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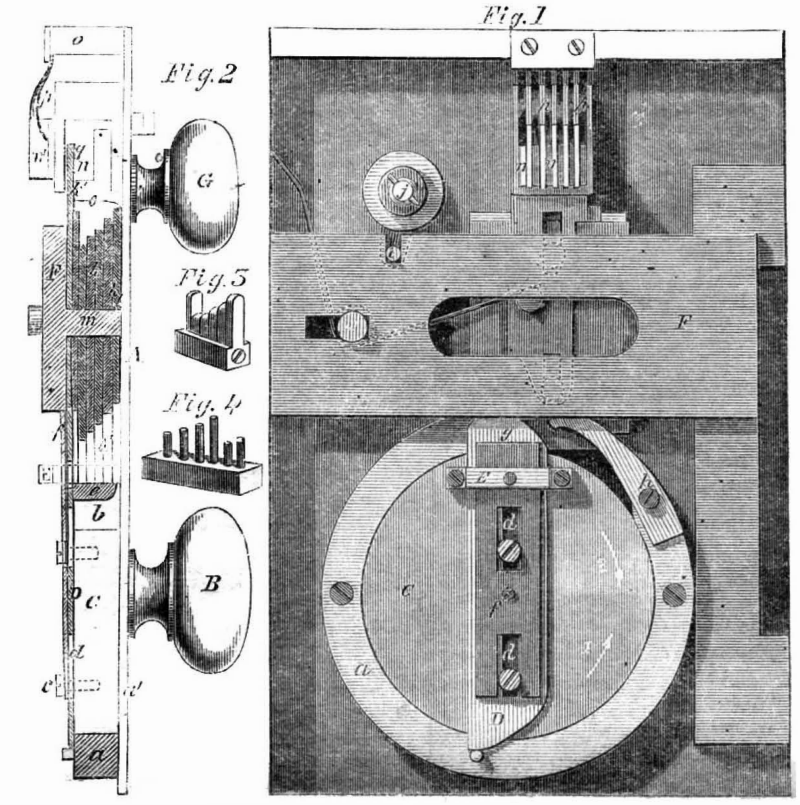
The Latest in Photography.—Photoglyphic Engraving.

Mr. Fox Talbot, the inventor of the well known "paper process" of photography, and who, with a liberality seldom found, relinquished his patent (being a wealthy man), and threw his improvements open to the world, has just been inventing a new process of engraving by light on plates of copper, steel, or zinc. Taking a perfectly clean plate, he covers it with a solution of a quarter of an ounce of gelatine dissolved in eight or ten ounces of water, mixed with one ounce of a saturated solution of bi-chromate of potash in water. The engraving process should be carried on in a darkened room, and is performed as follows:—

A little of this prepared gelatine is poured on the plate to be engraved, which is then held vertical, and the superfluous fluid allowed to drain off at one corner of the plate. The plate is dried over a spirit lamp, and the gelatine left in a thin film evenly spread over it. The object to be engraved is laid on this, and screwed down upon it in a photographic copying frame. This frame is then placed in the sunshine for one or more minutes. When the frame is taken from the light, and the object removed from the plate, a faint image is seen upon it—the yellow color of the gelatine having turned brown wherever the light has acted. Powdered gum copal is now spread thinly over the plate and melted into a thin covering, and the etching liquid applied. This liquid is the perchloride of iron, of which water dissolves an extraordinary quantity. This, of a certain strength (to be found by experience, five or six parts of the saturated solution to one or two of water being an average strength), is applied with a camels' hair brush, and the etching quickly commences, to be continued as long as the operator thinks fit. The liquid is then wiped off with cotton wool, the plate cleaned with water and whiting, and a perfect etching is obtained, the liquid acting only on those parts of the gelatine which have been left untouched by light. This liquid may be conveniently used for common etching, as it is, in every way, superior to aquafortis, and its preparation is simple, being merely a solution of peroxyd of iron in hydrochloric acid, evaporated nearly to dryness, and dissolved in water. It disengages no gas while "biting in," and does no injury to the hands or clothes of the operator. There are, of course, many points of difficulty in the process, which patience and experience on the part of the operator will easily overcome.

The venerable Alexander Von Humboldt is suffering from an attack of influenza, rather a dangerous complaint for a person of his age, ninety.

GOULD'S IMPROVED LOCK.



Fayette Gould, of Huntington, L. I., has invented and patented Aug. 17, 1858, the lock which forms the subject of our illustrations, and which is intended, as it is, to be unpickable, as two sets of tumblers are employed, and their relation may be so changed as to require different keys to open them.

Fig. 1 is a back view, Fig. 2 a section, and Figs. 3 and 4 are the two keys.

A represents a plate which forms the outer or front part of the lock case, if a complete case is required. B is a knob, the arbor of which passes through the plate, A, and is attached to a circular plate or boss, C, which is fitted and allowed to turn freely within an annular ledge, *a*, secured to the inner side of plate, A. In the plate or boss, C, a radial chamber or recess, *b*, is made, this chamber or recess being formed or cut into the plate from its periphery. On the outer face of the plate, C, a sliding plate, D, is secured by screw, *c*, which pass through an oblong slots, *d*, in the slide, D. A pin, E, passes through this sliding plate, D, and also through the plate, C, into the recess, *b*, in the plate, C. A projection, *e*, is also attached to plate, D, this projection extending into the recess, *b*, as shown clearly in Fig. 2. To the sliding plate, D, a spring, *f*, is attached, which bears on the pin, E, and has a tendency to keep it thrust into *b*. The ends of the sliding plate, D, are beveled or cut obliquely as shown clearly at *g*, in Fig. 1, and to the annular ledge, *a*, two pins, *h* h', are attached.

F represents the bolt of the lock, which is fitted in guides just above the annular ledge, *a*, and moved back and forth by a bit. *i*, which is attached to the arbor, *j*, of a knob, G. Between the bolt, F, and the plate, A, a series of sliding tumblers, *k*, are placed side by side. Each tumbler, *k*, has a notch, *l*, made in it, the notches being made at varying points in the tumblers. To the inner side of the bolt, F, a bar, *m*, is attached at right angles, the bar extending to the plate, A, and when the bolt is shoved forward and the lock in a locked state, the bar is in front of the tumblers, *k*. One of the tumblers, which is designated by k' extends upward further than the others, and a piece, *n*, rests or bears upon it. A pin, *o*, projects from the side of the tumbler, k', said pin extending over the upper ends of the other tumblers, *k*, as shown clear-in Fig. 2.

To the upper part and at the inner side of the plate, A, a series of horizontal tumblers, n', are placed. These tumblers are fitted in a box, o', and a spring, *p*, bears against the back edge of each tumbler, n'. The tumblers, n', are each slotted at varying points, *q*.

From the above description of parts it will be seen that if the bolt, F, be in a locked state, that is thrown out from the plate, A, that the tumblers, *k*, must be moved in order that the notches, *l*, may be brought in line with each other and the upper tumblers, n', must also be so adjusted that their notches or recesses, *q*, will be brought in line to receive the upper end of the tumbler, k', in order to permit of the adjustment of the tumblers, *k*. The movement of the tumblers and unlocking of the lock is effected as follows:—Two keys, Figs. 3 and 4, are employed, each key being provided with bits of varying lengths correspondingly respectively to the distances between the notches or recesses, *l q*, in the tumblers, *k n*. The knob, B, is first turned until the recess or chamber, *b*, is brought in line with a hole, *a*, in the plate, A, and the key, Fig. 3, is then pressed with the fingers into said recess or chamber, the shorter bit being first entered and the knob, B, slightly turned so that the spring, *f*, cannot force the key out from the chamber or recess. The key, Fig. 4, is then applied, its bits forced through apertures in the plate, and against the upper tumblers, n'. By this means the notches or recesses, *q*, are brought in line to receive the upper end of tumbler, k'. The key, Fig. 4 is held to the case, A, with one hand, and the knob, B, is turned by the other by the other, in the direction indicated by arrow 1, and when the key, A', in the recess or chamber, *b*, is brought below the tumblers, *k*, the sliding plate, D, will be actuated by the pin, h', and the projection, *e*, of plate, D, in the recess or chamber, *b*, will force the key, Fig 3, upward, and the tumbler, k', will be raised, in consequence of the upper ends of tumblers, *k*, striking the pin, *o*, and the tumblers, k', will pass into the notches or recesses, *q*, in the tumblers, n', while the notches or recesses, *l*, will be brought in line, so that by turning the knob, G, the bolt will be thrown back, the bar of the bolt passing into the notches or recesses, *l*, of *k*. The lock is locked by merely turning the knob, G, so as to throw the bolt, F, forward, and then turning the knob, B, in a reverse direction to its former movement (see arrow 2), and the pin, *h*, will then actuate the sliding plate, D, and when Fig. 3 comes in line with the hole or opening, *a*, the spring, *f*, will cause the pin E, to force the key, from the plate C, and the spring will force the tumblers down so as to throw the notches or recesses, *l*, out of line with each other. The springs effect the same result for the tumblers, n'. The tumblers, n', it will be seen, serve as a check or guard to the tumblers, *k*; they are important, but might be dispensed with in certain cases, where very great security is not requisite. It will be seen that the bits in the keys may be changed in position and the position of the tumblers may also be changed by having access to the back of the lock. The lock, therefore, may at any time be changed so as to require different keys, that is, a different arrangement of the bits in order to open it.

It will be seen that when the key chamber is opposite the key-hole there can be no communication with the tumblers, except by rotating the boss containing the key chamber. When that is done the key hole is closed by the solid boss passing over it, consequently it is unpickable, there being no possibility of access to the tumblers by a pick.

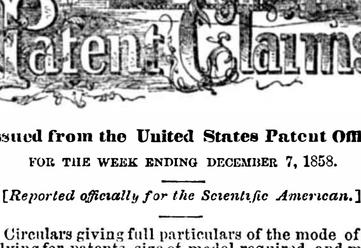
The lock is also powder-proof, as the key chamber is cut in the solid metal. The lock can be made still more simple for ordinary uses by doing away with the check or guard tumblers.

Any further information can be obtained by addressing Ketcham, Brother & Co., Nos. 4 and 6 Liberty place, near Maiden-lane, New York.

Poisoning by Paint.

M. De Calvi, an Italian chemist, is said to have experimentally demonstrated that the cases of poisoning by remaining in newly-painted rooms are not due, as has hitherto been supposed, to the white lead, but to the vapors of the oil of turpentine. According to his statement, the effects will be the same whether the paint employed is lead, zinc, or other pigment, so long as the oil of turpentine, or any of its analogues, is employed as the medium. The treatment he proposes for such cases is, the energetic use of stimulants. We have before noticed this fact, but think by again calling attention to it, some of our inventive readers may suggest a preventive, which is better than such a cure.

NEW GAS JET.—Dr. Grussi, of Paris, has suggested to the club of the Scientific Press, of that city, the addition of a small piece of platinum wire, fixed in the jet at a very short distance above the orifice where the gas issues. This thin wire, situated in the center of the flame, increases to a surprising degree its illuminating power.



Issued from the United States Patent Office

FOR THE WEEK ENDING DECEMBER 7, 1858.

[*Reported officially for the Scientific American.*]

*** Circulars giving full particulars of the mode of applying for patents, 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.

COOKING STOVES—Federal C. Adams and Joseph Peckover, of Cincinnati, Ohio : We are fully aware of the common use of vertical partitions in stoves, to divide the descending from the ascending portion of a flue, but know of none constructed and arranged in this manner.

We are also aware that it is common to admit air in various ways, and for manifold purposes, but not in this precise manner, and for these purposes.

Therefore, we claim in combination with the smoke passages formed by the single vertical and inclined partition, E, arranged with regard to the exit aperture, B, as described, the admitting of air under the grate into the air spaces, and from thence into the smoke passages by means of the perforations in the lip or flange of the back lining plates of fire box, all substantially as and for the purposes set forth in the specification.

EXTENSION TABLE—Adolphus Bader, of New York City : I claim the arrangement of additional plates, F G, in arms, E, of such a shape and form that by drawing out the arms the plates are brought to a level with the top of the table, substantially as described.

I also claim confining these arms at the proper places by means of the notches, f, and the hook, g', and to guide the same by means of pins, c, and notches, d, substantially as specified.

[In this table a number of additional plates are arranged on arms which slide under the table top, these arms being made of such a shape that when they are withdrawn halfway, the plates which they support are brought to form a continuous plane with the stationary top, thereby doubling the area of the table ; and when further drawn out, the table is trebled in its size. The arms are provided with springs and guide pins, which move in suitable grooves, and which serve to guide the arms, and keep them in their proper places while being drawn out or pushed in.]

SEWING MACHINES—Robert M. Berry, of New York City : I claim the combination and arrangement of the feeding foot, L, of cork, or its equivalent, with the peculiar feeding mechanism described, or its equivalent, operating in the manner substantially as and for the purpose specified.

SEWING MACHINES—Hobert H. Bishop, of Bristol, Conn. : I claim the plate, k, in slides on the needle bar, h, at right angles to it, and carrying the eye-pointed needle, in combination with the bent lever, m, and stops, 4 and 5, or their equivalents, for the purposes and substantially as specified.

