this arm a thread is cut to fit a thumb-screw, D; this latter has a groove, *a*, turned in its circumference, in which a pawl, *b*, is fitted to retain it in its position; this pawl is attached at its other end, to the stand, and so that it can be raised up and out of the grooved nut, to allow the arm to slip through when the beam is to be changed. It will readily be seen that when the beam is full, the weight will be at nearly a right angle with the stand, giving a friction equal to its full weight, but as the yarn is unwound, and the deam grows smaller, the weight conforming to the surface will drop and be supported by the arm in the stand more and more, in exact proportion to the decrease of the diameter, and of course the friction will decrease in the same proportion. Ordinarily, with good warping, this friction will be sufficient, but if the number of the yarn is not uniformly the same, and care is not taken to weight the beam properly on the warper, it will become necessary to have more friction than the weight affords; this can be obtained by turning the wing-nut, which will bring the side of the weight to bear against the inside of the beam head, and the friction can be increased as much as may be required. The bearing surfaces of the weight are covered with leather, to avoid injury to the yarn and beam head. Actual use, says the inventor, has proved that this friction weight will save more than one half of the usual number of breakages in weaving. All things being equal, the inventor guarantees fifty per cent less breakages of the yarn in the loom with this weight on the dresser than with any other now in common use. It was patented Nov. 15, 1864. For further information address B. Saunders, Nashua, N. H.

THE breech-loading rifle Commission at the Springfield armory are very busy completing their work, and will, no doubt, strongly urge the adoption of the breech-loading rifle.

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Contents:

(Illustrations are indicated by an asterisk.)

*Stannard's Water Motor..... 239
A Strong Room..... 239
Genuine Diamonds Found in California..... 239
Scarcity of Furs—Better Traps Wanted..... 239
A Locomotive with a History. 239
Facts About Petroleum..... 240
Preservation of Steam Boilers. 241
Bituminized Paper Pipes..... 241
Savannah Cotton..... 241
Machine Molding in Lead Works..... 241
A New Detergent..... 241
Perpetual Motion..... 241
Polytechnic Association..... 242
Farmers' Club..... 242
The French Ammonia Engine. 242
Artificial Limbs..... 243
Manufacture of Varnish..... 243
Rules for Screw Cutting..... 244
Drying Grain for Market..... 244
Re shingling Roofs—Ventilation..... 244
A New Microscope of Astonishing Power..... 244
Peat..... 244
Miscellaneous Summary..... 245
High Winds in England..... 245
New Application of Spectrum Analysis..... 245
The National Debt..... 245
*Saunders's Beam Elevator and Transporter..... 246
Camp Nelson Waterworks.... 246
*Saunders's Improved Bobbin..... 246
*Saunders's Friction Weight for Beams..... 246
The Great Victory..... 247
Knowing Too Much..... 247
Strikes..... 247
Value of Coal Ashes..... 247
Microscopic Objects..... 248
Recent American Patents..... 248
Patent Claims.....248, 249, 250
Notes and Queries..... 251
*Bond's Step Ladder..... 254
A Rare Mineral..... 254
Bleaching Sponge..... 254
Wild Peppermint as a Rat Exterminator..... 254

THE GREAT VICTORY.

There was satisfaction in Athens when the overwhelming danger to the Republic from the hosts of Darius was scattered at the battle of Marathon; there was relief throughout Greece when the still greater power of Xerxes was broken at Platæa; the bells of England rang with gladness when the Invincible Armada was swept away by the fleets of Elizabeth; but never since the beginning of the world has there been so wide-spread, exalted, and profound joy as that which filled the hearts of the American people when the telegraph flashed the intelligence over the land that the central power of the rebellion was broken in pieces.

And well we might rejoice. This great event stirred all the emotions of the heart. It appealed to all that is weakest and strongest, to all that is highest and lowest in human nature. The first thought was a feeling of triumph over the formidable enemy that was struggling to destroy the nation, an enemy defiant, haughty, contemptuous and absolutely fiendish in his malignant cruelty. But the strongest emotion was gratitude for the safety of the unity and power of the nation through the great peril. It was well understood that the question at issue was, whether this country should be broken up into hostile and contending fragments, burdened with the support of vast armies and navies, passing the time in brief alternations from peace to war, now watching with jealousy the growth of each other's power, and now cutting each other's throats; or whether we should be one great, united, harmonious people, settling our disputes by decisions of the Supreme Court, with the inconceivable blessings of popular education spread throughout our borders, with an organized, prosperous, contented and hopeful industry, with the means of happiness more abundantly and more widely diffused, and with the masses of the people raised higher in the scale of humanity than has ever yet been known in the history of the human race.

For the right determination of this great debate the heart of the nation is moved with inexpressible gratitude to the brave and devoted soldiers of our patriot army. Among so many thousands there are doubtless considerable numbers of scoundrels, but on the whole there has never before been marshalled in the ranks of war a body of men so high in all mental and moral attributes as those who are now engaged in the glorious work of crushing to earth the last remnants of this most wicked rebellion. The army that came nearest to ours was doubtless that of the Roundheads of England, but when we consider the progress that has been made since 1640, in civilization, and especially in general education, there can be no doubt that our soldiers are superior in intelligence and character even to the fine body of men that were led to invariable victory by Oliver Cromwell. Braver than the "Ironsides" it were perhaps impossible for soldiers to be, but impartial history will pronounce those not less brave who bent their heads and went forward through the withering fires of the Wilderness, and dashed themselves so many times against the impregnable defences of Spottsylvania.

With this gratitude to the soldiers comes the slow but inevitable recognition of the greatness of their commander. General Grant may not have an intellect superior in its power of comprehending problems, but through all future generations his memory will occupy the very highest position among those eminent men who have been great in action. The mind that he has is all wisdom; it is a guide to conduct; it throws its light upon the untrodden way. His judgment is healthy and sound, and is not disturbed by collateral and irrelevant considerations. "He has one of those rare intellects that across the maze of immaterial facts goes straight to the true point."

But the judgment of General Grant would have done nothing towards accomplishing his great achievements without those strong qualities which have carried his decisions into effect. His power of dispatching business brought all departments of his great army into the highest perfection of organization and discipline. He has, too, in an eminent degree that highest courage which has been rare indeed among the commanders of armies—the moral courage that dares to take the responsibility of battle. But the strongest element in his character is his inflexible tenacity of purpose. It is not the patience that waits in idleness, but the active perseverance that works and waits—the instinctive determination that is stimulated to more dogged obstinacy by the encounter of unforeseen obstacles, and that never thinks of looking back. This is indeed the most powerful quality in human nature, and in a contest it decides the victory. Said Wellington at Waterloo—"Three times I have saved this day by perseverance," the triumphs of Marlborough were due to the same spirit, and the highest appreciation of the noble character of Milton has declared its crowning grace to have been "his sublime and majestic patience."

The surrender of Lee, with his whole army, is a fitting conclusion of the masterly generalship of Grant and the splendid fighting of his noble army.

KNOWING TOO MUCH.

"A little knowledge is a dangerous thing," says Pope, and the truth of it was brought forcibly to our mind recently, when visiting a machine shop. The foreman was telling an apprentice how to do some part of the work when the youth interrupted him, saying—"I know all about it—I can do it myself." "Well!" said the foreman in reply, "I have been twenty years in this business and I can't say that I know it all. I am content to learn every day, and I think after you have lived a little longer you will find what I say to be true."

It was; we corroborate it.

It is natural that a youth should be hasty, and in the pride of his initiation into a few mysteries of his trade, fancy he is master of it all. But time brings experience to him as to us all, and that is the light which reveals, not how much but how little we know.

All knowledge is comparative, and the greatest minds are not the most ostentatious—not the most boastful of their accomplishments—but are content to acquire a little every day, to add to their stock. "There is no royal road to learning," which is to say, that the man in humble life has as fair a chance as the rich one, and that money cannot purchase mental ability, although it may bring privileges for information. In the pursuit of knowledge with facilities, not under difficulties, we are all dependent one upon the other. The practical man has his experience to demonstrate that certain effects spring from specific causes; the scientist brings his knowledge of physical laws and the properties of matter generally to bear upon the solution of a given question, and both classes work to mutual advantage; for one to sneer at the other as a visionary, or as an artisan, as the case may be, is to show how a little knowledge can be made a dangerous thing.

STRIKES.

If the story of a helpless child starving to death is told in simple narative and minute detail, it moves the sympathy, and harrows the soul of every reader; it sinks into the heart, and fastens upon the memory so that it can never be forgotten. But if the story is of many hundreds or thousands perishing by starvation, the magnitude of the suffering removes it from the scope of our sympathy.

By this principle in human nature, we all fail to form any conception of the wasting woe that is now filling thousands of households among the iron workers of England. The 70,000 men that were thrown out of employment by the great lock-out, have no means of obtaining a subsistence for themselves and their little ones but their own skilled right hands, and these are now hanging idle by their sides, in consequence of a quarrel between themselves and their employers.

While it is beyond the power of our imagination to conceive the cruelty upon the part of the iron masters which could arbitrarily bring this wide-spread suffering upon their colaborers, we are prompted to enquire whether the conduct of the workmen has been so marked by common sense and judgment as to make it a guide for imitation. This great crisis brings up anew the ever recurring question in relation to the wisdom of strikes.

There are two kinds of strikes, and one of these must certainly command the approval of all who really sympathize with the masses of mankind. That is the strike of the individual, who accumulates capital by saving till he can leave his service and go to work upon his own account. All the advance that has been made in wages, from a few pennies a day up to as many shillings or dollars, has been effected by this operation. The price of labor, like the price of everything else, is fixed by an inexorable law of nature, which no man can alter—the law of supply and demand. The demand for labor depends upon the amount of capital seeking to hire laborers. Every man who withdraws himself from the body of employed and adds himself to the body of employers, exerts a tendency by both operations to raise the wages of labor. We may hate, we may even despise, this miserly spirit, but we cannot deny that we are indebted to this very spirit of accumulation for the superiority of wages in this country and England over those in India and Ceylon.

In a nation of educated and provident workmen large numbers of individuals are constantly passing from the class of hired to that of hirers, and wages consequently are steadily advancing, without any jar, without any ill will, without any suffering. We raise no quarrel with those who think it wise and profitable to organize strikes. We are well content that every man should determine his own course in accordance with his own judgment. But for our own part, the agencies to which we look for securing a perpetual advance in wages, are common schools and savings banks.

VALUE OF COAL ASHES.

