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Woods of Australia.

The cedar of Australia is a most valuable wood, and almost the only kind used in joiners' and cabinet work amongst the colonists for the last fifty years; it is said to attain ten feet in diameter. The white beech of the colonists, a species of Vitex, is a noble tree, rising eighty to one hundred and forty feet, whose wood is much prized for the decks of coasting vessels, of fine bright silvery grain, said never to shrink in floors (as do the majority of the colonial woods) after moderate seasoning. A magnificent species of Rhamnus has wood very close and hard, likely to prove ornamental, evidently a serviceable wood. The teak wood of the colony (*Endiandra glauca*,) a noble tree, has wood hard, close, fine, dark color in the duramen, with a powerful aromatic fragrance throughout, is said to be very durable, evidently a valuable timber. The rosewood, a species of *Meliaceæ*, possesses fine timber, durable and ornamental, and possesses an agreeable fragrance, the effect of an essential oil; bedsteads made of it never harbor insects. —[London Building News.

American Nickel and Cobalt.

Near Middletown, Conn., two mines containing the ores of the above-named metals have recently been opened. The metal bearing rock is believed to be of an unlimited depth; the ore is visible in grains throughout the lode, and amounts to about 10 per cent. of each metal. This shows that the lode is exceedingly rich, and when these mines are in full working order their product must have a beneficial effect upon the price of these metals in our markets. Great preparations have been made at the mines for smelting the ore, such as the erection of furnaces, steam engine, stampers, and ore separators.

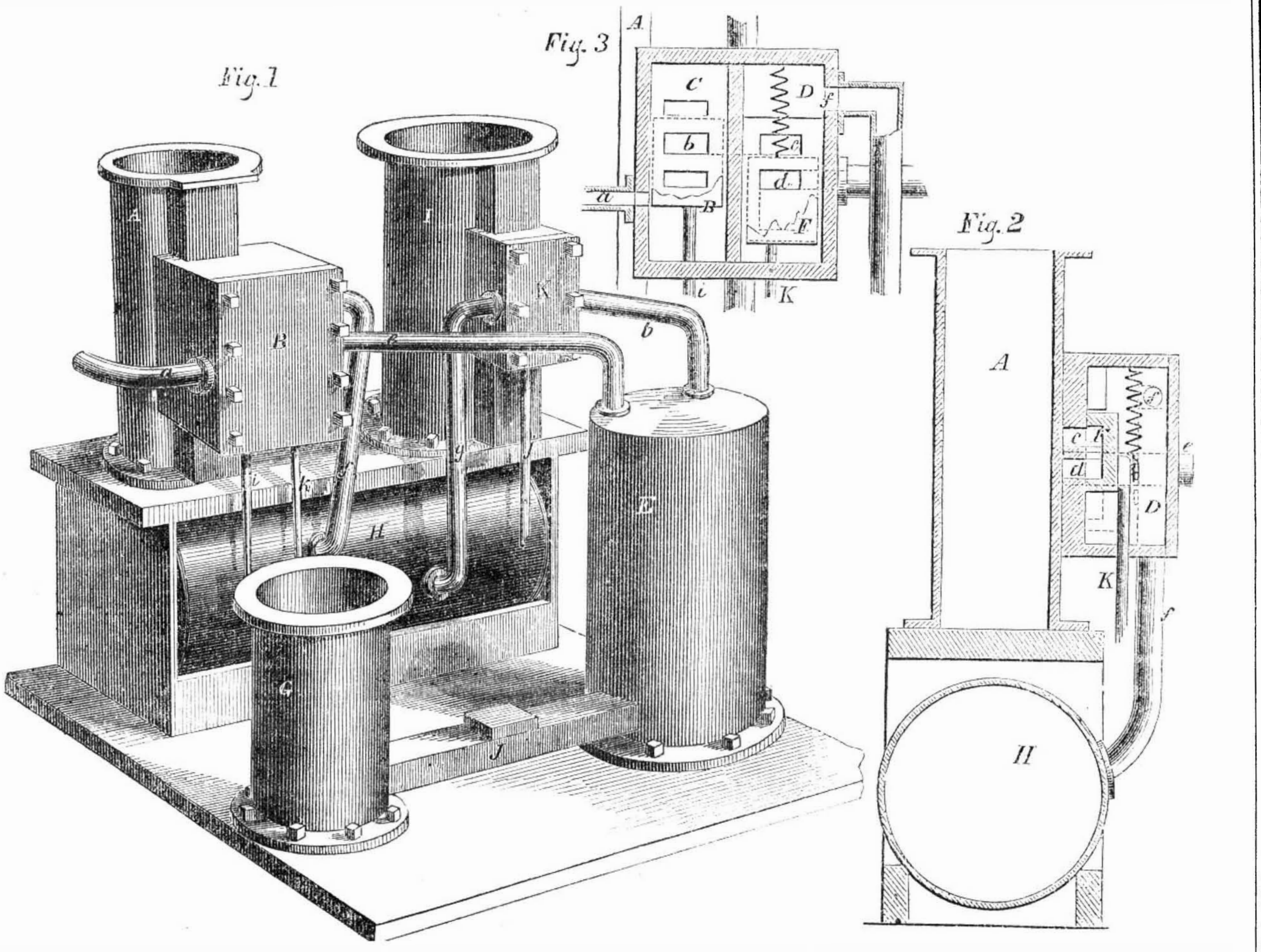
London the Greatest City.