WASHING MACHINE—Jesse Bowen, of Yellow Bud, Ohio : I claim the alternating rotation of the tub in one direction, and the similar rotation of the rubber in an opposite direction, by means of the levers, racks, and pinions, arranged and operating as set forth.

SEED PLANTERS—Jarvis Case, of Bloomington, Ill. : I claim, first, Dispensing with side rails, and connecting the front and rear truck by the drivers' seat, hinged to the front truck, and rigidly secured to the rear one, substantially as described.

Second, I claim the so arranging of a reversible marker upon the front truck of the machine, so that when planting the runner shall not touch the marker arm ; but when said front truck is raised up to turn the machine around, the runner shall catch and raise up and hold up said marker, for the purpose and substantially as described.

Third, I claim in the construction of the runner, the hollowing out for the marker arm, the forming of the seed ducts in the sides of the runners, and so inclining the straight edge thereof as that its heel shall be the lowest point, all as described, and for the purpose specified.

RAILROAD CAR BRAKES—Henry E. Chapman, of Albany, N. Y. : I claim the arrangement of the shaft, L, having upon it the right and left hand screw threads, the right and left hand nuts, K K', the rods, J J', the levers, I I', the shafts, H H', the levers, G G', and the cross bar, F, in their relation to each other and to the brake, as and for the purposes set forth.

BURNERS FOR LAMPS—M. B. Dyott, of Philadelphia, Pa. : I claim, first, Regulating the light of a gas lamp by raising and lowering the heater, and pin connected to it, while the head of the burner remains stationary, substantially as described.

I also claim, in combination with the heater and burner, the valve or projection, n, on the one, and the valve seat, o, on the other, when the said valve and seat are located between the top of the wick and the openings at which the gas is burned, substantially as described.

MACHINE FOR CUTTING STAVES FROM THE BOLT—Isaac W. Forbes, of Jefferson, Wis : I claim the arrangement of the hinged platform, d, and its latch bolt f, in such a manner with relation to the concaves, a and m, and the knife, b, of the cutter head, that the said parts can be operated substantially in the manner and for the purpose set forth.

HORSE RAKES—Christian Garver, of Londonderry Township, Pa. : I claim the arrangement of the cross piece, A, staples, f, parallel arms, B, slots, i, and pins, O, with rake, J, in the manner and for the purpose specified.

CORN HARVESTERS—Bronson Murray, of Ottawa, Ill. and John VanDoren, of Farm Ridge, Ill. : We claim, first, In combination with the inclined knife or cutter, A, the curved guides or arms, d d, for bending over, and thus facilitating the cutting, substantially as described.

We also claim in combination with the stationary cutter, A, the reciprocating cutter, B, when operating together substantially in the manner and for the purpose set forth.

We also claim in combination with the cutting and guiding or directing apparatus for severing and dropping the stalks, the shovers, E E, for moving them rearward, as described.

We also claim the arranging of the conveying apron, P upon removable supports, F F, and so inclining it that it will convey the stalks over or past the opening, J, behind it, when used, but leave a delivery at J when removed, substantially as set forth.

COMPOSITION FOR PURIFYING GAS—Paul B. Goddard, of Philadelphia, Pa : For the purifying of illuminating gas, I claim the use of lime dissolved in a saccharine solution, whether combined or not with other substances, substantially as set forth.

HORSE RAKES—John W. Hadcock and Parker Wilcox, of Norway, N. Y. : We claim the arrangement of the rake teeth, D, with the metal point or shield, c, as and for the purpose set forth and described.

WASHING MACHINE—John G. Haley, Isaac Wilson, & Jackson Lyon, of Cameron, Ill. : We do not lay any claim to the general arrangement of the machine described, as it is not new.

Neither do we claim ribs of different sizes, when made rounded upon their rubbing surfaces.

But we claim making the spaces between the edges of the slats, a, of the washboard of a width different from that of the spaces between the edges of the slats, b, of the cylinder, F, and allowing the slats of each to interlock or mash, and slip upon each other, for the purpose of causing the clothes to move or change their position in the wash box whilst they are undergoing the rubbing process, substantially in the manner and for the purpose set forth.

HARVESTERS—Henry Opp, of Belleville, Ill. : I claim the employment of the plate, c', operated as described, in combination with the bar, J, or its equivalent, attached to the finger bar, G, the whole being constructed and arranged as and for the purpose set forth.

[This is an improvement for discharging the cut grain in gavels from the machine, and also a novel arragement of the finger bar in connection with the sickle, whereby it may be raised and lowered independently of other portions of the machine, and secured at any desired point within the range of their movement, in order to cut the grain at varying hights, as may be desired. There is also a means employed for raising and lowering the front part of the machine, whereby the finger bar and sickle may be made to pass any obstruction in their path.]

WROUGHT NAIL MACHINE—Adrian V. B. Orr and Gideon Bantz, of Frederick, Md. : We are aware that dies, levers, cams, cranks, furnaces, &c., have all been used for the purpose of making nails; we therefore wish it to be understood that we make no claim to any of the mechanical devices distinct from our manner of using and constructing them.

But we claim, first, the dies, E and F, constructed in the manner described, and when acting simultaneously, in combination with the heading swage upon the heated bar, as specified.

Second, We claim with the said header and dies, the use of the elongated tweer, opening in the manner and for the purpose set forth.

LIME KILNS—Clark D. Page, of Rochester, N. Y. : I claim the construction of the cupola with the sectional form shown in Fig. 2, combined with the arrangement of the flues, E E F F F, substantially as described.

SEWING MACHINES—Samuel F. Pratt, of Roxbury, Mass. : I claim for interlooping two threads in order to sew cloth or other material, by means of an eye-pointed needle, or its equivalent, the combination of a thread carrier or adjuster, M, and a hook, P, so acting together and with the eye-pointed needle, or its equivalent, as not only to cause the thread of the carrier to be laid or presented in rear of the needle in a proper manner to be seized by the hook, but to cause the hook to pass through the loop of the needle, seize the thread of the carrier, and next recede, and draw the said thread in the form of a loop, through the loop of the needle, and properly present it for the needle to pass through it during its next downward movement, after the cloth may have been fed along the length of the stitch.

I also claim the thread carrier, M, constructed with the slit, a, or its equivalent, and barb, b, operating in the manner described, to present the lower thread to the reciprocating looper hook, which will draw it through the loop formed in the needle thread.

METHOD OF MEASURING AND RECORDING BY THE TAPE—E. A. Preston, of Battle Creek, Mich. : I claim the described arrangement of a tape measure, whereby the same is made self-registering by means of the drum E, the pawl, f, and the ratchet wheel. F, in combination with the spring, c, arranged in the barrel, D, and with the pinions, G H I and J, and the wheels, G' H' I' and K, constructed and arranged substantially as set forth.

[This invention consists in arranging the tape measure on a barrel containing a spring, for the purpose of drawing in the tape, in such relation to a drum that the tape, while it unwinds from the barrel, passes over the surface of the drum and rotates it; and by an arrangement of ratchet, pawl, and gear wheels, the amount of tape drawn out is indicated by hands upon a dial on the face of the box.]

PLATFORM SCALES—Elnathan Sampson, of St. Johnsbury, Vt. : I claim the arrangement of the stationary frame, B, descending and sliding platform, L L', rising frame, H, descending arm, O, and weighing beam, when the whole is combined by means of links, E E I N, and knife edge bearings, D G M M' K, and arranged in the manner and for the purpose as described.

[This is an improvement in scales for weighing railroad cars, coal carts, hay wagons, and other heavy objects, and the principal features of the invention consist in dispensing with the lower cross bars, and their attachments heretofore employed for sustaining the platform, and indicating the weight of any objec placed upon it. For these is substituted a more simple and economical combination and arrangement of parts, which not only render the scale more effective and sensitive in its operation, but also less liable to get out of order from the constant traversing of cars and other objects over the platform.]

AMALGAMATOR—Lewis Solomon, of New York City : I claim, first, The use of elongated amalgamating chambers, I, when arranged to operate in the manner and for the purposes specified.

Second, The arrangement of the amalgamating chambers, I, within a heated chamber, A, for the purposes specified.

WATERPROOF CORK COMPOSITION—Andrew Stevens, of New York City : I claim as an improved article of manufacture, granulated cork, that is covered and impregnated with the composition specified.

[By impregnating and coating granulated cork with a solution of a gum in alcohol, and certain essential oils, it is rendered less susceptible of absorbing moisture, and better adapted to the purposes of filling the quilted linings of overcoats, jackets, mattresses, and other articles of a like character, intended for life-preservers; and also imparts to them a peculiar and pleasant odor, which is, however, so distasteful and injurious to bedbugs and other vermin, as to keep them entirely away from the articles so impregnated.]

GUARD FOR CIRCULAR SAWS—Reuben S. James, of Bethel, Vt. : I claim the shield, G, with blade, H, arranged with or without tongue, I, for circular saws, operating substantially as described and for the purposes set forth.

BURNERS FOR LAMPS—Josee Johnson and Frederick Bailey, of New York City : We claim the combination in a lamp of the tubes, a a d m n, glass tubes, c c c, and barrel, B, the same being constructed and operated substantially in the manner and for the purpose set forth.

GRAIN AND GRASS HARVESTERS—M. G. Hubbard, of Penn Yan, N. Y. : I claim the attachment of the front corner of the reaping platform to the corner of the machine, by means of the hinge, K, constructed and arranged substantially as and for the purposes set forth.

I also claim the elastic connection between the reel and driving power, in combination with the flexible attachment of the outer reel arm, arranged substantially as and for the purposes described.

I also claim the employment of the self-sustaining raising lever, when constructed and arranged as and for the objects specified.

I also claim supporting a portion of the weight of the outer end of the platform by means of the spring, m, or its equivalent, substantially as and for the purposes described.

SEALING PRESERVE CANS—Allen Taylor, of Baltimore, Md. : I do not claim, broadly, constructing a preserve can top with a groove for containing the cement, so that the cover may be sold in the market separately from the body of the can with the cement applied to it, ready for closing and sealing up the can.

But I claim the forming of the gutter-shaped rim, E, which supports the sealing cement of a porous or textile substance, said substance being applied to the downwardly bent edge of the cover, and forming with said edge a V-shaped gutter, in which the cement when melted will be confined, yet allowed to come in contact with the metal surface, and thus seal the cover to the can with a small expenditure of cement, and in such a manner that the cover can be readily unsealed without cutting up and wasting the cement, as when other modes of sealing are adopted, substantially as set forth.

EDGE KEYS FOR BOOTS—George C. Todd, of Lynn, Mass. : I claim the shank, B, in combination with the disk, C, so attached to the side of it that the angle of inclination of the disk to the shank may be varied as required, substantially as set forth.

PREVENTING INCRUSTATION OF STEAM BOILERS—John Warren Harnett, of Cincinnati, Ohio; I am aware that grease or other oleaginous matter has been used as a means of preventing boilers from priming, and that it has been used for that purpose in a manner totally different from that specified, and which constitutes my invention.

I therefore lay no claim to the use of fat or oily substances for the purpose of preventing boilers from priming, whether said substances be in a solid or liquid state.

I claim the means and manner specified of injecting oil, or other fatty matter, in a liquid state, into the boiler, for the purposes set forth, whereby the said oil fatty matter is fed to the boiler simultaneously, and in connection with the water, as described.

STOVES—Charles Hartwell, of Boston, Mass. : I do not claim the employment of a mixture of air and super-heated vapor for heating air for warming buildings, for this, I am aware, is the invention of J. H. H. Perkins, and was patented by him in December, 1856.

But I claim in connection with the evaporating vessel, E, or its equivalent, for supplying vapor to the air, the described arrangement of the parts of my stove, consisting of the fire pot, A, lower chamber, B' D', receiving pipe, d, tubes, c, and oven, or other cooking vessel, F, arranged in relation to each other substantially in the manner and for the purposes described.

And in connection with the above I also claim the aperture, a, leading from the interior of the case, B, to the ash pit, in the manner and for the purposes described.

WATCH CASES—Auguste Lachat, of New York City : I claim the method of constructing a "magic" watch case, substantially as described.

I also claim making the head of the push pin movable in the manner and for the purpose set forth.

SEWING MACHINES—John Mackenzie, of Cleveland, Ohio : I do not claim, broadly, working the feed apparatus and the shuttle driver by the same eccentric pin projecting from a revolving wheel, or its equivalent.

Nor do I claim giving the feed dog such a movement as is described.

But I claim combining the lever-like feed dog, K, with the revolving eccentric pin, e, which operates the shuttle by means of the vibrating slotted double cam-like plate, P, and the two levers, L and M, the connecting rod, K, and the springs, S S, the whole being arranged and operating as described to produce the movements of the feed dog.

[This invention consists in a certain arrangement and combination of mechanical devices to provide for the operation of the feeding dog by the elongation of an eccentric pin which drives the shuttle.]

SAW SET—Edward Marshall, of New York City : I claim the described method of setting saws whereby the saw is firmly clamped, and held in the slot, i, by means of claws, a a, while the tooth is being bent or set, the saw being alternately clamped and released as the teeth are successively set, as is fully described.

FURNACE FOR MELTING IRON—William McFarland, of St. Louis, Mo. : I claim the combination of a reservoir, A, with a cupola furnace, B, so as to collect the metal as fast as melted, substantially as and for the purposes set forth.