The *Manchester Courier* of March 11th says:—"It seems that an extraordinary rise has taken place in the value of ashes in London. A short time ago the parish of St. Pancras had to pay contractors to take them away from the houses in the district, but it has now, in consequence of the augmented value, conceded the right to collect them to Mr. Ferguson, of Paddington, for which he has paid no less than £1,800, although the concession is only for six months. But the high price tempts other speculators to poach on Mr. Ferguson's manor and yesterday morning he had to bring a man named Bridges before the Clerkenwell magistrate, for purchasing ashes of the inhabitants on his own account. The magistrate said he was determined to protect the contractor, and fined the unauthorized collector, £2. As he was unable to pay that sum he was sent to prison for three weeks."

It would be very interesting to know for what purpose these ashes are used. Muspratt gives analyses of nine samples of Scotch and Welsh coals; and of

these that from Porthmawr in Wales is about an average specimen. Its constitution is as follows:—

Silica	34·21
Alumina and oxide of iron	52·00
Lime	6·199
Magnesia	0·659
Sulphuric acid	4·12
Phosphoric acid	6·633
Total	97·821

The other samples are formed wholly of these same substances, but in different proportions. The silica and alumina would doubtless be combined as silicate of alumina, which is clay.

The lime would be combined first with the phosphoric acid which in this specimen would take it all. The compound formed would be phosphate of lime. This is commonly said to be insoluble and worthless, the biphosphate or super-phosphate being the soluble and highly prized fertilizer which produces such magical effects. The phosphate is, however, soluble to some extent, and is not wholly worthless as a fertilizer.

In other samples of coal ashes which have been analyzed, the quantity of phosphoric acid was not sufficient to take up all the lime, and in these cases the remainder of the lime would enter into combination with the sulphuric acid, forming sulphate of lime. This is known under the names of gypsum and plaster of Paris, as a very valuable fertilizer.

It may be that the ashes of English coals contain these two substances, phosphate of lime and sulphate of lime, in sufficient quantities to make them valuable as manures. It would be a little surprising, however, if their value for this purpose should be so great as to make the privilege of collecting them in a single district for six months worth $9,000. This circumstance suggests the possibility that some rare metal or other valuable substance may have been discovered in them. It also suggests the desirableness of a more thorough examination of the ashes of American coals. The constitution of these is, however, so different from that of the ashes of English coals, that it by no means follows that any substance occurring in one will be found in the other.

MICROSCOPIC OBJECTS.

"All that tread
The earth are but a handful to the tribes
That slumber in its bosom,"

says Bryant, speaking of the human race. With equal truth it may be said that all the hosts of mankind who have been born into the world since the creation, are but a handful to the countless myriads of beings that swarm in that invisible world which has been revealed to us by the magical power of the microscope. When we reflect that each one of these beings has his own needs and desires, his loves and battles, his career from life to death; and that every drop of every stagnant pool has been teeming with them for immeasurable ages before the existence of the human race, the mind is overwhelmed in the effort to conceive the vastness of this creation. It is an impressive thought that mankind should have lived on the same planet with this world of sentient beings for so many thousands of years without any suspicion of its existence.

It is not strange, therefore, that when the discovery was made, the minds of men should be turned to the examination of their minute, strange and curious contemporaries, and that this study should be prosecuted with ever-widening interest. That this is the case we are very frequently reminded by some improvement in the microscope, by some discovery through its aid, or by some work upon its use.

We have now before us a book of 140 pages on "The Preparation and Mounting of Microscopic Objects," devoted exclusively to this department of microscopic observation. The various methods of attaching the minute specks to glass slides, so that they may be brought under the focus of the instrument, as well as the balsams and cements employed, and the different modes of preparing the objects, are very fully and intelligently discussed.

The work is by Thomas Davies, and is published by William Wood & Co., 61 Walker street, New York.

A PINE tree was lately cut in Colebrook, Conn. for the shaft of a big wheel for a Manufacturing company, which worked thirty-six inches in diameter and twenty-six feet in length. The stump was six feet through.

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:—

Protector for Baskets.—This invention consists in applying a metallic frame to baskets in order to protect the same or preserve them from wear or injury. The inuention is chiefly designed to be applied to large baskets or those in which weighty substances are conveyed or carried, such, for instance, as bushel baskets used by farmers and others, coal baskets for carrying coal, &c. Baskets of this kind are soon worn, cut, broken or destroyed, in consequence of the weighty substances carried in them, and a metallic frame renders them durable, serving as a support to the basket in holding its contents and likewise protecting it from external injuries, such as blows, concussions, &c. Philip Eley, of New York city, is the inventor.

Means for Raising Oil from Wells.—This invention relates to a new and improved means for raising petroleum in wells through the medium of air injected into them. The invention has for its object, first, the keeping of the air passage free from mud, sand, etc., which are liable, in the old plans, to choke all said passage; second, in having the air passage so arranged that it will not interfere in the least with the ascent of the oil in the oil tube, nor the oil interfere with the current of air—due provision being also made for the difference in the exhaustion of the oil tube and well pipe, as well as for the ready connecting and disconnecting of the several parts. The above invention is by Messrs. L. W. Turrell, Samuel Stanton, and L. C. Ward, Newburgh, Orange Co., N. Y.

Winding up Watches.—This invention consists of a main spring barrel composed of two barrels, one inside the other, the outer barrel being rigidly connected with the main gear wheel, and the inner barrel carrying the winding arbor, the main-spring and the maintaining ratchet, or its equivalent, in combination with two stops or dogs, one applied to the inner, and one to the outer barrel, in such a manner that, when the spring is wound up the inner barrel turns independent of the outer barrel until the two stops are in contact, and when the main spring breaks the inner barrel flies back and completes a full revolution, or nearly so before its stop strikes the dog of the outer barrel, and thus the force of the spring is spent, and injury to the mechanism of the watch is prevented. Invented and patented by G. C. Martin, Cleveland, Cuyahoga Co, Ohio.

Roller Cleat for Trunks.—This invention consists in the arrangement of mortises or cavities in the cleat of a trunk, in combination with rollers, the axles of which have their bearings in the sides of said mortises or cavities in such a manner that the rollers can be secured to the cleat without the use of a metal bracket, and a simple, cheap and durable fastening for said roller is produced. The ends of the cleat are made thin and turned up over the edge of the trunk in such a manner that, by the cleat, the edge and ends of the trunk are protected, as well as its bottom, and the cleat is less liable to be knocked off than it is when attached to the bottom in the ordinary manner. John A. Lieb and John Schmadel, of 69 Prince st., Newark, N. J., are the inventors of this improvement.

PURIFYING WATER.—A Mr. H. A. Sheldon sends the following account of an experiment to purify water:—"Having occasion to purify river water which was colored by passing through swamps containing muck, peat, and other decayed vegetable matter, I tried the usual method with alum, which deposited the mechanical impurities but left the water the color of pale sherry wine. I then mixed 1 oz. powdered alum and 2 oz. clean white clay together, for one barrel of water, made a thin paste and stirred it with the water, which, in twelve hours, was perfectly transparent and colorless. The precipitate in the latter case was of a dark chocolate, in the former a pale ashen color."

MESSRS. DAVISON, STILES & WOOLSEY, 229 Broadway, are the agents for the traveling and steam cranes illustrated on page 190 of the current volume. All letters should be addressed to them.

ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING APRIL 4, 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.

47,080.—Cigarette.—L. L. Arnold, New York City:

I claim, First, As a new article of manufacture, a cigarette, constructed and combined in the manner described, and,

Second, The method herein described of making the same.

47,081.—Cabinet Organ or Harmonium.—Thomas Atkins, Cincinnati, Ohio:

I claim so arranging the stops or swells of an organ or harmonium with regard to a common lifting piece, F, operated by a foot or knee pedal, as that they may all, or any one, two or more of them, be opened or closed by said pedal, without raising the hands from the keys, substantially as herein described.

47,082.—Manufacture of Blacking, Etc.—Roberts Bartholow, Cincinnati, Ohio:

I claim the manufacture, compounding and preparation of a new and improved kind of oil blacking for leather, boots, shoes, harness and other articles manufactured, in whole or in part, of leather, composed of the ingredients above named, and manufactured, compounded and prepared in the manner and for the purposes substantially as set forth at large above.

I also claim, as a new manufacture, oil blacking for leather and other articles, made by combining petroleum or any of its products, or other hydro-carbon oils, treated substantially as hereinbefore set forth, with any suitable acids, oxides, gums or resins, substantially in the manner specified.

47,083.—Oil for Paint.—Roberts Bartholow, Cincinnati, Ohio:

I claim the manufacture and preparation of a new and improved kind of oil for mixing and compounding with white lead, zinc, white and other mineral paints and pigments, in lieu of linseed oil and other paint oils, and for other purposes, composed of the ingredients above named, and compounded, manufactured and prepared in the manner and for the purposes substantially as set forth above.

47,084.—Process for Preparing Petroleum for the Manufacture of Paint, Etc.—Roberts Bartholow, Cincinnati, Ohio:

I claim the manufacture, compounding and preparation of paints for common purposes, of various colors and shades of color, and embracing all colors and shades of color, from crude petroleum and refined petroleum, in combination with sulphuric acid, nitric acid, acetic acid, common glue, dry white lead, otherwise known as carbonate of lead, dry white zinc, otherwise known as oxide of zinc, and other white pigments, and pigments of various colors, combined in the proportions and in the manner substantially as set forth above.

47,085.—Machine for Securing Soles to Boots and Shoes.—John Blakeney, Philadelphia, Pa.:

I claim, First, The screw rod, I, and its internal wire, x, and the nut, composed of the arms, G and G', or their equivalents, in combination with the system of gear wheels herein described, or the equivalent to the same, whereby the said screw rod is caused to revolve at a faster speed than the nut, for the purpose specified.

Second, Two or more cutters, 4 and 7, arranged in the projection, m, of the rocking frame, in respect to the wire x, in combination with the slotted plates 10, or their equivalents, for adjusting the said cutters, as set forth.

Third, The support, 24, adapted to the last, in combination with the movable plate, Y, and the devices herein described, or the equivalent to the same, whereby the said support can be adjusted vertically and laterally, in the manner described.

Fourth, The combination of the plate, Y, adjustable plate, 14, rocking frame, 19, adjustable support, 24, and sliding support, 15, the whole being arranged and operating substantially as and for the purpose herein set forth.

47,086.—Spring Bed Bottom.—J. Blair Bowditch, New Haven, Conn.:

I claim the combination of the slats, B B, with the wooden springs, D D, as herein described, for the purpose specified.

47,087.—Lamp Cone.—Charles H. Buckalew, Jersey City, N. J.:

I claim the construction of the cone frame with a metallic base and bifurcated connecting arch, with a filling or dome of glass blown or cast within the said frame, substantially as herein described and represented.