[This invention is designed to prevent the collecting of the melted metal in the bottom of the furnace, and thus keep the furnace free, and in good melting condition. In all cupola furnaces at present used, there is more or less difficulty experienced by iron-founders, from the collecting of the iron and slag in the bottom of the furnace amongst the fuel, because, as the iron rises in the furnace, the slag is carried upward through the body of the coal denominated the "bed." When the iron is tapped from the furnace, the slag, being less fluid, and of a sticky nature, does not settle with the iron, but adheres more or less to the coal, coating it, and injuring the bed. Each time it rises, more accumulates, and the action of the blast on the slag chills it, thereby forming a large body of dead matter in the furnace, curtailing its capacity, and interfering with the melting. Mr. McFarland's invention consists in providing on the side of the furnace an auxiliary reservoir, for the purpose of receiving the melted metal as fast as it is melted. The connection between the furnace and reservoir is effected by means of a pipe—the reservoir being below the bottom level of the furnace. This appears to be a very excellent arrangement, and the inventor thinks that he will be able to melt in a cupola furnace having his improvement attached, even "pilot knob ore."]

LIFE BERTH FOR VESSELS—James P. McLean, of New York City : I claim the arrangement of the removable bed or bottom, c c', canvas joints, E E, lockers, F F', oar and signal com artment, D, air tubes, and the projections, grooves, and plates, G G1 G2 G3, combined and operated in the manner and for the purpose substantially as described and shown.

DOOR LATCH—Henry Hackman, Jr., of Paque, Pa. : I claim the revolving bolt, E, the lever arms, G G, peg I, coiled spring, K, the shouldered shank, I, and spring catch, O, when combined and used substantially as described.

BUSTLES—Charles A. Postley, of Jersey City, N. J. : I claim the combination of adjustable hoops and adjustable waist ribs, arranged in the manner described, so that the size of the bustle and the position of the hoops may be varied to suit the wearer.

DEVICE FOR SUPPORTING FURNITURE CASTERS—Henry E. Richards, of Newark, N. J. : I claim a new article of manufacture for a caster rest, consisting of the arrangement of the concavity, A, and the points, B B B, substantially as and for the purpose described.

SAW SETS—I. P. Vanvleck, of Cooksville, Wis. : I claim the hammer head, E, operated from the treadle, H, through the medium of the bar, I, springs, D L, and arm, J, in connection with the anvil, F, and gage, G d, the whole being arranged substantially as and for the purpose set forth.

[By this invention a saw may be set readily and perfectly even by a person inexperienced in such matters. The inventor uses a spring hammer operated by a treadle in connection with an anvil or bed and gages to effect this object.]

MODE OF OPENING AND CLOSING FARM GATES BY APPROACHING VEHICLES—Caleb Winegar, of Union Springs, N. Y. : I claim, first, The combination only of two or more capstan rollers, substantially as described.

Second, The operating of gates by means of winding up the weight or equivalent spring with the wheel of a carriage, or by lever, each time in passing and re-passing the gate, sufficient to open or close the gate or gates, substantially as described.

SPINDLES FOR THROSTLE SPINNING—C. E. Brown (assignor to himself, John Tenney, and John Rhodes), of Millbury, Mass. : I am aware that various forms of fliers and spindles have been used, and do not claim of themselves as heretofore used, but only in the combination, arrangement and use of them, as described.

But I claim the combination and arrangement of the stationary socket spindle, the loose spindle, and the reversed flier and whir, when constructed and operating in the manner and for the purposes set forth and described.

BILLIARD TABLE CUSHION—J. E. Came (assignor to himself and Jas. E. Came), of Boston, Mass. : I do not claim a billiard table cushion made of vulcanized caoutchouc alone, or of the same covered with cloth ; nor do I claim the application of a paste-board, steel, whalebone or hard vulcanized caoutchouc facing to the elastic caoutchouc body or bed of a cushion for a billiard table, and having a common leather or cloth or non-waterproof covering simply stitched on it and not connected to it. When a plate or thin layer of whalebone or pasteboard has been fixed to the entire surface of the rubber body of the cushion, its outer surface has not been covered with a layer of waterproof material cemented to it throughout. When cloth is applied to the facing of hickory, or its equivalent, by caoutchouc cement, the cement not only protects the wood or hard facing from dampness and the effect of atmospheric changes, but by its elasticity and its connection with the cloth covering, the wood is not only prevented from being split or injured by the blows of the balls, but the balls are caused to operate to better advantage than when the covering over the hard facing is loose or not cemented thereto. A moment's reflection will suffice to satisfy any person that, when a ball impinges at an acute angle against a cushion, the cloth of which or leather cover is loose or disconnected from the body at the place of impact, such ball will drive the cloth before it into a ridge which will operate to injure the proper reflex of the ball. When the hard hickory facing has its cover cemented to it, no such injurious lateral movement of the cover can take place under a blow of the ball. The main characteristics of my improvement are, that the covering of the hard facing of the body should be waterproof, and be cemented to the outer surface of the facing. When the covering is cloth as above described, and has a layer of cloth stretched over it, the adhesion or friction of the two layers of cloth, generally speaking, will be sufficient to prevent the outer layer from having any injurious lateral movement, but to entirely prevent any such, the two layers of cloth may be cemented together. Thus it will be seen that the mere employment of a strip of whalebone, pasteboard, or steel as a facing to the rubber body, irrespective of the waterproof cover, I do not claim.

But I claim my improved mode of making a billiard table cushion, viz., of a vulcanized caoutchouc body, A, a thin facing, a, of hickory or its equivalent, and a covering thereto of waterproof cloth or material, the whole being applied together and covered with one or more layers of cloth, substantially as described.

SEWING MACHINES—John First (assignor to himself and James Frost), of New York City : I claim the employment of the slotted arm, D, the rod and pin, E H, and the swiveling guide, G, or their respective equivalents, in combination with each other and with the crank, E, substantially as described, for the purpose of communicating the requisite irregular motion to the needle bar of a sewing machine, as set forth.

VULCANIZED RUBBER GOODS—H. L. Hall, of Beverly, Mass., assignor to the Beverly Rubber Company : I do not limit myself to any particular method of making the restored rubber plastic.

I do not claim combining fibrous materials with native rubber before it is vulcanized for the purpose of then being vulcanized or for any other purpose, as that has been done before, and is a very different process from mine.

But I claim the improvement in the manufacture of rubber goods of every description, which consists in combining fibrous materials with waste vulcanized rubber rendered soft and plastic in the manner described, whether such fibrous materials be such only as are found in old or waste vulcanized goods or fabrics, or new fibrous materials added to the rubber compound.

SECURING THE ARMS TO THE HUBS OF PROPELLERS—H. O. Perry, (assignor to himself and Sidney Sheppard), of Buffalo, N. Y.: I do not confine myself to any precise degree of taper to the conical ends of my arms, nor do I confine myself to the employment of four arms.

But I claim the employment of the conical ends, c', confined in the corresponding sockets in B', by the keys, D 1 D 2 D 3, &c., substantially in the manner and for the purposes set forth.

VALVES FOR GAS METERS—R. M. Potter, (assignor to Wm. Mackenzie, assignor to R. M. Potter), of New York City : I disclaim eccentric rotary valves ; but I claim the eccentric sliding valve, b, when constructed, arranged and operated substantially as described.

SAW MILL—S. R. Smith and P. P. Lane, (assignor to Lane & Bodley), of Cincinnati, Ohio : We claim, first, The longitudinal rack bar, l, combined as described, with the segment wheel, K, pinion, j, and accessory rack, i, so as to admit of the head blocks being placed in gear at any required distance asunder without disconnection or adjustment of parts.

Second, The described arrangement of the collar, G, box, H, cushions, L, and temper screws, J, whereby the saw may be fixed rigidly in any position or allowed lateral play to any desired extent and return automatically to its normal plane, when released and by means of which the position of the said normal plane may be varied at pleasure.

Third, The perforations, 5, applied to the transverse racks, p, in the manner and for the purpose explained.

SEWING MACHINES—S. G. Tyler (assignor to himself, G. J. Savage, and J. W. Barnum), of Quincy, Ill. : I do not claim any particular arrangement of feeding apparatus other than the self-adjusting toes attached to and forming a bearing surface for such apparatus.

But I claim making the bearing surface of a feeding foot or pressure pad of a sewing machine, or their equivalents, with two or more parts or toes, each self-adjusting to varying thicknesses or inequalities of surface, cording, hemming or sewing plain work, and combing the same with a sewing machine feeding apparatus, substantially as and for the purposes specified.

BURNERS FOR VAPOR LAMPS—E. M. Williams (assignor to himself and John Gabel), of Philadelphia, Pa.: I am aware that vapor lamps have been constructed in which a supplemental flame has been employed for volatilizing the fluid, but I am not aware that a sliding supplemental wick tube arranged as shown and described has been employed for the purpose of graduating the heat employed for volatilizing the fluid within the lamp, and thereby regulating the power of the illuminating flame as may be desired. I do not claim, therefore, broadly, the employment or use of a supplemental flame for volatilizing the fluid within the lamp.

But I claim the supplemental sliding wick tube, D, arranged relatively with one or more vapor tubes, C, to operate substantially as and for the purpose set forth.

[This is an improvement in that class of lamp in which the fluid or burning material is volatilized, and the vapor burned as it is generated. The invention consists in the use of a sliding wick tube fitted in the cap of the lamp and placed in close relation with one or more vapor tubes, whereby the latter, by the adjustment of the former, may be heated to a greater or less degree, and an illuminating flame of greater or less brilliancy obtained.]

PREVENTING EXPLOSIONS IN STEAM BOILERS—Jane H. Lloyd, executrix of R. L. Lloyd, deceased, late of Philadelphia, Pa., assignor to G. P. Perry, of said Philadelphia; I wish it to be understood that I do not desire to limit the claim of the invention to such special mode, as modifications of the same may be necessary in adapting it to different forms of steam boilers.

But I claim as the invention of the said Richard L. Lloyd placing within a steam boiler or metallic conductor, arranged to communicate with the outside of the said boiler, substantially in the manner set forth, in order to maintain an electrical equilibrium between the inside of the boiler and outside thereof, or with any matter surrounding or in connection therewith for the purpose specified.

RE-ISSUES.

METALLIC TIPS FOR BOOTS AND SHOES—George A. Mitchell, of Turner, Me. Patented Jan. 5, 1858: I claim as a new article of manufacture my described metallic tips, constructed in the manner and for the purposes fully set forth.

I also claim as a new article of manufacture a metallic tipped boot or shoe, constructed essentially in the manner and for the purposes fully set forth and described.

DESIGNS.

METALLIC COFFIN—Wm. H. Forbes, of New York City.

COOKS' STOVES—G. D. Sprecher, of Lancaster, Pa.

Invention of Balloons.

The admirers of crinoline will be proud to learn that the invention of balloons is owing to a similar contrivance. The French give a curious anecdote of a simple occurrence which led the inventor of such machines—Montgolfier—to turn his attention to the subject. It is to this effect:—A washerwoman of the Rue aux Juifs, in the Marais, placed a petticoat on a basket-work frame, over a stove, to dry. In order to concentrate all the heat, and to prevent its escaping by the aperture at the top, she drew the strings closely together which are used to tie it round the waist. By degrees the stuff dried, became lighter, and the stove continuing to heat and rarify the air concentrated under the framework, the petticoat began to move, and at last rose in the air. The washerwoman was so astonished that she ran out to call her neighbors; and they, seeing it suspended in the air, were amazed. One individual, however, a simple paper-maker from Annonay, named Montgolfier, as much astonished, but more sensible, than the others, returned home, and without loss of time, studied the works of Priestley on different kinds of atmospheres. The result was, the manufacture of the first balloon, called Montgolfier's, of which he was the inventor. As the nautilus probably gave the idea of a sailing vessel, so also do very simple causes often produce great and unexpected results.—*Chambre's Recollections.*

"A NEW TELEGRAPHIC invention has been exhibited in London. The model consists simply of a trough filled with water, on each side of which are two copper plates, the plates on the one side being connected with a common electric battery; and it is found that, without any wire, the electricity passes through the water and makes signals on the other side, in the ordinary manner—the theory being that the copper plates guide the electric current in the circuit."

[We copy the above from our venerable neighbor, the New York *Sun*. What a nice idea it would be, if we could only send our messages through the briny deep without the aid of ocean cables, simply using water, as the conducting medium! This great discovery has, however, not even the merit of novelty to recommend it. To our certain knowledge it is thirty years old, and we know not how much older. The idea is impracticable.

Something about Magnetism.

At no great distance from Constantinople is the ancient town of Magnesia, once a city, and the residence of the great Ottaman rulers of the East, and the centre of Oriental splendor. A pleasant ride from this old Magnesia brings us to the vicinity of the most remarkable iron-mines in the world; remarkable not for the quantity of metal produced, but for the peculiar properties of the ore. The mineral here obtained has the specific name of leadstone, or (as now corrupted) loadstone. If a strip of this stone be balanced on a point, it will turn on that point till it takes a direction which is opposite to the motion of the earth; and as the globe revolves from west to east, so therefore does the loadstone stand in a direction north and south.

According both to history and tradition, round and about Magnesia dwelt, at a very remote period, a civilized race. Men of thought and science naturally had their attention directed to the astonishing and almost life-like property of this stone. Nearly all of us have read, or intend to read, the story of Sinbad the Sailor, in the "Arabian Nights' Entertainments." How long ago it is since that tale was written it is difficult to say; but it is certain that it was as popular before the Christian era as it is now. The loadstone of the tale is the Mountain of Adamant, which drew the nails out of the wonderful navigator's ship. We read in the legend, that "about noon we had come so near that we found what the pilot had foretold to be true, for we saw all the nails and iron in the ship fly towards the mountain by the violence of attraction, with a horrible noise; so the ship split and sank into the sea."

Since the Crimean war navigation has been much extended in the Black Sea, and here is a confirmation of the Arabian fable by a recent traveler. "Ships have lately run ashore on the coasts of the Black Sea near Sinope; and the captain of one that narrowly escaped wreck, suspected that the compass had been deflected by magnetic influence. This suspicion led to an investigation, which has issued in the discovery of a valuable mine of iron ore or leadstone on those coasts, the danger of which is calamitous." Now if this, or the mines near Magnesia, (and both are not far apart,) be not the identical Mountain of Adamant referred to by Sinbad, it is certainly a very remarkable coincidence.

The power which we call magnetism, derives its name from Magnesia, because of this loadstone; and as the subject is an old one, we ought perhaps to know all about it; but, nevertheless, it still mystifies the most profound philosophers. What we *do* know has been discovered by men of our own age.

As we have before said, if a piece of this adamant, or loadstone, be balanced, it will turn till its direction is north and south, and then remain stationary; but this is not all, for the loadstone has the power to impart the same quality to a piece of steel, which it does by mere friction, losing by the operation not the slightest power itself, yet giving to the steel no less an amount of power than itself possesses; and steel thus treated is said to be magnetised. But this power of placing itself at right angles to the motion of the earth is not the only quality that a magnet posesses. The attractive influence it exercises over iron and steel is no less wonderful, and indeed so much so that considerable force is necessary to remove the object attracted when once brought in contact with it. A number of mechanicians are now engaged in solving the problem—how to make this power useful for locomotion, and there is great probability that they may eventually succeed. Although we are not able to explain the cause of magnetism, yet we have ascertained that it is intimately connected with electricity, for we can produce the one from the other. The mariner's compass consists of a piece of steel shaped like an arrow, that has been rubbed with either a loadstone or magnet. When thus treated, it is called a magnetic needle; it is then fixed to a card on which are marked all the points of the horizon; in this way it becomes useful to the traveler by land and by sea, as he can direct his course to any point he pleases, knowing well that—

> The obedient steel with living instinct moves,
> And veers for ever to the pole it loves.

Hence the old name lead-stone is correct.

Another remarkable property inherent in magnet is that of having a power, which we call the repulsive or repelling power, this is no less active than its attracting power. In this way the chemists have given to the mechanics two horses—one that pushes and one that pulls; and it is for them to solve the means of harnessing them to a vehicle—a feat probably beyond the horse-taming powers of Mr. Rarey himself. SEPTIMUS PIESSE.

Influence of Out-door Air and Sunshine on Longevity.

A writer in one of the medical magazines argues that the more out-door air and cheery sunshine a man can use, the longer he will live. Go along any of the fashionable streets of New York, says the writer. and you will find no less than three, and often six, distinct contrivances to keep out sunshine and gladness. First, the Venetian blind on the outside; second, the close shutter on the inside; third, the shade which is moved by rollers; then there are the lace curtains, the damask or other material, &c. In the train comes the exclusion of external air by means of the double sash, and a variety of patent contrivances to keep out any stray whiff of air from entering from the bottom, sides and tops of doors and windows. At this rate, we shall dwindle into Lilliputs, if we do not die off sooner.

Course of Refinement.

The same age which produces great philosophers and politicians, renowned generals and poets, usually abounds with skillful weavers and ship-carpenters. The spirit of the age affects all the arts; and the minds of men, being once roused from their lethargy, and put into a fermentation, turn themselves on all sides, and carry improvements into every art and science. Profound ignorance is totally banished, and men enjoy the privilege of rational creatures, to think as well as act; to cultivate the pleasures of the mind as well as those of the body. The more these refined arts advance, the more sociable men become; nor is it possible that when enriched with science, and possessed of a fund of conversation, they should be content to remain in solitude, or live with their fellow creatures in that distant manner which is peculiar to ignorant and barberous nations.—*Hume.*

To Raise the Pile on Velvet.

We are sometimes asked "What is the best thing to do with a velvet mantle after it has been in the rain?" Velvet that is rough and knotty, from rain spots and splashes, can be rendered smooth again by thoroughly damping the back of it, and then passing the back of the velvet over a hot iron—the velvet, remember, must be passed over the iron, and not the iron over the velvet. The heat converts the water into steam, which rises through the pile, and so separates every filament. Some contrivance must be made to hold the iron upside down while the velvet is passed over it. If rested between two bricks covered with flannel, it will do very well; but if the same pair of hands that carried the umbrella over the mantle when it was out in the rain can be secured for that office, they will be found suitable. S. P.

WEIGHING COAL.—The good people of Philadelphia are agitating the question of a law, to compel all coal dealers to weigh their coals at the door of the purchasers. In London coals are delivered in sacks each of which is required by law to be of uniform weight, so that the purchaser can, by weighing one or more, detect any fraud in short weight. The better plan would be to use Martin's self-weighing coal carts illustrated on page 129, Vol. XII, SCIENTIFIC AMERICAN.

Golden Canals.

During the past five years, there have been construeted in California 4,405 miles of artificial canals for gold-washing, at a cost of $12,000,000. These canals are generally strong flumes for conveying mountain streams to the dry diggings, and are used to wash out the golden nuggets. They are mostly erected in the mountainous regions, and afford evidence of the daring and energy of our people. At one place a canal may be witnessed spanning some awful abyss; in another it will be seen carried in tortuous courses for miles round lofty mountain peaks, and finally it will terminate in a high fall of one hundred feet or more. It is here used as an immense hydraulic power, being conveyed in long hempen hose, and employed ingeniously like the streams of fire engines to wash down great gravel hills containing the golden deposits of past ages.

California Wool.

The San Francisco *Bulletin* states that California will soon be as distinguished for growing wool as it has been for producing gold. The clip of the present year, it is believed, will reach a million and a quarter pounds, and some qualities rival the finest Australian fleeces, which are so highly prized in England. California will do more good to the world by raising wool than collecting gold. The former is an article of necessary use, and gives employment to millions in manufacturing it into various fabrics, while the latter gives employment to comparatively few, and is only employed as a medium of exchange and ornament. Our flannels, broadcloths, shawls, and a multiplicity of the most beautiful textile productions are made of wool, and the increase of its product in California is a favorable sign for the future rise and progress of manufactures in that State.

Cold Water to cure Scalds.

A writer in the *Ohio Cultivator* says:—"I placed a large tub full of water with plenty of ice in it, by the side of a large kettle full of water which was boiling very fast. I then rolled up my sleeve above my elbow, and thrust my arm into the kettle of boiling water up to my elbow, then immediately back into the tub of ice-water, letting it remain a few seconds, then into the boiling water again, repeating this process ten times in a minute, without injury or inconvenience, not even making my arm look red. From this experiment, I suggest the propriety of using cold water baths immediately after being scalded. Cold water is always handier than hot water. The sooner cold water is applied after scalding, the surer will be the cure."

American Cotton in England.

Although much has been done by the British manufacturers to obtain greater supplies of cotton from other countries than the United States, it appears that they are more dependent than ever upon the American supply. At a recent meeting of the "Cotton Supply Association," held in Glasgow, it was stated that in 1801 England obtained 45 per cent. of its cotton from the United States, now it takes 80 per cent. In 1810, 60,000,000 pounds were obtained from America, in 1812 it declined to 17,806,000, (during the war), then in 1817 it rose to 85,649,000 pounds. The supply of cotton from India, Pernambucâ, and Bahia, has greatly declined during the past two years, and as a consequence, an increased quantity is demanded from America.

LARGE CAST IRON COLUMNS.—Twelve cast iron columns for the State House, Madison, Wis., are being cast at Cincinnati. They are each 50ft. in hight, 4ft. in diameter, and weigh between 200 and 300 tuns, and will cost about $30,000.

Stearine is composed of 78-8 parts of carbon, 11-8 of hydrogen and 9-4 of oxygen, and it is coming into very general use for candles and the like, as it gives a splendid light and is free from grease.

New Inventions.

Improved Grinding Mill.

The many improvements which have taken place in mills would seem to leave but little room for further invention, but the subject of our engraving proves that such is not the case, and that great improvements have been effected. B. A. Beardsley, of Waterville, N. Y., is the inventor of this mill, of which Fig. 1 is a perspective, with part broken away to show its interior construction, and Figs. 2 and 3 are different plans of the grinding surfaces.

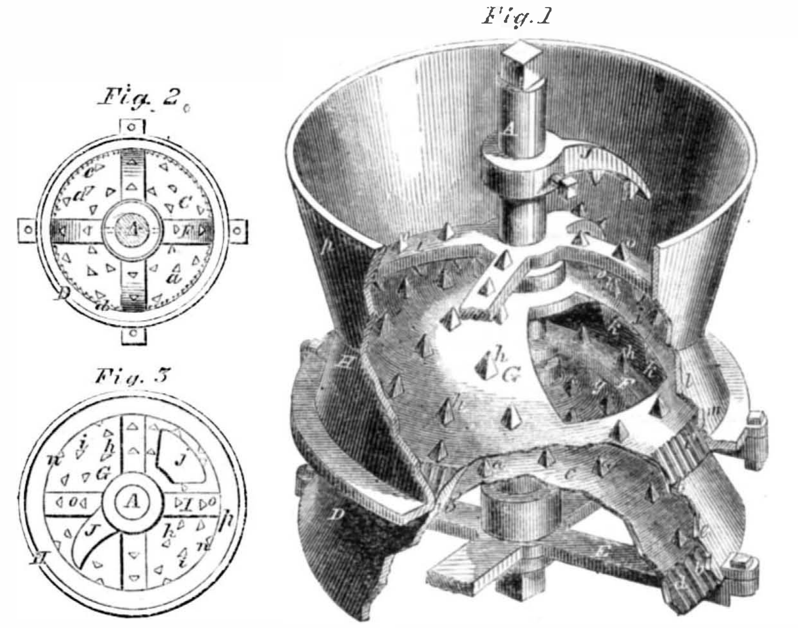
A represents a vertical shaft, the lower end of which may be stepped in an adjustable bridge, and arranged in the usual or any proper way. On the lower part of the shaft, A, a conical or semi-spherical cast iron shell, C, is permanently secured. This shell has upright taper or conical teeth, *a*, on its upper surface, and around its lower part a finely toothed or corrugated strip, *d*, is formed. Just above the toothed strip, *d*, triangular projections or teeth are formed, said projections alternating with the lower row of teeth, *a*, on the shell, C.

The shell, C, is encompassed by a cast iron case, D, of conical form, provided on the upper part of the inner surface with teeth, *b*, and at its lower part with fine teeth, *e*, which correspond to the teeth, *d*, on the shell, C. The teeth, *b*, are not placed very near each other, as will be seen by referring to Fig. 2, where they are marked *d*. The case, D, is stationary, secured to any proper framing, and to the bottom of the case, D, arms, E, are attached, crossing each other at right angles, and having an aperture made through its center, through which the shaft A, passes, their arms serving as a guide to the lower part of the shaft. To the upper part of the case, D, arms, F, are attached, these arms are of inclined or curved form corresponding to the inclination or curvature of the shell, C, and cross each other at right angles, a circular opening being allowed at their point of intersection to allow the shaft, A, to pass through. The arms, F, are provided with conical teeth, *g*, both on their upper and lower surfaces, as seen in Fig. 1. G is a conical or semi-spherical shell or case which is permanently secured to the shaft, A, and is provided with teeth, *h i i′*, on its upper surface precisely similar to the teeth, *a d e*, on shell C. Through the shell, G, an orifice, *j*, is made, the edges of which are made knife-edged as shown in Fig. 1. The under side of the shell, G, is also provided with teeth, *k*, precisely similar to the teeth, *a*, on shell, C, and the teeth, *h*, on the upperside of shell, G. The lower edge of the shell, G, has a rebate formed in its lower edge all around it, the rebate forming a shoulder or guard, which projects over the upper edge of the case, D. The lower edge of shell, G, fitting in a rebate, *b′*, made in the upper edge of the case, D, (see Fig. 1). The adjoining edges of the shell, G, and case, D, are therefore fitted one into the other, and a certain degree of vertical play or movement is allowed the shaft, A, and consequently the shells, C G, without exposing a space between the shell, G, and case, D. This play or movement is necessary in order that the shell, G, may be adjusted to grind coarse or fine as may be desired. The employment of the guard serves to prevent the escape of the contents of the mill between the lower edge of shell, G, and the top of the case, D. If no guard were employed it would be impossible to raise the shell, G, for adjustment, without leaving an opening between the shell and the case, through which the contents of the mill would immediately pass out.