[This improvement relates to the construction of the air cone or flame deflector which surrounds or covers the upper part of the ordinary kerosene or petroleum oil lamps. The improvement consists in forming the cone of glass and metal combined. A frame of metal is first made, corresponding to the shape of the cone; this frame is then filled with glass, when hot, by pressure. A transparent cone is thus produced, the use of which results in obtaining probably twenty per cent more light from lamps to which the improvement is applied.]

47,088.—Breech-loading Fire-arm.—John W. Cochran, New York City:

I claim, First, So constructing and applying a breech block, having a movement such as is herein described, as to provide for the insertion of the cartridge into the barrel from the under side of the stock of a fire-arm, substantially as herein specified.

Second, Providing a cavity, c, substantially as herein described, in the under side of such a breech block for the reception of the cartridge when the gun is in the inverted position shown in Fig. 3, whereby the movement of the said block which is necessary for the insertion of the cartridge into the chamber of the barrel is greatly reduced, and the discharged cartridge shells are steadied while being withdrawn from the barrel.

Third, The construction and arrangement of the rear end of the breech-operating lever, e, substantially as herein described, whereby an opening between the said end of the breech block and the stock is avoided.

47,089.—Railroad Switch.—J. W. Colwell, Macedonia, Ohio:

First, I claim the guards, C C' d d', and guard rails, D D', in combination with the switch rails, when arranged as and for the purpose set forth.

Second, I claim placing the main track, A A', on a tangent with and at the junction of the side track, B B in combination with the guards and guard rails, substantially as and for the purpose specified.

47,090.—Harrow and Roller Combined.—Wm. H. Converse, New Castle, Maine:

I claim the harrow, E, fitted in or to the frame, A, substantially as shown, in combination with the bent bar, F, provided with the plate,

G, and a rear part, g, having a relative position with the harrow teeth, c, as described, the sides, f f of F, being fitted loosely on the harrow shaft, D, and bar, F, and harrow, E, connected by a spring, H, the above parts being applied to the frame, A, of a roller, C, and all arranged to operate substantially as set forth.

[This invention consists in combining a harrow with a roller and arranging the former in such a manner that it may be readily cleaned from weeds and trash which may engage or become entangled in its teeth, and also be capable of yielding to conform to the irregularities of surface over which it may pass.]

47,091.—Railroad Car Brake.—David T. Cross, Cincinnati, Ohio:

I claim the self-acting pawl, K, and its described or equivalent accessories, for the object set forth.

47,092.—Trunk Stay.—John M. Dailey, New York City:

I claim the use of one or more curved bars or plates moving upon suitable guiding pins in the cover and body of a trunk or other case, arranged and operating substantially as herein described and for the purpose specified.

Second, The combination with an ordinary hinge of the curved bar, h, arranged together and operating substantially as and for the purpose specified.

[This invention relates more particularly to traveling trunks, and consists in a peculiar combination of the hinge and stays, whereby they serve not only as clamps for strengthening the corners of the trunk, but also afford much more reliable holding stays for the trunk cover when open than the ordinary ones hitherto employed.]

47,093.—School Seat and Desk.—Wm. Disbrow, San Francisco, Cal.:

I claim the arrangement of the grooved bars, K, and sliding seat, M, with the standards, E, and desk, A, in the manner herein shown and described.]

[The object of this improvement is to facilitate the adjustment of the length and inclination of school desks, so that such furniture may be readily changed to suit the wants of pupils, enabling them to preserve the best bodily positions for health, etc. This is one of the best inventions of the kind that has come to our notice.]

47,094.—Desulphurizing Ores.—M. B. Dodge, New York City:

I claim mixing the ore and salt in a dry state and afterward steaming them within a close vessel in a perforated bottom.

[This invention consists in treating auriferous or argentiferous ore after it has been stamped with steam and common salt, in such a manner that the salt is equally diffused throughout the entire mass, and when the mixture is put into the desulphurizing furnace the full benefit of the salt is obtained, and the sulphur is effectually separated.]

47,095.—Pump Piston.—Wm. Foster Dodge, New York City:

First, I claim the expanding band, D, in combination with the shell, A, having a series of openings through which the pressure of the column of water or other fluid acts against the interior of the said band, substantially as and for the purpose herein specified.

Second, A piston, composed of a hollow shell, A, having openings, a a, in its sides and a valve seat and valve at or near its bottom, and a surrounding band of leather or other soft elastic or flexible material confined to the said shell between the said openings, by means of rings, c c, the whole combined substantially as and for the purpose herein specified.

47,096.—Protector for Baskets.—Philip Eley, New York City:

I claim a metallic frame, adjustable or otherwise, applied to baskets, in the manner substantially as and for the purpose herein set forth.

47,097.—Screw Steam Valve Cock.—Samuel D. Fales, Central Falls, Smithfield, R. I.:

I claim constructing the valve and valve seat for a steam or water valve cock in the manner substantially as described, for the purposes specified.

47,098.—Railroad Draft Bar.—Remy Fiegel, Montgomery County, Pa.:

I claim the boxes, A A', springs, B B' B' B' B', rod, C, bolt, F, and shackle, G, in combination with a buffer, E, rigidly fixed to the platform of a car, the whole being constructed, arranged and applied so as to operate together, substantially as described and set forth, for the purposes specified.

47,099.—Remedy for Disease in Trees.—Henry Furnel, Huntington, N. Y.:

I claim the combination of the herein-before mentioned ingredients, for the purpose set forth, substantially in the proportions described.

47,100.—Mode of Rendering Wick Incombustible.—E. P. Furlong and E. M. Lang, Westbrook, Maine:

We claim a wick rendered incombustible by saturation or coating, substantially as described.

Second, Saturating or coating a wick to prevent its combustion, substantially as described.

Third, Rendering a wick incumbustible by saturation in plumbago or its equivalents, as described.

47,101.—Silvering Glass Pitchers.—John W. Haines, Somerville, Mass.:—

I claim the dropping on of the hot glass on the outside rim of the pitcher, and by means of suction with the mouth expanding the solid piece of hot glass into oval shape, producing two copartments, as above described.

47,102.—Screw Driver and Tweezers.—D. Frank Hartford, Boston, Mass.:

First, I claim the wires, k k, and pin, j, or their equivalents, in combination with the tweezers and screw driver, substantially as and for the purpose described.

Second, Throwing the points of the tweezers beyond the point of the screw driver, by means of the spring, etc., substantially as set forth and for the purpose described.

Third, The spring lever, l, to operate substantially as described in combination with the tweezers, the indentation, n, and shoulder, m, for the purpose described.

47,103.—Machine for Cleaning Sheet Iron.—Edmund A. Harvey, Wilmington, Del.:

First, I claim cleansing sheets of metal by scrubbing and washing them and preventing them being oxydized thereby, by immediately afterward subjecting said sheets to heat, and thus causing all moisture to be evaporated from their surfaces, substantially as described.

Second the combination of the squeezing rollers, E E, and a heater for quickly drying the sheets, substantially as described.

Third, The rotary brushes, C C, in combination with the reciprocating brushes, D D, and feed rollers, all arranged, substantially as and for the purpose specified.

Fourth, The water tubes, H, in connection with the brushes and feed rollers, arranged to operate, as set forth.

Fifth, The heater, I, when used in combination with the brushes and feed rollers, and arranged to operate in connection therewith, for the purpose described.

47,104.—Screw Windlass and Capstan.—Henry Heitman, Brooklyn, N. Y., and John Radican, New York:

First, We claim the gear wheels, V V, applied in combination with the gear wheel, D, worm wheels, L L, captan, E, and windlass, I I, substantially in the manner as herein set forth, so that the capstan can be readily connected or disconnected from the windlasses, and a more or less powerful force can be exerted, according to the work to be accomplished.

Second, The combination of the capstan barrel, E, pawls, G G G, and toothed wheel, D, with pawls, F F, and with stationary locks in the bedplate, B, substantially as described, so that by a simple change of the pawls, F and G, the capstan barrel can be used independently or in connection with the parts to which motion is imparted by the gear wheel, D.

47,105.—Cultivator.—George F. Hassenpflug and George Barnhart, Green Township, Ohio:

We claim the frame, a c, when constructed as described in combination with the plow standards, b b b b, the same being attached, as specified.

47,107.—Manufacture of Sweat Proof Paper Collar.—James H. Hoffman, New York:

I claim the manufacture of sweat proof paper collar, with the composition, substantially as described, applied in the manner substantially set forth.

47,108.—Car Coupling.—Edward P. Howland, Worcester, Mass.:

I claim the drop bar, B, made in shape substantially as herein described, having a pin, c, and shoulder, o, near its lower end, and when part of the same is made with wrought iron, with metal cast around it, substantially as and for the purpose set forth.

47,109.—Governor.—W. F. Keeler, La Salle, Ind.:

First, I claim combining with the balls and connecting arm of an ordinary governor for regulating and measuring the speed of a steam engine or other machine a column of mercury, k, resting upon a disk or movable bottom in the case in which the mercury is inclosed, substantially as above described.

Second, I also claim the combination of the mercury gauge, O, with the closed case, G, the movable disk, f, and the shaft, B, substantially as above described.

Third, I also claim the combination of the movable disk, I, and shaft, B, with the closed case, G, for containing mercury, substantially as described.

Fourth, I also claim balancing or controlling the centrifugal force of the balls or other rotating apparatus of a governor for regulating speed in machinery by means of the weight of a column of mercury rising within a gage, O, upon the stationary frame, as herein described.

[This invention consists in a governor to regulate speed and indicate speed attained, wherein a column of mercury is employed to restore the moving parts to their normal condition, and to measure the speed or power attainad by the machinery to which the governor is attached.]

47,110.—Melodeons.—William Kinnard and J. B. Dreher, Cleveland, Ohio.

We claim First, Hanging the door or panel to the case in combination with the treadles, substantially as and for the purpose described.

Second, We claim the arm, G, and rod, H, in combination with the levers, I and J, and swell, substantially as and for the purpose described.

Third, We claim the hinged panel, A, treadles, B, in combination with the arm, G, rod, H, and levers, I J, substantially as and for the purpose described.

47,111.—Stove Pipe Damper.—Hiram Kipe, Thornbury, Pa.:

I claim combining with an ordinary stove pipe a wind wheel, T, a spindle, d, and ball governor, Q, for operating a throttle valve, V, substantially as above described.

[The object of this invention is to provide an automatic valve arrangement for use in stove pipes for domestic use more especially, and it consists in the application within the pipe of a wind wheel which operates the valve through an ordinary ball governor.]

47,112.—Mattress.—Robert Krause, New York:

I claim the application of a movable partial frame, adjusted by a screw and held in position by spring tongues, to any common mattress frame and spring bottom, by means of which frame, screw and spring tongues any spring bed mattress can be turned into a comfortable bed without the aid of cushions and pillows, as here described.

47,113.—Manufacture of Bolts.—William J. Lewis, Pittsburgh, Pa.:

I claim making bolts with square necks from old iron, by first staving up or enlarging that part of the rod intended for the neck previous to the formation of the square, and subsequently squaring that part by compression or otherwise, without regard to the nature of the tools used for that purpose.

47,114.—Roller Cleat for Trunks.—John A. Lieb and John Schmadel, Newark, N. J.:

We claim, as an improved article of manufacture, the trunk cleat, A, provided with rollers, b b, inserted in mortises, a a, all as herein specified.

47,115.—Heel and Toe Plate for Boots and Shoes.—Ira E. Loughborough, Pittsford, N. Y.:

I claim the external plate, b, when provided with projecting lips, c, and points, e, it being secured to the boot by the clamping lift or lifts, f, which are nailed on within the encircling rim of the plate, the edge of the lifts being entirely protected from wear by the said rim or flange.

47,116.—Watches.—G. C. Marten, Cleveland, Ohio.:

I claim a main spring barrel constructed of an outer barrel, B, and an inner barrel, C, which are provided with stops, d e, and combined with the main spring, winding arbor and retaining power, in the manner and for the purpose substantially as herein set forth.

47,117.—Furniture Caster.—W. T. Mersreau, Newark, N. J.:

First, I claim the ball or roller, B, provided with the journals, b, when the same shall be constructed as shown, for the purpose specified.

Second, In combination with the same, I claim the base, A, ring, C, and collars, d d2, when the same shall be combined substantially as shown, for the purpose set forth.

47,118.—Boiler Furnace.—J. A. Miller, New York:

First, I claim the slits or openings, a a, in combination with the horizontal passages, E, in the side walls of the fire chamber, and with the ducts, D, in communication with the ash pit, substantially as and for the purpose herein specified.

Second, Giving the openings, a a, an inward horizontal inclination toward the bridge wall or rear of the fire chamber, substantially as and for the purpose herein specified

Third, The pier, G, and side openings, c c, over the fire bridge, in combination with a system of stilts or openings, a a, for the admission of air through the side walls of the fire chamber, substantially as and for the purpose herein specified.

Fourth, The laterally oblique arrangement of the perforations, g g, in the back or inner screen, I, of the fire door, substantially as and for the purpose herein specified

Fifth, The hollow hinge, h i, in combination with one or more openings, m n, in the door or fire front and with a pipe, j, for the introduction of air from a blowing apparatus, whereby a current or currents of cold air are discharged in thin sheets across the open doorway, substantially as and for the purpose herein specified.

47,119.—Manufacture of Packing for Pistons, etc.—Ivon B. Miller and Wm. H. Miller, Philadelphia, Pa.:

We claim, First, The application of dry powdered substances to the fibrous material for the manufacture of packing in the manner above described, or any other substantially the same, and which will produce the intended effect.

Second, We claim the fibrous braided cover as applied to packing, in the manner and for the purpose above described, or any other substantially the same, and which will produce the intended effect.

Third, We claim the application of powdered substance to the fiber before it is made into yarn, as above described, or any other substantially the same, and which will produce the intended effect.

Fourth, We claim the use of the cover made of one kind of fiber, and the inside or filling made of another kind, without the use of powdered substance, as above described, or any other substantially the same, which will produce the intended effect.

47,120.—Construction of Albums.—John D. Mets, Dubuque, Iowa:

I claim connecting together the leaves of books by means of strips of leather, cloth, or the equivalents thereof, applied substantially as described.

47,121.—Mode of Taking Casts from the Face of Living Persons.—Clark Mills, Washington, D. C.:

I claim the mode of process herein described.

47,122.—Valves for Steam Engines.—Albert Morton, South New Market, N. H.

I claim the use of two port covers, C C', one at each end of the valve and connected together by a rod or rods or their equivalents in combination with the crosshead, D, and regulating rod, g, constructed and operating substantially as and for the purpose set forth

[This invention consists in the use of two port covers one at each end of the valve connected together by a rod or rods or their equivalents applied in combination with a crosshead and screw-rod, and valve in such a manner that by turning said screw-rod either by hand or by the action of the governor, the steam is cut off at any desired point or the speed of the engine is regulated automatically if desired in a simple and effective way.]

47,123.—Refrigerator.—Owen E. Mosher, New York City:

I claim the combination of the ice chamber, B, trough, C and water tank, D, when the said parts are constructed and arranged in the manner and for the purposes herein specified.

[This invention consists in applying a water tank to a refrigerator having an ice chamber fitted in it in such a manner that the water in the tank will be kept at a low temperature and the water drawn from the tank as required for use. The object of the invention is to obtain cool water from a refrigerator without using the waste water from the ice chamber which always has an unpleasant flavor.]

47,124.—Baling Press.—George C. Paine, San Francisco, Cal.:

I claim, first, The peculiar arrangement and construction of the double toggle levers connected with the follower, D, in combination with the chain or ropes, s s, pulley, H H, and friction rollers, g', whereby I am enabled to locate the shaft and wheel on the outside of the vertical press box for the purposes described.

Second, The levers, l N, and bars, n n, connected together and applied to the top, K, of the press box as shown, in combination with the catches, L L, all arranged substantially as and for the purpose herein set forth.

Third, The loops or catches, R R, applied to the shafts, p p, connected at their upper ends by the rod, q, and cranks, r r, and arranged relatively with the sides, O O, substantially as and for the purposes herein set forth.

Fourth, The connection of the pintles of the hinges of the side doors, O O, by means of the pulleys, P P, and cross chain, Q, substantially as and for the purpose specified.

47,125.—Apparatus for Refining and Distilling Petroleum.—James Perkins and Wm. H. Burnett, Newark, N. J.:

First, We claim the combination of the receivers, C and K, with the agitator, N, and sediment receiver, M, substantially in the manner and for the purposes described.

Second, We claim the combination of the parts, C E K N and O, substantially in the manner and for the purpose described.

Third, We claim the use of the exhaust pump, H and R, in combination with the distilling and condensing apparatus described substantially in the manner and for the purposes set forth.

47,126.—Feed Wheel as a substitute for Ratchets or Pawls.—O. C. Phelps, New York City:

I claim the combination of the shifting apparatus above described with said wheel and clutch as and for the purpose herein set forth.

47,127.—Percussion Cap-holder for Fire Arms.—Rufus S. Pickett, New Haven, Conn.:

First I claim the combination of the ratchet-wheel with the endless belt and its forked stud, p, when the whole is constructed and fitted for use substantially as herein described.

Second, I claim the combination of the endless belt with the guide, m, and cup, l, when the whole is constructed, and fitted for use substantially as herein described.

47,128.—Harvesters.—Amos Rank, Salem, Ohio:

First, I claim the combination of a hinged platform with a guard, g, and guard levers, h h, when the rear ends of said levers are attached by a sliding connection to the platform substantially as described.

Second, The connecting of the bail or guard, g, at a fixed point to the divider boards of a platform in such a manner that while the bail is always connected to the platform the bearing point, i, of the bail always remains the same substantially as herein described.

Third, The arms, b b, applied at the ends of the guard, g, substantially as described.

47,129.—Churn.—John Rankin, New York City:

First, I claim the use or employment of a blower for forcing a blast of air into the churn box, substantially as described, in combination with two screw dashers arranged one above the other and so as to create a circulation of the cream, all as and for the purposes set forth herein before.

Second, I also claim the employment in combination of two screw dashers, one above the other, when one feeds from the middle toward each end, and the other feeds from each end toward the middle.

Third, I also claim the employment of the internal and external gears, j i, and pinions, f g, in combination with the friction rim disc, k, and friction pulley, m, of the blower shaft, the whole arranged and operating as specified.

47,130.—Steam Boiler.—Edwin Reynolds, Mansfield, Conn.:

I claim the arrangement and construction of a boiler substantially as described.

47,131.—Machine for Cutting Tobacco.—F. W. Ritterhoff, C. A. Colquitt and William Mulchahey, New York City:

We claim the slotted adjustable disk, L, in combination with the lever, K, ratchet wheel, J, screw rod I, and follower, H, constructed and operating substantially as and for the purpose described.

47,132.—Process for Preserving Wood.—Louis S. Robbins, New York City:

I claim the process herein described for preserving wood from mold and decay, the same consisting in first removing the surface moisture from the wood and then changing and saturating the same with hot oleaginous vapors and compounds substantially as herein described.

Also removing the surface moisture from wood by means of hot oleaginous vapors substantially as herein described.

47,133.—Oil Well Pump.—John B. Root, New York City:

I claim, first, the employment, in an oil well, of an additional tube so arranged and applied in combination with the oil tube and an exhausting pump, that while it permits the exclusion of water from the lower part of the well by means of the seed bag, it provides for the escape of the gases from the well, substantially as herein described.

Second, The arrangement of the tube, C, surrounding and connected with the upper part of the well substantially as herein described, whereby the oil tube and oil pump may be removed without disturbing the seed bag.

46,134.—Churn.—Sarah E. Saul, New York City:

First, I claim the laterally sliding covers, C C, in combination with the dasher shaft as and for the purpose herein shown and described.

I also claim the hand rest, F, in combination with the crank, E, substantially as and for the purpose herein shown and described.

[This invention relates to a new and improved churn of that class in which a rotary dasher is employed, and it consists in a dasher of such construction in connection with sliding covers, and also in connection with an angular cream box or receptacle; and further in the employment of a hand rest with a crank, whereby it is believed that several advantages are obtained over ordinary churns of the class specified.]

47,135.—Clasps for Clothing.—Chandler Seaver, Boston, Mass.:

I claim my improved clothes fastener attachment, the same consisting of the plates, a and d, and the stud, f, they being constructed and to operate in connection with an eyelet or hole in the outer lap of the garment substantially in the manner as herein before explained.

47,136.—Base Burning Stove.—S. B. Sexton, Baltimore, Md.:

First, I claim a base burning stove which is so constructed that the gas which is generated in the coal supply cylinder, C, can be conducted off through the top plate of said cylinder and around the feed opening at pleasure substantially as herein described.

Second, A chamber, D, with a valvular bottom and escape pipe, d, arranged over the coal supply cylinder or magazine of a base burning stove substantially as described.

Third, The draft flues, c c, when carried out of the top of the chamber, B, and conducted into a chamber, a, having an ascending flue leading out of it substantially as described.

Fourth, The combination in a base burning stove of the projecting ledge, h, formed on the lower edge of the opening, through case, F, and a flanch, I, projecting from the base rim of the cylinder surrounding the chamber, B, substantially as described.

Fifth, The application of a supplemental grate, S, to the magazine of a base burning stove substantially as described.