H is a case, the lower end of which is bolted to the upper end of case, D. The lower part of case, H, is of conical form corresponding in form to the case, D, and its internal surface is toothed precisely similar to the interior of case D, *m* representing the portion of the fine and *n* the coarse teeth. Within the case, H, and at the upper part of the lower portion of the case, arms, I, are placed. These arms cross each other at right angles, and have an opening at the point of intersection for the shaft, A, to pass through. The arms, I, are provided with teeth, *o*, both on their upper and lower surfaces. The arms, I, are constructed precisely similar to the arms, F of case, D. The upper part, *p*, of the case, H, is of inverted conical form and serves as a hopper. J is a cutter which is attached to the shaft, A, a short distance above the arms, I (see Figs. 1 and 3).

The operation is as follows:—Motion is given the shaft, A, by any proper means. The shells, C G, and cutter, J, rotating of course with the shaft, A, the arms, F I, remaining stationary. The bark or other substance to be ground is placed in the hopper or upper part, *p*, of the case, H, and is cut or partially crushed by the cutter, J, aided by the teeth, *o*, on the upper surfaces of the arms, I, the teeth, *o*, having a tendency to hold the bark while it is acted upon by the cutter, J. The bark partially crushed passes down, and the finer portion is further acted upon by the teeth, *h i*, on shell, G, and the teeth, *n*, on the inner side of the case, H, and finally ground by passing between the teeth, *m i′*. The larger portion of the bark that cannot readily pass down between the shell, G, and case, H, will pass down through the aperture, *j*, in the shell, G, and will be further crushed by the teeth, *k*, on the under side of shell, G, and the teeth, *g*, on the upper surfaces of the arms, F, and by the action of said teeth the

BEARDSLEY'S GRINDING-MILL.



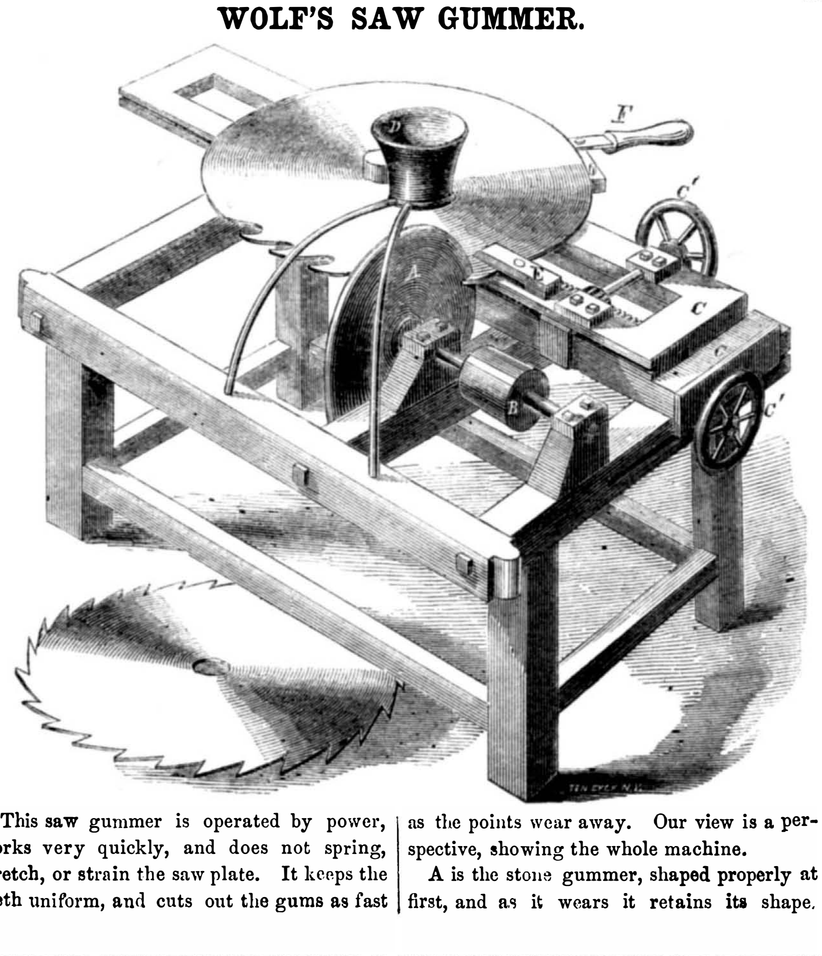
bark will be sufficiently reduced to pass down between the shell, C, and case, D, and escape from between the fine teeth, *e b*, thereof, in a properly ground state.

The mill may be made to grind coarse or fine by elevating or depressing the shaft, A, so as to increase or diminish the width of the space or passage through which the bark passes.

From the above description it will be seen that a large grinding or crushing surface is obtained quite near the shaft, A, for the shells, C G, may be of comparatively small diameter, say 18 inches. the smallness of the diameter of the shells being compensated for by their number for it will at once be seen that any number of the shells and cases may be used, the bark in passing through the mill being successively acted upon by each shell. The grinding capacity, therefore, of the mill may be made very great while the power required to operate or drive it will be proportionably small, in consequence of the grinding and crushing surfaces being quite near the shaft, A.

The invention was patented June 29, 1858, and any further information can be had by addressing the invention as above.

WOLF'S SAW GUMMER.



This saw gummer is operated by power, works very quickly, and does not spring, stretch, or strain the saw plate. It keeps the teeth uniform, and cuts out the gums as fast as the points wear away. Our view is a perspective, showing the whole machine.

A is the stone gummer, shaped properly at first, and as it wears it retains its shape, wearing equally on all sides. This has a very high velocity given it from the drum, B, moved by a belt; and the greater the velocity, the less tendency is there to wear. C C are carriages, moved by the hand wheels, C′ C′, on which the saw is fixed, and which can be moved to and from the stone in any position. The saw is hung on its center by a bolt with a thumb nut running through a center pin. D is a cup for oil or water placed over the stone, to keep it cool while at work. The clamp, E, holds a screw from turning on its center when the carriages are moved towards the stone for the purpose of cutting out the gums. When one tooth is gummed out to the proper shape, two movable stops on the main beams are set against the carriage, to keep it from going too far towards the stone; these stops are not seen. By this arrangement, all the teeth are made the same depth.

After the gums are all cut out, the clamp is removed from the edge of the saw, and the point of the tooth is brought out until it nearly touches the stone, then by taking hold of the iron bar, F, that extends under the saw, the center bolt being drawn tight, so that it cannot turn, and moving the iron bar around towards the band wheels, the back of the tooth will be dressed from the point to the root; and using the point of the teeth as a dial plate, the backs can all be cut alike. For rounding the saw, it must be loosened on its center, the shortest tooth brought to the stone, and then turned on its center, to cut all the teeth the same length. The bar, F, will suit all sizes of saws, and the teeth can be cut in large or small curves, as may be desired.

A circular saw of sixty inches in diameter, with twenty-four teeth, gums cut three-fourths of an inch in depth, has been gummed in one of these machines in less than an hour, with a very trifling cost for the wear of the stone; and, as we have before said, the faster the stone is made to revolve, the less it wears in cutting out the metal. Sash, muley, and other straight saws can be gummed as well as circulars, and the stones can be formed to cut teeth of any shape the sawyer may desire.

It is the invention of H. R. Wolf, of Louisville, Ky., and was patented October 5th, 1858. For machines, rights, and further information generally, the reader should address Staples, Watson & Co., Consolation, Shelby co., Ky., or Munn & Co., manufacturers and agents, Louisville, Ky.

Improved Stone-Cracker.

In order to accomplish economically and perfectly the cracking of stone by mechanical means to a size suitable for macadamizing or ballasting railroads and highways, a machine of great strength, durability, and considerable cost, is necessary; and therefore it is important to so construct and arrange the cracking teeth, which are subjected to a very great resistance, strain, and wear, that they will be able to effectively perform the duty assigned them, under ordinary circumstances, without breaking off, or being impaired to an extent beyond that common to all similar mechanical combinations which act with friction against resisting objects with which they are brought in contact; and in the event of one section of the teeth being exerted beyond their strength, and said section should give way, facilities shall be afforded, whereby the worn, broken, or impaired sections may be removed independently of the perfect sections, and others introduced in their stead at a small cost, and with very little labor and delay. This invention provides a machine which will economically and practically crack stone to a size suitable for the purposes stated, and possessing all the above-named requisites. It is the invention of A. C. Ellithorpe and L. Scoville, and was patented November 23d, 1858.

The production of the 2,597 coal mines in Great Britain is supported to be worth seventy-five million dollars a year.

Scientific American.

NEW YORK, DECEMBER 18, 1858.

In consequence of the great pressure of matter upon our columns, we shall publish with our next number a supplemental sheet, one-half the size of our regular paper; and it is our intention to continue to issue these supplements at such intervals as we may deem necessary in order to dispose of the interesting matter that crowds upon our columns. It is our intention to illustrate some of the principal manufacturing establishments of the country, and the subject of the first article will be the celebrated Saw, Printing-Press, and Engine Works of Messrs. R. Hoe & Co., of this city. The information which will be imparted from time to time, upon the great manufacturing processes of the country, will be of rare interest and importance to all who desire to become acquainted with them.

We have reason to feel the liveliest gratitude to our friends generally, for the kind efforts they have made to extend the circulation of the SCIENTIFIC AMERICAN; and we hope they will still exert themselves in its behalf. We promise them our best efforts to increase its value and interest, so that it may become a necessity to every well-regulated shop and household. A gentleman from Cincinnati voluntarily called upon us, a few days ago, and announced his intention to travel extensively during the winter, for the purpose of introducing a valuable improvement; and said he would undertake to send us two hundred new subscribers, and we have no doubt he can do it. Such an act of friendship as this, without any special reason for it, we cannot too highly appreciate.

We are anxious to add some important permanent improvements to the SCIENTIFIC AMERICAN, which is acknowledged to be "the best journal of the kind ever published;" and if our friends generally will take hold of the matter in earnest, and give us their efficient co-operation, it will enable us to carry out our long cherished plans. We shall spare neither pains nor expense in furnishing its columns with the choicest practical information drawn from every available source; and we shall extract from the columns of our foreign exchanges—English, French and German—such descriptions and illustrations of recent mechanical improvements abroad as will interest and benefit the industry of our own country.

Lowell and its Cotton Manufacture.

Lowell is the Manchester of America—the metropolis of American cotton manufacture. The last number of Hunt's *Merchant's Magazine* contains an interesting article on this topic, taken from a record of the venerable Nathan Appleton, of Boston, who had been identified with the rise and progress of this city, and from which we condense some interesting facts.

The power-loom, it seems, was introduced into the United States by Mr. Francis C. Lowell, in 1814, and was first used in his factory at Waltham, Mass. He was a very ingenious man, and made several improvements, not only in the power-loom, but also in other machines. The company at Waltham was very successful; and this induced Mr. Appleton, in 1821, (who was a small stockholder) to extend his interests in another direction, and to commence the manufacture of cotton cloth, and the printing of calicos. After examining various sites for a new manufacturing village, in company with Mr. P. T. Jackson, it was suggested by a friend that they should purchase the Pawtucket Canal, and thus obtain the whole power of the Merrimack river, with a fall of thirty feet. The spot where Lowell now stands was visited for this purpose in November, 1821, by a party consisting of Messrs. N. Appleton, P. T. Jackson, Kirk Boot, Warren Dutton, Paul Moody, and John W. Boot. At that period there were not more than a dozen families residing in the vicinity; but the impression made upon the minds of the party was so favorable, in regard to the manufacturing capacities of the situation that, one of them remarked, "some of us may live to see this place contain 20,000 inhabitants"—an anticipation which has been more than realized. The Pawtucket Canal was purchased from a private company which owned it, and Kirk Boot was appointed treasurer of the association which had been formed. "The Merrimack Company," now so famous, began soon afterwards to erect two mills, the first wheel of which was set in operation on the first of September, 1823. Three additional mills were soon afterwards erected; and from the very start, the place assumed an air of prosperity. The name given to it by the act of incorporation was in honor of the first introducer of the power-loom at Waltham, and who had done so much to improve the cotton manufacture of America.

The standard for a mill-power sold by the corporation owning the canal, was 25 cubic feet of water per second on a fall of 30 feet, with sufficient adjacent land for factories. The price paid for it was $14,336, of which $5,000 remained on mortgage, subject to an annual rent of $300. This water power was estimated as equal to 60-horse, and was considered necessary for running 3,584 spindles, with carding machines, looms, and all the necessary machinery for making cotton cloth.

The Merrimack Company commenced the printing of calicos in 1825; and in the subsequent year, John D. Prince, of Manchester, England, was engaged to take the charge, under whom the works were most ably managed—with Dr. Dana as chemist—until 1855, when he retired at an advanced age, on a life annuity of $2,000 per annum. The prints of this company (the fast colors), have obtained a wide-spread celebrity. It has been the settled policy of the Lowell companies to secure men of ability in every department, and to act towards them in the most liberal manner; this has been the secret of their success—their dividends amounting annually, with very few exceptions, to more than twelve per cent ever since they were established. To show how much the public have been benefited by improvements in our manufactures, the Merrimack prints sold readily in 1825 for 23·07 cents per yard; in 1858, the same classes were sold for 9·15 cents. To exhibit the benefits which the public have derived from improvements in the manufacture of cotton cloth, it is only necessary to state that the class of goods made at Waltham in 1816, which were readily sold for 30 cents per yard, now sell for 8 and 9 cents per yard.

The capital employed in manufacturing at Lowell, is $12,000,000, and the population has arisen from twelve families to 38,000 persons. There are 139 mill-powers used, amounting to 9,000-horse. A great improvement was made in the canal for supplying the water, in 1846, under J. B. Francis, Esq., the engineer of the corporation, and whose work on "Lowell Hydraulic Experiments" does him great credit. The first water wheels employed were of the overshot class, the best of which realized only 75 per cent of the water power; as these have worn out, the turbine has been substituted, which, as improved by Uriah A. Boyden, realize 88 per cent of the power.

Lowell is a great city, not from the number of its population, but because it is a hive of industry (a producing community), and therefore a mine of wealth in regard to the stable interests of our country.

The Patent Office.

From the Report of the Secretary of the interior, we learn that the income of the Patent Office, for the first three-quarters of the present year ending Sept. 20th, was $150,984; its expenditures during the same period were $144,433, showing a surplus revenue of $6,551. This affords us much satisfaction, as the excess of expenditure, during the same period of last year, was $2,526 over the income. While the other departments of government have spent more than the national revenue has warranted, the Patent Office has exhibited quite the contrary spectacle. During the period referred to, then were 4091 applications made for patents, and 696 caveats were filed. There were four more applications made in the same period of last year and 124 more caveats filed. Considering the great financial crisis through which our country has passed since then, our inventors have stood the shock manfully as is shown by the above statistics. In the three quarters referred to, 2,816 patents have been issued, 15 extensions granted, and 1,256 applications rejected. The Secretary recommends the establishment of a Board of Appeal in addition to the present force of the Office. The inventors of our country and the public have great reason to feel gratified at the above exhibit, as it affords indubitable evidence of the able management which prevails in the Patent Office.

Patent Law Changes in France.

A project of law will be presented to the Corps Legislatif at its next session, introducing some important improvements in the law of patents. Among them the following are the principal:—1st, The time allowed for putting a patented invention into operation is to be extended from *two* to *three* years; 2d, Instead of granting patents without examination, as hitherto, all applications and plans are to be submitted to competent "experts" named by government, and either refused (on successful opposition) or confirmed by the ministry; 3d, Instead of the onus of prosecution being left to patentees, as at present, all infractions on patent rights are to be prosecuted by the Procurator-Imperial: this results from the preceding rule—government thus first *proving*, and then undertaking to *defend* the ingenious discoveries of the inventor; 4th, If any invention be found of such public utility as to render its freedom beneficial, government is to have the right of buying it up from the patentee on fair terms, determinable by a jury composed of three arbiters named by the inventor, three by the Minister, and three by the Presidents of the Cour Imperial.

[We copy the above from one of our foreign exchanges, and it will afford us much pleasure to chronicle the passage of the act referred to. In the year 1855, while sojourning for a short time in the gay French capital, we were solicited by the late lamented Gardissal, editor of *L'Invention*, to contribute to the columns of his journal some views respecting the operation of the American Patent System, and to urge the importance of a preliminary examination, in all cases, by competent experts, so as to determine upon the patentability of an applicant's invention prior to the official decision. We prepared three articles upon this subject, and their appearance in the above-mentioned journal attracted a degree of attention much greater than we thought they deserved. One fine morning, while we were engaged in dotting down some items in "sight-seeing for home friends," we were waited upon by a fussy little gentleman whose face betokened an unwonted enthusiasm. Seizing us by the hand, he showered upon us all sorts of most admirable *bon mots*. The secret was, we had supported views expressed in an old neglected French pamphlet, in which its author had vainly attempted to make everybody believe that a preliminary examination was *the* great object to be attained in the otherwise excellent French Patent Law. We shall never forget this warm and enthusiastic friend; and we hope he may live to see *l'Examen préalable en matière de Brevets* fully established. But we encountered an opponent in the person of M. Jobard, of Brussels, a sincere and able man. His views, however, were peculiar; he had got them incorporated into the Belgian law, and seemed to think that no one but himself knew much about that subject; and he was evidently alarmed at the hardihood of our conduct in poking a side-thrust into his favorite theories. He evinced his want of knowledge of our system by giving an amusing account of an attempt on his part to get a patent here for some of his notions. The subject of a preliminary examination has since been agitated somewhat in France, and it now appears that the French legislators are beginning to think that there are some virtues in the United States system of granting patents. We wish these deliberations a happy issue.

An Improvement in Candles.

There is an old saying that "time tries all" and surely if this be true, candles have stood the test of time well, for they were among the earliest inventions of the fathers of our race, and despite burning fluid, gas and coal oil, still keep their place as light-givers, —a luxury to the rich—a blessing to the poor. Tallow candles are of two kinds, either dipped or molded, the former being the oldest, the latter the best, and they were invented in the middle ages by the *Sieur de* Brez at Paris. The very name, candle, suggests antiquity, its equivalent or derivative being found in the oldest languages; thus in Persian it is *kandil*, in Armenian, *cantol*; in Welsh, *canwyll*; and in Erse, *cainneal*. With all this age to support it, however, we must say that the candle is a greasy article, and much given to guttering, and wants snuffing very often; or rather did, for we wish to notice an invention which prevents these evils, and considerably elevates *M. Chandelle* (as the French call him) in the scale of illuminators. Mr. J. H. Tatum, of this city, patented on the 8th of Oct., of this year, a method of indurating or hardening common candles so that they are in every way equal to spermaceti or the highest priced varieties, without materially increasing the cost. They do not gutter, and a plaited wick can be used, so that they do not require snuffing. We have seen them burn, and were charmed with the pleasant, cool, and healthy light they gave.

Mr. Tatum's process is simple in the extreme; the candle of common "stock," when molded or dipped in the usual way, is immersed in a vat of liquid fat and gums of such a nature that it adheres to the tallow, and forms a thin coating outside it; and then the candle is dipped in another composition, whose base is stearic acid, which will not itself adhere to tallow, but will adhere to the intermediate composition. This gives the candles an indurated coating, which, being fusible at a much higher temperature than the tallow, causes the candle to burn with a beautiful cup-shape, prevents guttering, and improves the light. All grease is prevented; and on the hottest day they will remain as hard and clean as in winter.

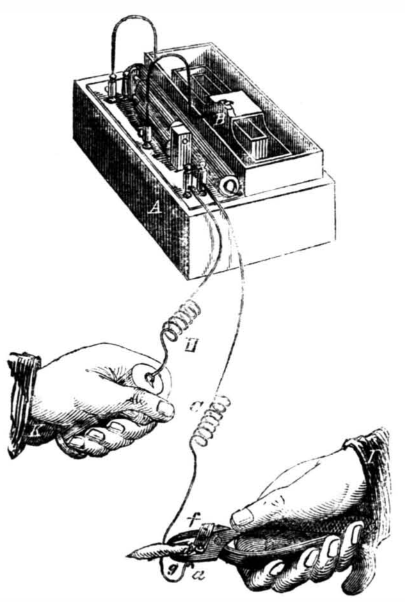
This improvement is a valuable one to the candle trade, as it will give an excellent appearance to any "stock," and greatly improve the quality of the candles in their illuminating power and saleableness, besides extending their use, and giving them greater facilities to replace burning fluid.

We are told by philosophers (and they ought to know) that the progress of the ages is developed in the most minute details of life. So we suppose that Macbeth, when next he calls "What ho there! lights.' instead of being served with torches, will be answered by an array of indurated candles.

Extracting Teeth by Electricity.

The following description, which we extract from the London *Engineer*, is of an American invention which has been patented recently in England, communicated through Messrs. Newton & Son, of London :—

The object, says the patentee, is to mitigate the severity of the operation of extracting teeth, by rendering the nerves of the teeth required to be removed insensible at the moment the forceps is being applied. The improvement consists in combining with a common dental forceps a magneto-electric machine, so that a wire from one pole of the machine shall form a metallic connection with the forceps that grasps the tooth, while the other pole of the machine is brought into connection with the patient's hand by a second wire. The handles of the forceps, which are held by the operator, are better to be insulated by being covered with gutta percha, or similar non-conducting substance.



In the illustration, A represents, in perspective view, an ordinary magneto-electric machine, with a battery, B, attached; D the ordinary dental forceps. A wire, C, passes from the negative pole of the electro-magnetic machine to the point, *a*, of the forceps, where a close metallic connection is made. On the inner sides of the forceps, at the point, *d*, a small metallic cup is placed, and a small copper stem projects from the opposite sides, *e*, of the forceps. As the parts *f* and *g*, of the forceps close upon the tooth, where it is surrounded by the gum, an induced current from the magneto-electric machine passes through the wire, C, and across from *d* to *e*, and thus applies itself around the whole tooth in the vicinity of the nerves, and so affects the nerves as to render them temporarily insensible. The patient operated upon must hold in one of his hands the extremity of the other wire, H (which is attached to the positive pole of the machine), so as to complete the circuit through his body. I represents the hands of the operator grasping the forceps, and K the hand of the patient grasping the wire passing to the positive pole of the machine. The magneto-electric machine has a sliding rod, by which the induced current may be varied in intensity, as is well understood. The intensity of the current to be passed through the patient's tooth should be graduated by observing in advance how much he can conveniently bear when he grasps the extremity of the wires, H and C, in each hand. A little practice will enable the dentist to determine this readily. The magneto-electric machine, A, is of the ordinary form employed for medical purposes, and consists of a battery of one cell, a primary coil, an inducing coil, a small electro-magnet for breaking and closing the circuit through the wires, C and H, and the patient's body. Any other form of magneto-electric machine may be employed.

Instead of using a little electro-magnet brake circuit in the first helix, as shown in the illustration, a clock-work brake circuit or electrotome may be used, or a rasp may be used in connection with the aid of an assistant for breaking and closing the circuit. So also there are several forms of magneto-electric machines in which permanent magnets are used to induce, by mechanical action, a magneto-electric current in a coil surrounding a revolving soft iron armature. In all these cases the same peculiar effect on the nerve of the patient's tooth would result if either of these machines were combined with the forceps, inasmuch as they are all well known to be equivalents in applying electricity to the body for medical purposes. A direct current from the battery might also be combined with the forceps, and with the aid of an interposed brake circuit the same effect would take place, to a great degree, although the use of such a battery of the proper intensity would probably be found much more inconvenient than the magneto-electric (or, as they are sometimes called, the electro-magnetic) machines above named. So, also, instead of a metallic conductor from the magneto-electric, or other battery, the body of the operator might be employed, he taking hold of the negative pole with his left hand, and grasping the forceps with his right hand.

Tar Oils.

In the process of distilling coal to obtain oils, if the temperature of the retort is suffered to be elevated above a certain degree, a great quantity of tar passes over combined with the crude oil, and as a consequence, the more tar that is driven over, the less oil is obtained. On redistilation, some of this tar passes into the condition of oil ; and this fact leads to the conclusion, that what are now called "coal oils," were obtained from tar by C. B. Mansfield, of Cambridge College, England, in 1847, in which year he secured a patent for his invention. In this patent he states that, in distilling coal tar, there are obtained "ammoniacal water, oil heavier than water (dead oil), and an oil lighter than water, also a large quantity of naphthaline, an oil which is solid at ordinary temperature." He describes six different kinds of oil, which he manufactured from coal tar, their volatility being indicated by their boiling points.

The above oils were obtained by first distilling coal tar, and then redistilling the crude oil or naphtha which passed over, at different temperatures ; the lowest degree giving off the most volatile oils—which were condensed, and kept separate. The first oil which passes over at the lowest temperature was called *alliole* ; its boiling point was 135°; the second, *benzole*, boiled at 168° ; the third, *tolule*, at 229° ; the fourth, *cumole*, at 291° ; the fifth, *cymole*, at 355° ; and the sixth, *mortule*, at 500° ; the latter was distilled from dead oil. All these oils with the exception of benzole, had a fœtid odor ; this was removed by treating them with weak sulphuric and hydrochloric acids, to precipitate the impurities, then they were washed in clean water. They were afterwards submitted to a redistilation, in which the vapor was passed over dry lime which absorbed the moisture, and they were then obtained in a very pure state. Caustic alkalies and the bicarbonate of potash were also used to purify the oils of an acidulous character ; as tar oils, like coal oils, are divided into acid and alkaline varieties ; the latter oils require acids, and the former need alkalies, to purify them. By submitting benzole to the action of strong nitric acid, in a glass vessel, then pouring it among cold water, a heavy yellow oil falls to the bottom, which when washed, has a fragrance like the oil of almonds, and is very useful for perfuming soap. By treating cymole—the heaviest oil of coal tar—with nitric acid, a fragrant oil resembling cinnamon in its odor, is obtained. The oils obtained from tar are capable of dissolving gutta-percha, india-rubber, and some resins ; they are also capable of mixing with alcohol, for burning in common lamps, like a mixture of turpentine and alcohol.

Mr. Mansfield's discoveries seem to be of a very useful character, but they have had a very limited application, hence we think it may be of considerable benefit to direct the attention of the public to them at this time.]