47,137.—Manufacture of Propellers.—James Sutherland, New York City:

I claim constructing a propeller out of two parts by forming the hub of each part substantially as herein shown and described and fitting the two parts together as and for the purposes set forth.

[This invention consists in constructing the propeller in two parts y so forming the hubs of each half that the cams fit together and form a perfect hub and propeller wheel, thus allowing the wheel to be forged of wrought iron and producing a propeller of superior strength, lightness and durability.]

47,138.—Machine for Distributing Fertilizers.—J. H. Thomas and P. P. Mast, Springfield, Ohio:

First, We claim the slats or strips, C, suspended from the bar, B, and projecting down through the opening in the bottom of the hopper, A, when connected at the bottom by bar, d, substantially as and for the purposes set forth.

Second, The shafts, C, provided with the projections, a and e, as and for the purpose described.

Third, The slats, C, as arranged in combination with the bar, D, and bottom pieces, F and F', as and for the purpose set forth.

47,139.—Device for Raising and Lowering Lock Gates.—William Thomas, Ottawa, Ill.:

I claim the combination of the block and tackle, the roller levers, ratchet wheels, the pawls, the springs and frame of the machine being operated and used as herein before set forth for the uses and purposes aforesaid.

47,140.—Medical Compound.—John Thurmon, Pike County, Mo.:

I claim the medical compound prepared as described.

47,141.—Insulator for Telegraph.—S. F. Van Choate, New York City:

I claim, first, the combination of the cavity, A, face plate, D, and pin hook, C, for the purposes set forth.

Second, The wooden bracket, B, plate, D, and hook, C, as above combined when coated with the composition as above, and for the purposes set forth.

47,142.—Addressing Machine.—N. E. Warren, Cleveland, Ohio, and G. W. Warren, Hillsdale, Mich.:

We claim, first, The curved lever, C C', operated by the bent spring, G, in combination with the adjustable head, D, when arranged and operating as herein set forth.

Second, We claim the pall, F', rock shaft, L', slotted arm, L'', and adjustable rod, J, in combination with the quod ratchet, 1, operating as specified.

Third, We claim the adjustable head, D, with the faces, d d', arranged and operated as and for the purposes specified.

47,143.—Railway Carriage.—True West, Roxbury, Mass.:

I claim the combination and arrangement of the four struts, E E E E, the four pendulous rods or hangers, F F F F, and the two semi elliptic springs, G G, disposed on each side of the truck frame, B, with the said frame, the axle boxes, C C, thereof, and the platform or carriage body, A, the whole being substantially as represented in Figure 1, of the drawings as herein before explained.

47,144.—Electro-magnetic Musical Instrument.—Lorenzo Wesson, Chillicothe, Ohio:

First, I claim an electro-magnetic apparatus for playing music with variable power or expression, by automatically varying the battery power exerted on the magnets to accord with the number of magnets in use or with the strength of sound required, in any manner, substantially as set forth.

Second, I claim a music board, B, provided with independent movable type, acting upon or constituting circuit breakers or circuit closers, to regulate or govern the tone, power or length of sounds produced by means of electro magnetism.

Third, I claim the key board, C, connected with a series of magnets, and constructed substantially as set forth, with two or more circuits, by which any of the said magnets may be put in action at will.

Fourth, In combination with the key board, C, and series of magnets, I claim the levers, G, plates, I, and wires, J, all arranged as described, and adapted to operate substantially as and for the purpose set forth.

Fifth, In combination with the electro magnets, E E' E2, music board, B, and additional battery, F', I claim the lever, G', operating substantially as described, to open communication between the additional battery and magnets, when required.

47,145.—Churn.—Henry P. Westcott, Seneca Falls, N. Y.:

I claim, First, The employment, in combination with the arm, E, lever, D, and arc, g, of a spring, f, substantially as and for the purpose set forth.

Second, I claim the use of a bellows, B, or its equivalent, in combination with the receiver and dasher shaft, in the manner and for the purpose substantially as set forth.

Third, I claim making the dasher adjustable, substantially as and for the purpose set forth, and,

Fourth, I claim the peculiar form of upper dash shown and described, for the specific purposes set forth.

47,146.—Pump.—Joseph F. White, Keene, N. H.:

I claim the combination in a double-acting pump of a valve chest, W, provided with triangular valve chambers, A, with a rotating pump tube, carrying hollow radial arms, E, which have partial rotary motion, in horizontal directions, and are provided with double-acting valves, substantially as above described.

[This invention consists in a double-acting force pump, in which the pistons are made to extend radially from a hollow pump tube which rotates with the pistons.]

47,147.—Apparatus for Dividing Sugar in Blocks.—Wm. H. Whitmore, Boston, Mass.:

I claim the combination of the conduit, one or more saws, and the separators, arranged substantially in manner and so as to operate as specified.

47,148.—Oil Ejector.—George L. Witsel and Edward Burke, Philadelphia, Pa.:

We claim the combination of condensing and exhausting pumps, in conjunction with induction and eduction pipes, arranged within an oil well, substantially as and for the purposes described.

Second, Connecting both the exhausting engines to a lever, which receives a rapid vibrating motion, substantially as and for the purposes described.

47,149.—Bow Pin for Ox Yoke.—Orville O. Woodruff, Killingworth, Conn.:

I claim the combination of the two levers, A A, constructed with pins, D D, substantially as and so as to operate in the manner and for the purpose specified.

47,150.—Window Cord Pulley.—Wm. C. Ames, Hartford, Conn., assignor to Landers & Smith Manufacturing Co., New Britain, Conn.:

I claim as a new and improved article of manufacture, viz.: a window or sash cord pulley case, having the face plate, a, midway, or nearly so, of the case, a, to to be attached to the back side of the jamb casing of the window frame, substantially as described.

47,151.—Mode of Weaving Fabrics with Button Holes therein.—John Conner (assignor to himself and Henry A. Ayling), Boston, Mass.:

I claim the improvement in weaving suspender webbing, etc., to form button or other similar holes therein, by the employment of a reed having a construction, and operating in the manner substantially as set forth.

47,152.—Mangle.—Josee Johnson, New York City, assignor to John Ward, Jr., Brooklyn, N. Y. Antedated March 30, 1865:

I claim the combination and arrangement of the screw, Q, the spring, O, and the links, N, with the rollers, B' and B, and the frame, A, substantially as and for the purpose set forth.

47,153.—Seed Drill.—Griffith M. Murphy (assignor to Lyman S. Paine), Lewisburgh, Pa.:

I claim, First, A sliding or transferable spring, E, whereby the power required to throw the drill tube out of working position may, at the will of the operator, be increased or diminished, substantially as described.

Second, The arrangement of the lever, C, entirely above the drag bar, A, substantially as described.

Third, The combination of the drill tooth, B, drag bar, A, lever, C, and spring, C, substantially as described.

47,154.—Shaft Coupling for Carriage.—Francis B. Morse, New Haven, Conn., assignor to Frederick C. Dayton, Jr.,

I claim as a new article of manufacture a shaft coupling, composed of a jack or stationary part, forged with two eyes, and a cavity for retaining an elastic presser, an elastic presser and a plain head with one eye, when constructed, combined and fitted for use, substantially as herein described.

47,155.—Forming Skeleton Skirt.—Datus E. Rugg, New York City, assignor to himself, F. S. Otis, Joseph I. and J. O. West, Jedediah Wilco & Co., and Henry Richardson:

I claim the method herein specified of shaping or forming ladies' skeleton skirts by sustaining the hoops in the proper position relatively, while being connected together by tapes, galloons, or their equivalents, for the purposes specified.

47,156.—Railway Car.—Signor Vallo (assignor to himself and Joseph Chapman), Philadelphia, Pa.:

I claim, First, Connecting the foot pieces, E E E E, with the springs, J, by means of the legs, F F F F, bars, G G, and spring seats, H H H H, substantially in the manner and for the purpose above described.

Second, Combining the spring seats, H H H H, with the bars, G G, by means of the pins, e e e e, on the inner edges of the said seats, and corresponding holes in the bars, G G.

Third, The combination and arrangement of the foot pieces, E E E E, with the legs, F F F F, by means of the hinges, a, and springs, a', substantially in the manner and for the purpose above described.

Fourth, Combining the rods, M M, with the foot pieces, E E E E, and guards, L L, to prevent the said foot pieces swinging forward by the motion of the cars, and also to allow them to be borne against the wheels at the proper time, substantially in the manner described and for the purpose set forth.

47,157.—Brush.—Albert M. White (assignor to himself and Barnard Larvey), Port Chester, N. Y.:

I claim the mode of securing the several bunches of bristles in the solid back of a brush, by means of separate staple like wires, C, applied substantially as herein described.

47,158.—Apparatus for Concentrating Liquids.—Chas. A. Wood, Dorchester, Mass., assignor to Daniel C. Hood, of the same place, and W. H. S. Jordon, West Roxbury, Mass.:

I claim as an improvement in vacuum pans the pan, A, in combination with a steam jacket, D, of wood or other non-conducting material, operating substantially as set forth, for the purpose specified.

I also claim an elastic packing for the joints of vacuum pans, operating substantially as described.

I also claim the within-described apparatus for conducting liquids, consisting essentially of the pan, A, with its jacket, D, packing, I, and dome, C, and the condenser, H I, the whole combined and operating substantially as set forth.

47,159.—Buckle.—Charles E. Woodman and Charles B. Hatfield (Assignors to Charles E. Woodman), Boston, Mass.:

We claim the combination and arrangement of the holding bar, b, and the straight-edged tongue, C, with the bar, a, the overlapping tonge, B, and the buckle frame, A.

We also claim the combination and arrangement of the compound or double tongue, C, and the bar, b, with the overlapping tongue, B, and the buckle frame.

We also claim the combination and arrangement of the compound or double tongue, C, the bar, b, or its equivalent, the bar, d, and the frame, A.

We also claim the combination and arrangement of the cross bar, d, with a single tongue and an overlapping tongue, and the buckle frame.

We also claim the construction of the overlapping tongue with a slot, or its equivalent arranged within it, substantially in manner and for the purpose set forth.

We also claim the combination of the connections, e e, with the two cross bars, a b, and the tongue, B, applied to them, the said bars and the buckle frame, as specified.

47,160.—Preparation of Materials to be Used in the Purification of Gas.—Alexander A. Croll, London, Eng.:

I claim, First, The combining the neutral salts referred to, or as nearly neutral as convenient, with wood, sawdust, or other slightly absorbent or cellular matter, in the manner stated, and employing such mixture in the purifying apparatus, for the purification of gas, substantially as described.

Second, I claim the use or application of the chloride or sulphate of manganese referred to with charcoal or wood sawdust, as a disinfectant

[This invention relates to combining neutral salts, or salts as nearly neutral as convenient, with wood, sawdust or other absorbent or cellular matter, and employing such mixture after it has been allowed to cool, for the purification of gas.]