To Remove Stains.

In certain books we find directions for the removal of stains by one particular process, as if all stains were removable by the same treatment. Previous to the removal of a stain, it is necessary to ascertain the nature of the material by which the stain has been caused. If by an animal or vegetable substance, chloride of lime will be most generally eligible, providing always that the tissue on which the stain exists be not itself dyed with a color removable by chlorine. Here, in this circumstance, generally lurks the difficulty. It is not a stain from a colorless tissue that has to be removed, but a stain from a tissue itself dyed and stained by colors, some of which are not dissimilar in nature to those which have to be removed. Grease stains may sometimes be most conveniently removed by turpentine ; at other times by fuller's earth. Castor oil stains may be removed by spirit of wine, in which liquid that very peculiar oil is soluble ; a property by taking advantage of which, castor oil may be separated from other fixed oils fraudulently or accidentally mixed with it. When paint stains occur upon woolen cloth, they can frequently be removed by no more difficult plan than by rubbing the cloth briskly with a piece of flannel. This process, however, is only successful whilst the paint is wet. If the paint has become somewhat dry, turpentine must be employed, which seldom fails to achieve the desired purpose. Most people who dabble much in chemical operations stain their apparel now and then with acid, which causes discoloration, more or less, according to the strength and character of the acid. Oil of vitriol and spirit of salt leave red marks upon black and many other tissues. If the redness be touched with hartshorn it disappears on the instant, and provided the hartshorn has been speedily applied after the accident, the tissue usually will not suffer injury.

New Mode of Constructing Boilers.

There has recently been made at one of the railroad works in England an entirely novel boiler, that is to say, in its mode of construction, which is intended to revolutionize the present system. We condense a description extracted from a British exchange. Until very recently, it was believed that the riveted portion of the boiler was as strong as any other part of it, but the experiment of Mr. Fairbairn demonstrated that if the strength of an ordinary boiler plate was assumed to be 100, then a joint secured by a single row of rivets was equal to 56, and, if double riveted 70 ; in other words, if a boiler was made of plates capable of resisting 100 pounds pressure, per square inch, it would only be safe to use 56 pounds of steam in it if single riveted, 70 pounds if double riveted. The new plan is to increase the strength of the plates at this weak point of all the boilers, and instead of riveting the plates on the flat part one to the other, to bend the plates to a right angle and rivet the flanges together, thus angle irons are entirely dispensed with, and the joints instead of being the weakest are the strongest parts. The plates are rolled thicker towards the edges to admit of this, and thus strength is added in the plate itself, and an equilibrium of strength is maintained in all parts of the boiler.

A Podoscapher.

M. Ochsner, of Rotterdam, will stand on record as the first "podoscapher." These "podoscaphs" are a species of *sabot*, about fifteen feet long and nine inches high (or deep). Standing erect, the "podoscapher," provided with a pole flattened at the end (for paddling), and twelve feet long, can advance, turn, or recede with great swiftness in water not deeper than the length of the pole. M. Ochsner won a wager by ascending the Rhine, from Rotterdam to Cologne, in his "podoscaphs," in seven days.

Notes & Queries

*** PERSONS who write to us, expecting replies through this column, and those who may desire to make contributions to it of brief interesting facts, must always observe the strict rule, viz., to furnish their names, otherwise we cannot place confidence in their communications.

C., of N. Y.—The reason why a person must stand upon a stool with glass legs, to be charged with electricity from a machine, is to cut off communication with the earth, which is the great receiver of electricity. There are free currents of electricity passing between the atmosphere and the earth, and whenever this free communication is stopped we have the phenomenon of lightning, which restores the equilibrium.

J. M., of Mich.—The cost of boring artesian wells depends upon the character of the under strata—if hard rock, it will be very great. A bore of three inches will discharge 360 gallons per minute easily. We are not acquainted with any person who makes a business of "prospecting" for artesian well springs. In Vol. VIII, SCI. AM., we published a series of illustrated articles on the subject.

D. M. L., of Cal.—An overshot wheel working pumps will be more effective for your purpose (raising water) than a hydraulic ram ; but a turbine wheel will answer your purpose equally well, and it is much cheaper than an overshot.

A. P., Jr, of Mass.—The best imitations of "stub and twist" gun barrels are made by winding thin ribbons of genuine twist around gas-tubing. A partial imitation is made by acids, in browning the barrels. Different makers of rifles and fowling-pieces employ different proportions of bore and length of barrel ; no definite rule is followed. To prevent iron from scaling while being "case-hardened," use a paste to cover it composed of flour mixed with the prussiate of potash. The iron in ships is prevented from rusting by paint—nothing more.

J. McM., of Ky.—The latent heat in steam is necessary to maintain it in that state, otherwise it will condense. You cannot, as you suppose, use the latent heat of steam, by conduction, for any purpose without condensation. The latent heat is taken up in the expansion of the water, and occupies a greater space, hence it is not sensible. The theory is very simple.

S. B. L., of N. Y.—There is no instrument used for testing the strength of vinegar except a hydrometer ; but it is valueless in regard to determining its purity, which is the most important consideration, as it is often adulterated. There is no work known to us on the vinegar manufacture.

R. S. B., of Mich.—If the article itself cannot be stamped with the date of the patent—as would be the case with artificial teeth—it would meet the requirements of the law to put the date conspicuously upon the packages containing them.

C. F., of Conn.—There is no special composition used for preventing long thin steel tools from becoming crooked during the hardening process ; nor do we believe any composition can effect this object, which is strictly a mechanical result.

W. F. W., of Philadelphia.—Flannel is the best filtering medium for gum mucilage known to us. When it becomes saturated, it can easily be cleaned by washing in hot water.

D. H. M., of Ohio.—Your article on beams and girders is necessarily delayed to prepare the diagrams.

G. H. & H. S., of Iowa.—We do not know anything about the party to whom you refer, and would not advise you to intrust your patent papers in his possession. We thank you for the fine list of names you send us.

I. S. R., of Md.—We do not know where you can purchase the hollow mandrel for turning.

E. H. D., of Mass.—You will find some further information regarding the sub-Alpine tunnel in the London *Atheneum* of the second week in October last.

W. C., of N. Y.—In Arnott's Physics you will find tables of the heat developed by air undergoing compression.

H. A. S., of Vt.—The light to which you refer as having been exhibited at Albany, is the same, we believe, as that we have previously described.

B. T. M., of Mass.—We have been informed that one ounce of alum dissolved in six ounces of hot water, to which is added one ounce of sulphuric acid, makes the "dead dip" for brass to which you refer. The brass after dipping must be washed in hot rain water, then dried in warm clean sawdust. The above proportions will answer for any amount of liquor.

D. B. W., of N. Y.—Mr. P.'s paper is regularly mailed to Wayland Depot, Steuben county, N. Y., and if he does not get it, the fault is due to the thieving propensity of some one. We can account for its failure to reach him in no other way. We can have no possible design in withholding it ; and we find his name entered on our books as clear as day. Common starch paste is employed in binding books ; but lac varnish is put on the leather and the cloth covers of some books.

L. L., of N. Y.—Your proposed method of carrying the mails, &c., through a tubular railroad, by atmospheric pressure, is quite old. You will find one described and illustrated on page 265, Vol. VIII., SCI. AM.

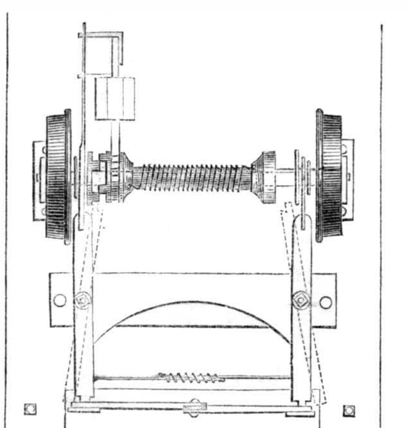
R. T. K., of Philadelphia.—Could you not give us some positive data in establishing your theory of "ocean currents being the cause of earth electric currents and variations of the compass." The variations of this instrument take place in situations far removed from the sea. This would militate against your theory.

G. A. S., of N. Y.—There is nothing in the English law in reference to putting patented articles on sale within certain specified limits. The decision in the sewing machine case at Hartford was in favor of the plaintiffs—Messrs. Wheeler & Potter. By referring to

No. 2, present volume of the Sci. Am., you will find a statement of this case which will enlighten you upon the question at issue. It would be neither right nor proper in us to impute bad motives to the judge who decided the case. If injustice has been done to any of the parties, it can be remedied before the Supreme Court at Washington.

J. E. R., of Md.—From your description we cannot satisfy ourselves of the cause of the explosion of your boiler. The crystalline burned appearance of the flue would lead us to infer that the metal had been red-hot on some prior occasion, and having been suddenly cooled, its tenacity was destroyed. The flues of boilers should never be allowed to cool suddenly.

Car Brakes and Starters—We are continually receiving letters on this subject; some of them asking us whether there has ever been an invention which saved the power lost in stopping, so that it could be used to aid in starting, and others, again, suggesting the utility of such a device. To afford all the information in our power on the subject, we engrave the under part of a



car, having an invention for this purpose attached. The inventor is Robert Grant, and it was patented October 10th, 1854. It is a torsional spring clutch acting upon the wheels of the car, and assisting their advance, when desired. in such a manner that the compression of the spring may be employed as a starting force whenever the cars are to be put in motion. This perfectly economizes the power, and the spriug is made a reservoir of power, in which it is stored up until required. We are surprised that the device is not in use upon our city cars, where it would save the horses much wear and tear, and so put money in the pockets of the companies.

J. H., of Philadelphia.—H. C. Baird, of your city, is publisher of a good work by Morfitt on tanning.

E. H. D., of Boston.—The work to which we referred is the *Scottish Guardian*. We hope you will be able to get all the information needed.

C. C, of Ohio; A. J. R., of Mass.; R. E., of N. Y.—We have written to you in reference to your machines for printing addresses on newspaper wrappers. We are having a large number of inquiries about it. See our remarks in No. 10.

W. T. C., of Md.—The ore you sent us for examination is iron pyrites, and is worth nothing.

J. D. R., of Pa.—Your sketch shows a water wheel which is intended to lift its own water, and thus keep itself perpetually in motion. The principle involved is the same as if a man should lift himself into the air by exerting his full strength upon the seat of his pantaloons.

G. B., of Mass.—Black sealing wax dissolved in alcohol will answer your purpose for filling in the engraved letters on door plates. It can easily be removed afterwards, when dry, with benzole or alcohol.

B. & M., of Ohio.—You can easily soften taps and dies so as to file them by heating them to a cherry color, thon allowing them to cool very slowly in sand which has been heated. They require to be tempered for use afterwards.

F. B., of N. J.—"Smee's Electro-Metalurgy" will give you the information desired regarding electro-plating. Published by Wiley & Halsed, Broadway, this city.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, December 11, 1858:—

S. F. S., of N. Y., $55; E. D. J., of Maine, $30; J. M., of L. I., $25; B. F. S. M., of N. Y., $30; D. R., of Pa., $25; E. S., of N. J., $30; J. B. W., of N. J., $25; E. H. A., of Ala., $35; N. W., of Wis., $22; S. & W., of Ill., $25; N. & S., of Conn., $40; T. D., of N. Y., $35; G. S., of N. H., $25; P. & C. D. A., of Ala., $50; W. H. C., of N. Y., $30; J. A., of La., $40; D. G., of N. Y., $20; M. C. C., of N. Y., $25; S. M. H., of Md., $40; W. B., of N. Y., $30; J. D. F., of Ala., $25; W. M., of Md., $25; J. E. H., of Ohio, $30; T. D., of Mass., $57; P. B., of N. Y., $25; J. F., of Pa., $25; D. & S., of Ind., $25; I. W. S., of Ill., $90; P. H. K., of Mo., $30; J. M. W., of Ind., $25; H. R. K., of Vt., $60; I. D., of Mass., $150; S. & B., of Ind., $25; D. P. K., N. J., $30; S. Y., of R. I., $30; J. G., of Pa., $27; M. & D., of N. Y., $30; O. S. O., of N. Y., $30; G. E., of Wis., $55; F. D., of L. I., $20.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Dec. 11, 1858:—

G. S., of N. H.; J. F., of Pa.; D. & S., of Ind.; P. & C. D. A., of Ala. (two cases); J. L. G. W., of Mich.; W. M. W., of Ind.; M. C. C., of N. Y.; J. M., of L. I.; D. G., of N. Y.; H. & Z., of Ohio; S. & B., of Ind.; D. R., of Pa.; T. & W., of N. Y.; J. G., of Pa.; P. B., of N. Y.; J. D. F., of Ala.; S. & W., of Ill.; W. M., of Md.; F. D., of L. I.; J. B. W., of N. J.; T. D., of N. Y.; S. & N., of Conn.; G. E., of Wis.; A. D. of Mass.

Literary Notices.

The Banks of New York: Their Dealers, the Clearing-House, and the Panic of 1857. By J. S. Gibbons. New York: D. Appleton & Co.—In this depraved age of the world the most interesting subject of the day is money, and he who can write well on currency, bullion or bills is a great writer. Mr. Gibbons can do this. The title explains the subject. which is handled in a light and pleasant manner, with a due appreciation of the merits of a banking system, and a full knowledge of the principles that should govern it. It should be in every counting-house in the city, and all who are interested should carry a copy home.

The Tenant House: Or, Embers from Poverty's Hearthstone. New York: R. M. Dewitt, 160 and 162 Nassau street.—This book portrays in a series of vivid sketchy tales the life of the poor in our city. It is written by a gentleman who formed one of an investigating committee to report to the Legislature on the condition of the tenant houses, their occupants, &c., and the facts then collected form the basis of this work. It is a true remark, that "one-half of the world do not know how the other half live," for if the poor could but know more of the rich, and *vice versa*, much misery and distress would be alleviated and banished from among us. This book shows where are to be found subjects for our charity, sympathy and relief, and the highest reward the author can have is to know that his narratives have incited many to try and do something to banish poverty and reduce crime. Need we say more than that the author is the Hon. A. J. H. Duganne?

Text-Book of Modern Carpentry.—This is a neat and very able volume, by Thos. W. Silloway, Architect of the new Capitol at Montpelier, Vt. It treats of the preservation of timber, the construction of arches, walls, roofs, bridges, trussed beams, framing, &c., and is illustrated with several copperplate engravings. The information contained in it regarding the choice of timber for building purposes is very valuable. Sold by Wiley & Halsted, this city.

The Sayings and Doings of Sam Slick. By Judge Haliburton. Bound, 75 cents; paper. 50 cents. New York: Dick & Fitzgerald, 18 Ann street.—The writings of Judge Haliburton have long been regarded as the productions of the finest humorist that has ever attempted the delineation of Yankee character, and the entertaining work before us shows that he has lost none of his original wit and humor. It will be difficult to find a volume so full of fun and good sense as this, which chronicles the last experience of Sam Slick.

The Autocrat of the Breakfast Table. By Dr. O. W. Holmes. Received through Mason & Bros, New York, from Phillips, Sampson & Co., Boston. When Dr. Holmes first undertook to be his own Boswell in the *Atlantic Monthly*, he had little intention, we suspect, of making a book, but he has made one full of pleasant philosophy, gems of poesy and quiet talks. What a grand thing it would be if all breakfast table talk resembled the Autocrat's! But it does not, and so we should all read the book that we may learn how to talk better than we now do, not only at breakfast, but all day.

Our Musical Friend is the title of a new musical periodical containing twelve pages of well printed music, original and selected. It is published weekly, at 13 Frankfort street, this city, and the price is only ten cents.

Blackwood's Magazine. Published by Leonard Scott & Co., Gold street. This veteran periodical for the present month contains a most able article on "Edward Irving," once the most celebrated pulpit orator in London; another on Buckle's "History of Civilization." "What will he do with it?" and the "Light on the Hearth" are continued.

We have received parts 43 and 44 of "Dr. Muspratt's Chemistry," applied to the arts and manufactures; and parts 23 and 24 of the "Imperial Cyclopædia of Machinery," by W. Johnson, C. E. Our acknowledgements are due to Messrs. C. B. Russell & Bros., of 12 Tremont street, Boston, and 290 Broadway, New York, the publishers of the above works.

A WORD TO OUR PATRONS.

Will our Friends Favor Us?—Any of our readers who do not preserve files of our paper for binding (we hope there are but few such), and who have Nos. 4 and 5 of the present volume which they are willing to spare, will oblige the publishers by sending said numbers to this office. Ten cents for each copy will be paid.

Back Numbers of the present volume of the Scientific American will be supplied to new subscribers when desired, with the exception of Nos. 4 and 5.

Science and Art.

Notes on the Progress of the Paddle and Screw.—No. 5.

The use of the screw propeller in China may be of an indefinite antiquity. A model of one was brought from that country about the year 1780. It had two sets of blades, turning in opposite directions; but the first distinct description of the screw propeller to be turned by machinery inside a vessel, seems to have been by D. Bernouilli, of Groningen, in 1752; and it is remarkable that this, though the earliest recorded proposal, was well enough matured to comprise the use of oblique vanes at the bow, sides, and stern, turned by a steam engine, and capable of being hoisted out of the water. The accompanying illustration, representing the inventions of Bernouilli, is copied from one published A. D. 1803, in *Annales des Arts et Manufactures*, Vol. XX, Pl. II., p. 100.

In 1768, Paucton proposed the pterophore, a screw thread on a cylinder, to be wholly or partly immersed. In 1770, James Watt suggested to Dr. Small the trial of a steam screw propeller; Bramah, in 1785, first patented a rotary engine for this purpose; Ramsey (1792) put the screw between two hulls, and Lyttleton (1794) used a three-threaded screw, while Fulton (1798) tried one with four blades. Shorter's screw (1800), with a jointed shaft (patented again by Phipps, 1850, with a movable outside bearing, and by many others), and worked by men, was applied in 1602, to the British ships *Dragon* and *Superb*. The first screw steamer I can find, was tried by Stevens in America, in 1804. In 1825, Brown used one on the Thames.

The only patent for combining the screw propeller and paddle wheel is that of Turck, in 1852. The *Bee*, a steam-tender for Portsmouth (Eng.) dockyard, has carried both paddles and screw since 1842, but they are not worked together.

Screw propellers are so various in form that we can scarcely arrange them for consideration according to their shapes or modes of action. A general division may be made into two classes. In one (as in the plans of Bernouilli and Bouguer), no thread continues through an entire revolution. In the other, a helical thread has at least one revolution (as in the plans of Duquet and Paucton). It will be better to group the inventions according to the several parts of the apparatus they relate to. And first, with respect to the general arrangement of the whole apparatus, there is scarcely any position under or above water all around the vessel which has not been proposed for the screw propeller; indeed, most of these varieties of position were exhausted by the earliest plans.

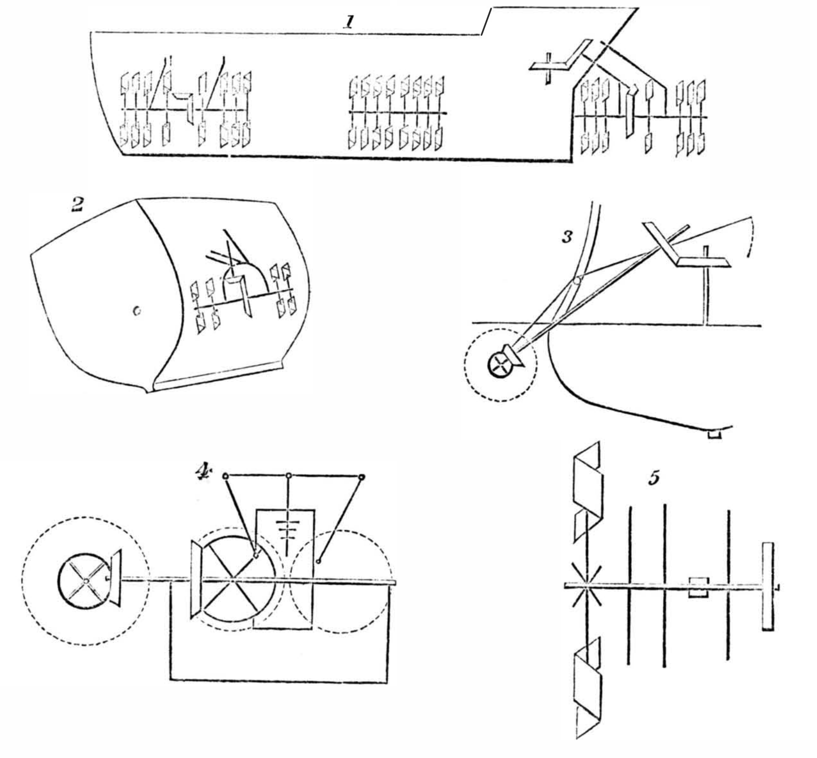
The first English patent relating to the subject is Miller's in 1775. Here the blades are at the end of the arms of a windmill on a vessel's deck, with its axis parallel to the keel. Duncan (1851) put the blades on an endless strap, running outside over the deck and round the hull. He suggested, also, (1856) that a spiral rib, wound round a floating cylinder, should act for propulsion as the cylinder is caused to turn.

Bernouilli and Shorter, having suggested propellers at the bow, sides, and stern of a vessel, Cummerow, in 1828, placed one in an opening in the stern deadwood, which is now the usual position.

Taylor, again (1838 and 1846), using two propellers on separate shafts, brought them so near that the blades overlapped and passed between each other. Napier (1841) placed one of the approximated propellers astern of the other. Carpenter (1851) put two propellers in separate stern-pieces. Bucholz (1851) had three of them, and placed the middle one astern of the others. In all these cases the shafts were on the same level; but Tombs (1856) placed the shaft of one (the aftermost overlapping propeller) a short distance above the other shaft, to which it was geared, so as to turn in an opposite direction. Morrison (1854) placed one propeller above the other.

Next, we must notice different propellers on the same axis. Perkins patented this plan in 1824, placing one shaft within the other, and turning the screws in opposite directions. Church patented it in 1829, and Ericsson in 1836, when a hoop with short vanes was used instead of blades. The Chinese propeller seen by Col. Beaufoy, in 1780, had two screws turned in opposite directions, but they may have had separate axes. The plan of Perkins was patented afterwards by Smith (1838). Dugdale (1849) put several propellers on the same shaft.

Such were the positions of the propeller



when in use; but it was soon found needful to have a power of altering the position, so as to hoist it out of the way. For this purpose, Bernouilli (1752) put hinges on the rods supporting his side propellers, and detached the propeller from the shaft at the stern. Others left the propeller free to revolve as the vessel sailed. Slaughter (1849) helped it to do so without resistance by a "donkey engine."

This week we give a side view of Bernouilli's screw propellers at the bow, side, and stern of a vessel, 1. 2. Three-quarters view of the side propeller. 3. Stern view of the side propeller, with a cross section of the vessel. 4. The steam engine. 5. Enlarged view of a section of the propeller.

Sabbaton's Coal Shovel.

The sifting or screening shovels now in use, are either made wholly of sheet or bar iron, or in part of both, and as these materials are flexible in their nature, they are liable to bend, and thus lose their form; and consequently the shovel, when constructed of these materials, no matter how well they may be put together, is liable to soon get out of order, and become unserviceable, in addition to the other defects of being expensive to construct, and fatiguing to handle.

The object of this invention is to make the shovel cheap, strong, and durable, by forming it of a material that shall combine these characteristics when the bars and its other parts are cast iron, and thereby enable the same to withstand the wear and tear that it is subjected to in shoveling and sifting coal, and the other broken material, and in assorting the different sizes of coal, coke, &c., and other purposes to which it may be applied, and at the same time render it light and convenient to handle.

To effect these objects, the form of the shovel is not altered, but is made in the usual or most approved form, as represented in the illustration, and of cast iron properly annealed, and made malleable in the usual method, by which means it is made a light, durable, strong, and cheap shovel, and capable of varying the spaces between the bars; of separating and sifting all ordinary substances, such as coal, coke, potatoes, or other articles and materials of a like character. The handle of the shovel may be formed, adjusted, and affixed to the sifting portion in the most convenient methods, or to suit the views of the constructor; but it is believed that the plan of handle represented in the illustration is best suited to the design.

It is the invention of Paul A. Sabbaton, of Albany, N. Y., from whom any further particulars can be obtained. Many of these shovels are now in use, and give great satisfaction. A patent is applied for.

Preserving Iron Ships.

Mr. Daniel McCrae, of Scotland, has just patented a greasy substance as a preventive coating for ships' bottoms, and other exposed surfaces. "Bone grease" is preferred, that is to say, fibrine grease obtained from the cells of bones by boiling. Other greasy matters may be employed, such as that obtainable from "kitchen stuff;" but oils, tallow, and lard are not available. The grease may have blue stone or sulphate of copper mixed with it, or it may have various poisonous matters incorporated, to prevent *molluscs* adhering to the ship.

Woolen Manufactures in Belgium.

While we are every day advancing in our manufacturing industry and the production of textile fabrics, it is well that we should not forget that we are not alone in our progress. Recently Belgium has made some advances in the woolen manufactures, which deserve to be noticed. During the last fifteen years the consumption of wool in that country has nearly doubled. In 1857 the quantity of cloth and other woolen goods exported from Belgium amounted to nearly $5,000,000. Flannel is now an important branch of manufacture, and fairly competes with the American and English.

Brickmaking by Elephants.

The Ceylon *Observer* contains an account of some brickmaking works recently visited by Sir Henry Ward. The works, which turn out about 20,000 bricks a day, are only six miles from Colombo. The clay for brickmaking is prepared by elephants. The wild and tame work together, and both attempt to shirk their work by endeavoring to put their feet in old footprints, instead of in the soft, tenacious, untrodden mud.

The Great Eastern.

There is now some hope of this vessel being completed at an early date. It has passed into the hands of a new company, with capital sufficient to complete it. Its cost to the new company is £160,000; and £140,000 is the estimate for finishing and equipping her for sea, leaving a margin of £30,000 for working capital.

Electric Clocks.—In Marseilles, France, one hundred electric clocks have been placed in various parts of the city, and in the street lamps, so that the hours may be known from them by night as well as by day. Such clocks have been on the street lamps in the city of Ghent, Belgium, for some years.