47,161.—Cork Pull.—Frans Gustavus Bielefield, Berlin, Prussia, and Charles C. E. Schwartz, Hamburg:

We claim the combination of the rod, B, the metallic spring, C, and the button, D, substantially as and for the purpose specified.

47,162.—Drying and Charring Peat.—Fred'k Ludewig Hahn Danchell, London, Eng.:

I claim, First, The improved arrangement of the apparatus for drying blocks of peat, as shown and described in reference to sheet 1, and particularly the arrangement of the endless bands and rollers, by which the blocks are turned over in passing from one set to another.

Second, The arrangement and distribution of the air passages of the apparatus for drying peat.

Lastly, The application of a steam blast for producing the requisite currents of air for drying and charring peat or other carbonaceous substances

47,163.—Breech-Loading Fire Arms.—Cyprien Chabot, Philadelphia, Pa.:

I claim, in combination with the hinged breech block swinging upward and forward, the lever, H, and its latch hung thereto, but so as to have a degree of motion independent thereof, and the spring bolt, e, for the purpose of locking the breech block when down, and for unlocking it by the same motion that raises up again, as herein described and represented.

47,164.—Windlass for Tightening Ship's Standing Rigging.—Jasper G. Codmus, Port Richmond, N. Y.:

I claim the frame, d, suspended by the eye, e, from the rope or shroud to be tightened, in combination with the winch barrel, f, and a hand spike or lever to turn said winch barrel, as and for the purposes specified.

47,165.—Platform Scales.—James H. Conklin, Yorktown, N. Y.:

I claim the combination of the lever, A, with the other parts, C and F, of a scale, in the manner and for the purpose substantially as set forth.

47,166.—Steam Pressure Indicator.—W. M. Davie and Charles T. Webber, Janesville, Wis.:

We claim the arrangement of the scroll spring, e, the cylindrical box or chest, a, shaft, c, pulley, I, chain, K, connecting rod, d, cross bar, f, and hand wheel, g, substantially as and for the purposes set forth.

47,167.—Washing Machine.—John H. Duck and Erwin S. Gould, Elgin, Ill.

We claim the pinion, N, and wheel, T, in combination with the shaft, C, and rubbers, O' O' O'' O'', constructed and operated substantially in the manner and for the purpose described.

47,168.—Mining and Tunneling Machine.—Herman Haupt, Cambridge, Mass., and J. Y. Smith, Alexandria, Va.:

First, We claim the pick or series of picks in combination with a mechanism for imparting rotary motion thereto, to operate in the manner and for the purpose substantially as herein set forth.

Second, We claim the method herein described of mounting the pick or picks upon bevel gear disks, bevel gear and driving pinion being at or near the circumference of said disks, as set forth.

Third, We claim the bevel pointed picks, and the arrangement of the same upon the revolving disk, with the bevel faces alternatingly reversed, substantially as set forth.

Fourth, We claim the method of hanging the rotary pick disks in a swinging frame so arranged in relation to the gear mechanism as that a translatory movement may be imparted to picks without interfering with their rotation.

Fifth, In combination with the swinging frame and rotary picks, we claim the method herein described of adjusting or feeding the picks up to the work as the operation progresses independently of the main frame of the apparatus, substantially as set forth.

Sixth, We claim the combination with the rotary picks, held as described in a swinging frame, of a mechanism for laterally reciprocating the swinging frame, substantially as and for the purpose set forth.

Seventh, We claim the stationary cutter in front of the swinging frame, under or between the rotary picks, for the purpose of removing the core of the ore or coal, substantially as set forth.

Eighth, We claim locating within the swinging frame a shaft provided with pinions at either end thereof, and arranged in relation to the gear mechanism so as to receive from the prime mover and impart to the picks rotary movement, substantially as herein set forth.

47,169.—Beehives.—William Henschen, Hennepin Co., Minn.:

I claim the arrangement in the construction of a straw beehive of a straw rope, or layers of rope, with the splints, I, top frame, C, and and bottom frame, D, substantially as and for the purposes herein described.

47,170.—Lubricating the Packing of Stuffing Boxes, etc.—Ivon Bruce Miller and William Hartley Miller, Philadelphia, Pa.:

We claim the application of the substance, mode and material above described to the stuffing boxes or other joints of engines or other machinery, or any other substantially the same mode and material.

Second, We claim the application of the above material to other materials used for the manufacture of packing, as cotton and hemp saturated with it.

Third, We claim the application of above material, or any other substantially the same, to the rod or stuffing box, or to the packing thereof, by using it through the cylinder of the engine, or any other application thereof whereby the rod will carry the said material to the packing.

Fourth, We claim the substance above described as an adjunct to the various patent packings.

Fifth, We claim the mode and material above described, or any other substantially the same, and that will produce the intended effect, as a cover or coating in place of muslin or other material for rope packing, as applicable in the packing made of powdered and fibrous substance, for instance.

Sixth, We claim the above described material as applied to the packing of pistons of engines and pumps.

47,171.—Braiding Guide for Sewing Machines.—Louis Planer, New York:

I claim, First, Providing the groove, J, with a concave bottom, and a spring, L, to operate in the manner and for the purpose herein specified.

Second, The arrangement of the set screw, M, with spring, L, for regulating the pressure of the spring upon the braid in passing under the bottom of the groove, J, substantially as herein set forth.

47,172.—Ground Augur.—David Ring, Damariscotta, Me. Antedated March 26, 1865.

I claim, First, The disks, D and E, provided with the top and bottom cutters, h and j, substantially as set forth, and for the purpose described.

Second, Rendering the borer expansible by means of the oblong slots, f, substantially as described.

47,173.—Lamp for Burning Oil.—Thomas S. Speakman, Camden, N. J.:

I claim, First, The use, in combination with lamps for burning animal, vegetable or mineral oils or fatty matters, of a wick, or its equivalent, for conveying to the flame a supply of water substantially as and for the purpose herein set forth.

Second, The use of the heat of the flame for producing the aqueous vapor which is conveyed to the flame.

47,174.—Oil Ejector.—L. W. Turrell, Saml. Stanton and L. C. Ward, New York City:

We claim, First, A contrivance for raising oil like that hereinbefore described, that is to say, one wherein the oil is drawn up through a central passage or tube, around which is an annular passage or tube through which the compressed air is made to act upon the oil, substantially in the manner and for the purpose described.

Second, The manner of securing the internal tube, F, within the internal tube, A, by means of the perforated disk, E, and the coupling clamp, C, substantially as described.

Third, The manner of securing the tube, J, in its position by means of the disc, K, and coupling clamp, H, constructed and arranged substantially as described.

Fourth, The stuffing box, L, in combination with an internal and an external tube, arranged in the manner and for the purpose above described.

47,175.—Writing Tablet.—Thomas Weaver, Harrisburg, Pa.:

I claim, First, The construction of a tablet attachment for the hand that moves with it and under it, and presents a continuous writing surface under the pen or pencil, whose parts are so proportioned and arranged as to form, when folded, a pocket vade mecum.

Second, The combination and arrangement of the paper case, M X' N X, with the rolls, M N, their driver, Q, the tablet leaf, L A, its bearing, O, its spring, A; also with the digital leaf, B K, its hinges, K K', its key hole, B, its stopper, R', for the ink bottom, B', situated in the hand side of paper case, substantially as and operating in the manner as herein described and set forth.

Third, The combination and joint operation of the metacarpal plates shown in Fig. 3, with each other, and with the digital leaf, B K, and with the carpal plates shown in Figs. 2 and 6, by means of the slot, F, the keyhole, E, the concave-convex slots, D D', their sliding clamps, 4 4, and the button, H, substantially as and operating in the manner as herein set forth and described.

Fourth, The combination and arrangement of the carpal plate, shown in Fig. 2, with the metacarpal plate shown in Fig. 3, by the buttons, T T'; also with the wrist by the hinged locking bracelet shown in Fig. 9, and the wrist band shown in Fig. 10, or with the plate shown in Fig. 6, which has the groove, J, the pad, P, the bands, a b, eyelets, 1 2 and 3, and buttons, U U', operating in the manner as and for the purposes herein set forth.

47,176.—Movable Fire-place with Gridiron Attachment.—S. W. Wetmore, Erie, Pa.:

I claim the movable fire-place, constructed with narrow sides, to be placed in the nature of a false door, in the doorway of the cooking stove, and to be used in connection with the adjustable folding gridiron suspended before it.

DESIGN.

2,041.—Show Case.—George Q. Pragnell, New York City:

I claim the design above described for the rails of a show case.

REISSUES.

1,926.—Shirt Collar.—Wm. E. Lockwood, Philadelphia, Pa., assignee by mesne assignments of Walter Hunt. Patented July 25, 1854:

I claim so indenting shirt collars made of a fabric composed of paper and muslin, or an equivalent fabric, that the indentations will represent the stitches of an ordinary dressed linen collar.

1,927.—Shirt Collar.—Wm. E. Lockwood, Philadelphia, Pa., assignee by mesne assignments of Walter Hunt. Patented July 25, 1854:

I claim a shirt collar made of a fabric composed of paper and

muslin, or an equivalent fabric, having a smooth white surface coated with transparent varnish, for the purpose specified.

1,928.—Revolving Fire-arm.—Rollin White, Springfield, Mass. Patented April 13, 1858:

I claim in that class of arms consisting of a fixed barrel with a rotating cylinder having a series of parallel chambers, which are brought in succession in line with the barrel to be fired, making a recess or aperture through the breech, and communicating with, but of less area than the rear end of the chamber, and of a form, substantially as described, suited to and in combination with the hammer, or the equivalent thereof, to strike through such recess against the rear end of the cased cartridge which contains the fulminate priming, as set forth.

1,929.—Tobacco Pipe.—The Tobacco Pipe Company, Baltimore, Md., assignees by mesne assignment of Andrew J. Bowen. Patented June 10, 1862:

We claim, First, The two tubes or channels, a and b, in the stem, in combination with the bowl, c, and cup or receptacle, d, as herein set forth.

Second, The device by which the cup or receptacle, d, is attached to the bowl, c; i. e., the male screw in the latter and the female screw in the former, or their equivalents, in combination with the channels, a and b, bowl, c, and cup, d, substantially as shown and described and for the purposes set forth.

PATENTS

GRANTED

FOR SEVENTEEN YEARS.

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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.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

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.

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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, &c., 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 F 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.

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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. 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.

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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	$50
On granting the Extension	$50
On filing a Disclaimer	$10
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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.

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 thing 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 no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars 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.

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.

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.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

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 at 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.

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.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

Correspondents who wish information from us through this column must, as an evidence of good faith, sign their names to their letters. We throw aside all anonymous communications

W. C., of N. J.—We don't know what the "trap process" of tempering springs is. One way to temper them is to make them hard first and then draw the temper in hot sand heated to 550 or 570 degrees, at which temperature they are dark purple to blue. Oil or tallow smokes at 470 degrees, and takes fire when a light is presented. At 570 degrees it goes out when the light is withdrawn.

R. B. C., of Mass.—It is not new to make a ratchet drill with vertical teeth; such drills were made and sold fifteen years ago.

E. W. D., of Conn.—The wisest and the most learned men are always the most ready to admit their errors, while the greatest fools and ignoramuses are the ones to insist most strongly that they never make mistakes. In the case referred to, all that was said was that the boat with the pulley engine ran faster than the one with the crank engine, but you must know that it is very easy for interested parties to conduct such experiments so as to show any result they please.

T. W. D., of Cal.—Petroleum is composed of the same elements as india-rubber, viz.: hydrogen and carbon. It is probable that by the destructive distillation of india-rubber part of it might be converted into oil closely resembling some portions of petroleum, but we know of no fact that would suggest the possibility of converting petroleum into india-rubber.

Horace, of Pa.—To calculate the power of a steam engine multiply the area of the piston in inches by the pressure per inch in pounds, the product by the length of the stroke in feet, this product by the number of strokes in a minute, and divide by 33,000.

J. S., of N. S.—For cotton machinery of all kinds address Whiting & Sons, Northbridge, Mass.

Nassau, of N. J.—It is rather a complicated problem, but it seems to us that the oscillations must be continuous.

Critic, of R. I.—The earth in its rotation on its axis turns one degree in four minutes; bodies, therefore, at the equator are carried along about seventeen miles in a minute from west to east. Portions of the earth nearer the center are also moving around from west to east, but with less velocity. If a hole were made through the center of the earth at the equator and a stone were dropped into it the stone would continue its eastward motion at the rate of seventeen miles a minute till it came to portions of the earth moving in the same direction but with less velocity, when it would overtake them and strike the eastern side of the hole.

B. H. M., of N. H.—India-rubber varnish for cloth should be of vulcanized rubber.

L. W. S., of Mo.—You can procure a newspaper file suitable for the SCIENTIFIC AMERICAN from Alfred Goulding, Worcester, Mass.

J. P. V., of Cooksville.—Your improvement seems to be new, and we should think a patent could be obtained for it. In what State do you reside?

F. G. F., of Ohio.—You have the right spirit. An inventor can never succeed if he allow a single failure to discourage him.

J. S. E., of Wis.—We cannot admit to our columns a communication that prejudges a case that may involve litigation in court.

C. C., of D. C.—We cannot publish your letter, for the reason that it might prejudice the rights of the patentees in advance of a judicial decision. The patent must stand on its own merits, without any interference on our part.

J. S., of Ind.—We have credited you $1 on account of your subscription. The article to which you refer was prepared expressly for our paper or we should not have published it, as we dislike long communications. We do not think your proposed article on natural and mental philosophy would be acceptable.

J. W. H., of N. Y.—You can procure soluble glass of Lewis Feutchwanger, No. 55 Cedar street, this city. We believe the emery wheels made with it are rendered insoluble by having the least possible excess of alkali, so that hot water is required for the solution.

O. D. M., of N. H.—The sample which you send us we take to be very thin tin foil pasted upon paper.

G. W. B., of N. Y.—The Avery engine should yield the full power of the steam (except that which is obtained by expansion), provided the arm at the point of exit moves with a velocity equal to that with which the steam flows through the orifice. This requires a long arm and a very rapid revolution. You can see an old Avery engine at a saw-mill in Attorney street in this city.

S. C. S., of C. W.—For general use in soldering gold rings you will find the following recipe valuable: Gold, 2; silver, 1; copper, 1. Stir it well, and add a little borax in powder; pour out in slips, which will make it handier to use. To clean gold which has been soldered heat it very hot; let it cool gradually, then boil in urine and sal ammoniac. A harder solder than the above is made of gold and silver.

I. H. D., of Mass.—The dispatch on the American line does not go to the Independent line, because the circuit is broken; there is no connection between them. We have never seen two rudders applied to one vessel in the manner you describe, and do not doubt its utility so far as increased action on the hull is concerned. Your hoisting arrangement through the aid of a hydraulic press would be too slow. No body could wait fifteen minutes to hoist a ton twenty feet. Your plans for iron-coating ships are not new; similar ones have been published in the SCIENTIFIC AMERICAN.

J. H. M., of Mo.—A man has no right to make a patented article for his family use without the inventor's consent.

U. S., of Md.—W. W. Secombe, No. 254 Broadway manufactures a very excellent hand-stamp canceller.

F. T., of Iowa.—If you have used your smokestack nine years and find it has now failed you have had good service from it and it has died of old age. The exhaust passing into it does not affect its durability, for whatever moisture resulted therefrom would be dried up almost instantly.

R. T. D., of Conn.—What you require is the terchloride of gold. A brass chain washed in this receives a golden deposit when dried.

J. T., of D. C.—You will find the information about the reporting machine on page 173, vol. XI.

T. A. H. C., of Mo.—A very useful book for you will be the Tinman's Manual and Builder's and Mechanic's hand book, by I. R. Butts & Co., Washington street, Boston, Mass.

Venango, of N. Y.—We understand that Professor Dana has a work in press on petroleum, and you will doubtless find that free from the absurdities and trivialities in the work of which you complain.

J. S., of Ill.—If you will send us a sample of the substance in your spring we will tell you whether it is petroleum. In these days the dreams of a great many people are running on oil wells.

J. W., of Mass.—No person except the owner of the patent right for a given state or territory has a right to make use of or sell the invention in such State.

A. G. W., of D. C.—We certainly did not mean to accuse you of plagiarism. We published your communication for the benefit of our large numbers of new subscribers, and we added the foot note principally to call your attention and that of other readers to our previous article.

NOTICE TO SUBSCRIBERS.

The first five numbers of the present volume of the SCIENTIFIC AMERICAN being out of print, we shall commence the time of each new subscriber from the date of receipt of the order, unless the writer states specifically that he wishes such back numbers as can be furnished.

SPECIAL NOTICE TO INVENTORS.

The money receipts on account of patent business, which have heretofore been published in this column, and the notification of cases sent to the Patent Office, will for the present be discontinued. The receipt of specifications and money from inventors will be acknowledged promptly by mail.

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 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* acknowledgement of our receipt on of their funds.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

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."

VOLUME IV., AND VOLUME XI., (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., VII., 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.

IMPROVED FURNACE—PATENTED JANUARY 3, 1865.—This is an invention of high importance to Engineers, Petroleum Distillers, Sorghum Manufacturers, Salt Evaporators, Etc., and is destined to create a revolution in the arrangement of furnace fires under long boilers and evaporators of any kind.
This furnace is made to extend in continuous sections under long boilers or evaporators to any desired length; the grate being also in sections resting on wheels set in a ledge on each side of the furnace, and each grate is raised and lowered at pleasure to apply more or less heat to the pan or boiler.
When the heat is too great, the draught is shut off in front; when it is about right, the chimney stopper is closed, and the heat all retained; as the boiling slackens, the grates are raised one or all, less or more, nearer to the pan; as the fire deadens, the draught is let on, and so continued.
When either grate wants more coal, it is drawn out, supplied, and returned to its place in one minute or less, and the places of any two of them can be exchanged quite as quickly.
When the furnace is too long for the grates to be run in and out with a hook, it is done by an endless chain.
The furnace is always inclosed by walls, which support the pan or boiler above it, except an extra section, which extends out front of the doors, where the fires are all made.
Fires arranged on this plan can be immediately withdrawn in case of the water getting too low in the boiler.
To Sorghum Manufacturers it must be invaluable, from the facility it affords for economizing the heat, modifying, regulating and varying it under different parts of the pan, as desired.
No part of the furnace is exposed to injury from heat but the grates.
Explicit directions given for making and setting a furnace; they can be cast and fitted, boxed and shipped to any point.
The inventor being a confirmed invalid, is disposed to sell out his whole patent to some party more able to introduce it, and will assist in procuring foreign patents. Address
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A CHALLENGE.—WE OFFER FOR SALE A NEW No-Chimney Kerosene Oil Burner, that gives a most brilliant light, without smoke or odor, that cannot be extinguished by sudden motion. We challenge the world to produce its equal. Send fifty cents and get a sample by return of mail.
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MACHINE SCREWS.—WE KEEP IN STOCK ALL lengths, thickness and threads, of Flat and Round-head Machine Screws, made by the American Screw Co. On the receipt of 20 cents we will send a card Screw Gage, enabling parties unacquainted with the different numbers to order the thickness and thread they wish, with prices attached. CHARLES MERRILL & SONS, No. 536 Grand street, New York. 16 2

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THE ADVERTISER, WHO HAS HAD A LENGTHY business experience, purposes shortly to visit the cities of Europe, and will assume charge of the introduction of a few American manufactures—patent rights, etc., which may be entrusted to him. Communications, stating particulars and address, may be addressed J. M. F., Box 1232, P. O., New York. 15 2

HORSE-SHOES.—JOHNSON'S PATENT HORSE-SHOES attached to the hoof without nails are the best shoes for an interfering or cutting horse. Illustrated in SCIENTIFIC AMERICAN, Vol. XII., No. 14. For particulars address JOHN M. JOHNSON, Station D, New York. A mistake occurred in the engraving of Fig. 2. 15 2*

THE UNION MOLDING MACHINE—BEST IN USE.—For circulars address H. A. LEE, patentee, Worcester, Mass. 15 4*

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No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. It is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN.
No. 37 Park Row, New York City

OFFICE A. A. PROVOST-MARSHAL-GENERAL,
AND SUP'T VOLUNTEER RECRUITING SERVICE SOUTHERN DIVISION OF NEW YORK, NEW YORK, March 20, 1865.

THE FOLLOWING CIRCULAR IS PUBLISHED FOR the information of those concerned.
RICHARD I. DODGE, Major 12th Infantry, A. A. P. M. General.

WAR DEPARTMENT PROVOST-MARSHAL-GENERAL'S OFFICE, WASHINGTON, D. C., March 11, 1865.

CIRCULAR No. 6.—In conformity with the Proclamation of the President herewith published, all officers and employees of this Bureau are instructed to give prompt attention to the receiving and forwarding of such deserters as present themselves in accordance with its provisions.

"BY THE PRESIDENT OF THE UNITED STATES OF AMERICA:
"A PROCLAMATION.

"Whereas the twenty-first section of the act of Congress, approved on the third instant, entitled 'An act to amend the several acts heretofore passed to provide for the enrolling and calling out the national forces, and for other purposes,' requires, 'that in addition to the other lawful penalties of the crime of desertion from the military or naval service, all persons who have deserted the military or naval service of the United States who shall not return to said service, or report themselves to a Provost-Marshal within sixty days after the proclamation hereinafter mentioned, shall be deemed and taken to have voluntarily relinquished and forfeited their rights of citizenship and their rights to become citizens, and such deserters shall be forever incapable of holding any office of trust or profit under the United States, or of exercising any rights of citizens thereof; and all persons who shall hereafter desert the military or naval service, and all persons who, being duly enrolled, shall depart the jurisdiction of the district in which he is enrolled, or go beyond the limits of the United States with intent to avoid any draft into the military or naval service, duly ordered, shall be liable to the penalties of this section. And the President is hereby authorized and required forthwith, on the passage of this act, to issue his proclamation setting forth the provisions of this section, in which Proclamation the President is requested to notify all deserters returning within sixty days, as aforesaid, that they shall be pardoned on condition of returning to their regiments and companies, or to such other organizations as they may be assigned to, and serve the remainder of their original terms of enlistment, and, in addition thereto, a period equal to the time lost by desertion.

"In testimony whereof, I have hereunto set my hand, and caused the seal of the United States to be affixed.

"Done at the City of Washington, this eleventh day of March, in the year of our Lord one thousand eight hundred and sixty-[L. S.] five, and of the independence of the United States, the eighty-ninth.

"ABRAHAM LINCOLN.

"By the President: WILLIAM H. SEWARD, Secretary of State."

The records and returns of these deserters will be made up in the same manner as is provided for in other cases by existing regulations, except that it will be noted on the book of deserters arrested, opposite the name of deserter, the fact of his having voluntarily surrendered himself in conformity with the President's Proclamation; and the number; thus surrendering themselves to be separately stated on the report to this office.

The Secretary of War directs that no reward be paid for the arrest of deserters who may be arrested subsequent to the receipt of this order by the District Provost-Marshals.

14 3t JAMES B. FRY, Provost Marshal-General.

CHIEF QUARTERMASTER'S OFFICE,
No. 1139 Girard street, Philadelphia Depot, March 31, 1865.

SEALED PROPOSALS WILL BE RECEIVED AT at this office till MONDAY, April 10, 1865, at 12 o'clock M., for delivery at the Schuylkill Arsenal, in merchantable packages (cases to be made to conform to specifications at this office),

3-4 Canton Flannel for Drawers, army standard.
Stockings, do.
Pegged Boots for Cavalry, do.
Pegged Bootees for Infantry, do.
Hospital Tents and Flies, do.
Forage Caps, do.

Samples of the standard articles required may be seen at this office.

Parties offering goods should make separate proposals for each article offered and must distinctly state in their bids when they will commence their deliveries, the quantity they propose to furnish each week, the price (*which should be written both in words and figures*), and conform to the terms of this advertisement, *a copy of which should accompany each proposal.*

Bids will be opened on Monday, April 10, 1865, at 12 o'clock M., and bidders are requested to be present.

Each bid must be guaranteed by two responsible persons, whose signatures must be appended to the guaranty, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.

All proposals should be made out on the regular forms, which will be furnished on application at this office.

The right is reserved to reject any bid deemed unreasonable, and no bid from a defaulting contractor will be received.

Indorse envelope, "Proposals for (here insert the name of the article offered)," and address

Colonel WILLIAM W. MCKIM, Chief Quartermaster,
15 2 Philadelphia Depot.

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ASSISTANT QUARTERMASTER'S OFFICE,
No. 451 EIGHTH AVENUE, NEW YORK, March 9, 1865.

CAVALRY AND ARTILLERY HORSES WANTED.—I will purchase in open market all horses that may be presented and pass inspection at the Government stables on Thirty-fifth street, near Tenth avenue, until further notice, as follows:—

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Artillery horses, 6 to 10 years old, 15½ hands high, and over 1,100 pounds, and dark color.

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A step ladder would seem to be the last thing to improve or modify so as to radically change its construction, and it is a good proof of the versatility of inventors that they have taken this simple thing in hand and greatly improved it.

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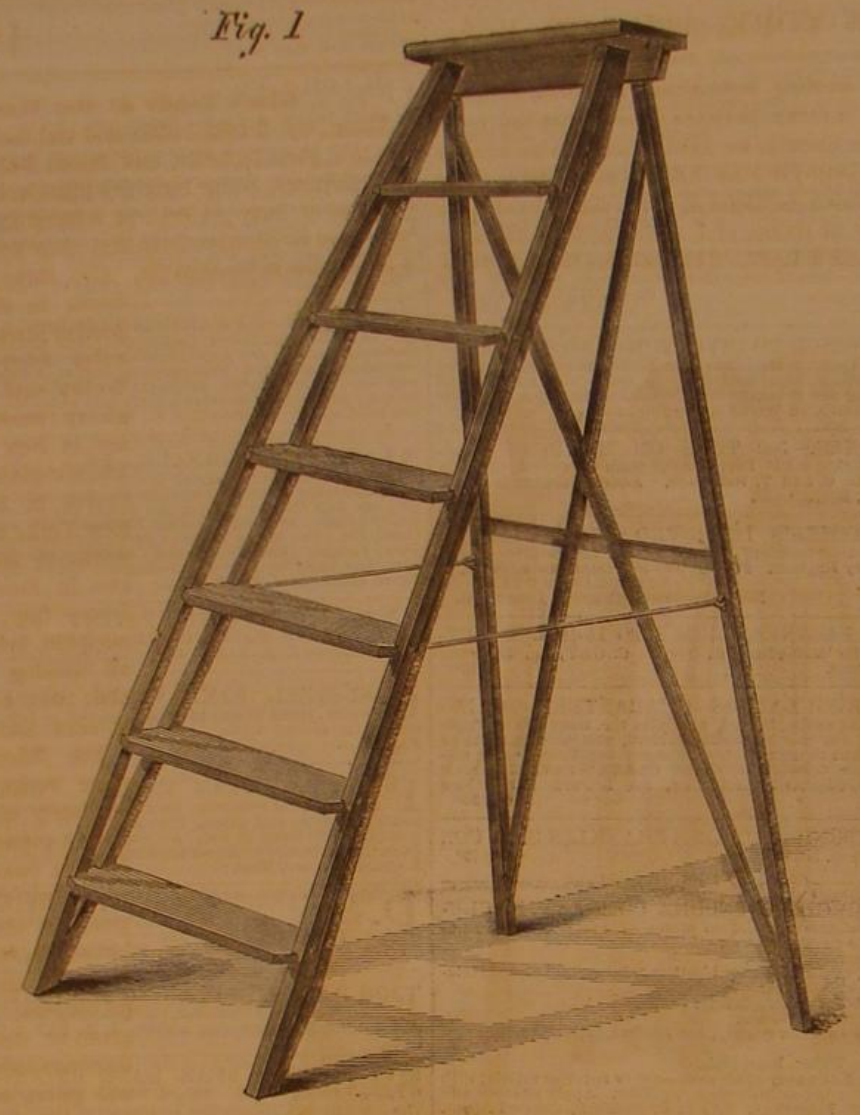
By referring to the engraving the reader will see that the sides or main supports of the steps are bow-

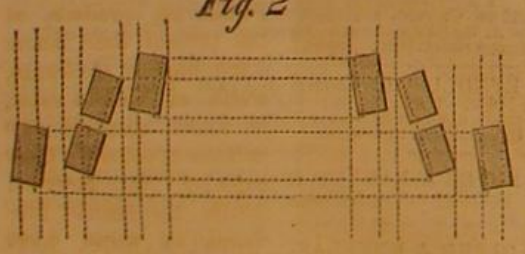
Fig. 1



BOND'S STEP LADDER.

shaped. They are also twisted on the inner side, so that great rigidity is given with less material. This twist is obtained by cutting the steps at varying angles, so that the desired curve is secured. A section of this ladder will appear as shown in Fig. 2, the different blocks or squares representing the parts as they appear when cut through the middle vertically. For gardeners or in stores, in fact in all places where

Fig. 2



such ladders are used, this one will be found convenient. It was patented on the 5th of April, 1864, by W. E. Bond, of Cleveland, Ohio; for further information address as above. State and county rights for sale.

A Rare Mineral.

The Reese River *Reveille* of 1st March, says:—

We saw lately, taken from the Warner and Wells lode by the Perseverance Company, a specimen of crystalized ruby silver ore that for beauty and rarity was a gem seldom equaled. The specimen consisted of a mass of crystals of some dozen or more, weighing about four ounces, of pure ore of the general class of antimonial sulphuret specified by Blake as "pyrargyrite." He says of it: "This silver ore is remarkable for its beautiful red color, which is best seen when a fragment is held between the eye and the light. This character has earned for it the title of 'ruby silver,' by which it is generally known. The color, however, is so deep that stout crystals, or opaque masses, appear nearly black by reflected light, hence this specimen is also known as 'black silver,' When powdered, it is cochineal red, and this may be shown by scratching it on a file. It is often found in very perfect crystals, which belong to the rhombohedral system. The prisms are six-sided and terminated by three or more planes. Specimens from Mexico have assayed sulphur 18, antimony 21.8, silver 60.2. This ore is found in Mexico and in several of the silver mines of Europe."

Bleaching Sponge.

I recollect seeing a few months since in your journal some processes for bleaching sponge, but I think in each case the sponge had to be immersed in an acid solution. I have found the following a better way, inasmuch as nothing except gaseous chloride comes in contact with the sponge. In the first place, I get a box and a basin; I then put some sponge on a flat surface, and invert the box over it; in the basin I put some "chloride of lime" and sulphuric acid, and place it under the inverted box. The chlorine becomes quickly disengaged, and in a few minutes imparts to the sponge a nice white appearance, apparently without the slightest injury to its texture. The operation had better be performed in the air, as it soon fills the room or house with a powerful smell of chlorine.—A. W. S., in the *Chemist and Druggist*.

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Alex. Robertson, writes to the *Canada Farmer*—"I have for the last four years proved to my satisfaction that the 'Wild Peppermint' is a sure and reliable exterminator of rats. In proof of the fact, I will state the result it has had with me. Four years ago my barn was regularly infested with rats; they were so numerous that I had great fears of my whole grain being destroyed by them, after it was housed; but having about two acres of Wild Peppermint that grew in a field of wheat, after the wheat was harvested, the mint was cut and bound with it, and drove the rats from my premises. I have not been troubled with one since, nor am I at present, while my neighbors have any quantity of them. I feel confident that any person who is troubled with these pests, could easily get rid of them by gathering a good supply of the mint and placing it around the walls or base of their barns."

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