This is now the greatest city in the world, and far surpasses all the great cities of antiquity. According to Gibbon, the population of ancient Rome in the hight of its magnificence was 1,2000,000; Nineveh is estimated to have had 600,000; and Dr. Medhurst supposes that the population of Pekin is about 2,000,000. The population of London, according to recent statistics, amounts to 2,500,000, 414,722 having been added to it during the last ten years. The census shows that it contains 307,722 in habited, and 16,889 uninhabited houses.

Composition of Gunpowder.

Gunpowder is composed principally of saltpeter about 75 per cent., combined with charcoal about 15 per cent., and of sulphur about 12 per cent. Each of these ingredients, as articles of merchandise and commerce, have advanced in their respective markets, in some instances upwards of 100 and even 150 per cent. Saltpeter principally comes from Bengal and the peninsula of British India. These circumstances have directed the attention of the scientific world towards the application of some other explosive powder or medium, which would be equally efficacious as gunpowder, and less costly. Gun cotton and fulminating silver have been the subject of experiment.

IMPROVEMENTS IN EXPANSIVE STEAM ENGINES.



The accompanying engravings represent improvements in the double-cylinder expansion steam engine, known by the name of "The Woolfe Engine," invented by John J. Johnston, Lawrence, Mass., who has taken measures to secure a patent.

Fig. 1 is a perspective view of the two cylinders, air pump, condenser, and the exhaust steam receiver. Fig. 1 is a side vertical section of the high pressure cylinder and steam receiver; and fig. 3 is a vertical section of the valve box, A, fig. 1.

The object of the invention is to obviate the back pressure of steam on the piston of the high pressure cylinder, and obtain a vacuum on the exhausting side of the piston of the low pressure cylinder, to increase the power of the engine, and effect a saving of fuel. A is the high pressure cylinder having the induction and eduction of the steam effected by a common slide valve, B fig. 3, working in the steam chest, B fig. 1, which receives steam by a pipe, *a*, from the boiler. The eduction port, *b*, of this steam chest communicates by a side passage with a second steam chest, D, figs. 2 and 3, at one side of C; the passage enters the steam chest, D, by a port, *c*. The steam chest, D, contains another port, *d*, from which a passage communicates with a pipe, *e*, leading to the condenser, E.

The ports, *c* and *d*, terminate in the seat of a slide valve, F, which is capable of such a movement as indicated by two positions (one in dotted lines) in fig. 2, showing a central section of the steam chest, D. From one side of this steam chest, or from any other convenient part of it, outside of valve F, a steam pipe, *f*, leads to the exhaust steam receiver, H—a vessel of about four times greater capacity that the low pressure cylinder engine, I. From this vessel a pipe, *g*, leads to the steam chest, K, of the low pressure cylinder which contains a slide valve and ports; the eduction port or ports communicate by a pipe, *h*, with the condenser. The arrangement of the cylinders and the other part of this engine, and the connections of the pistons are or may be substantially the same as those of any other double cylinder expanding engine. The arrangement represented is supposed to be for a beam engine; the cylinders being placed side by side, and the receiver, H, below them, the air pump, G, being in the same position relatively to the high pressure cylinder as the air pump of a common beam engine is to its cylinder, the condenser being placed beside the air pump and communicating by a passage, J.

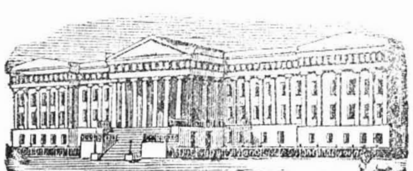
The slide valve, B, of the high pressure cylinder, A, and the slide valve of the low pressure cylinder are intended to be operated by any common valve gear connected to them by rods, *i* and *j*. The slide valve, F, is intended to be operated by a cam or other like device on its rod, *k*, in such a manner as to move it very suddenly from the position shown in full to that shown in dotted lines in figs. 2 and 3, which opens the port, *c*, and then releases it, so that the port may be closed to the steam chest, and brought into communion with the port, *d*, either by a spring, *l*, or by the pressure of steam, or the atmosphere. When the movement of the valve, F, to open the port, *c*, takes place, which is always at the instant the eduction of steam from either end of the high pressure cylinder commences, a rush of steam from the high pressure cylinder takes place, through the port, *c*, steam chest, D, and pipe, *f*, to the exhaust steam receiver, H', but this is only of short duration, being stopped by the valve returning to the position shown in full lines, fig. 2, which directs the exhaust steam from cylinder, A, through the port, *d*, and pipe, *e*, to the condenser. The steam escaping from the high pressure cylinder to the receiver, H, expands to a pressure but a little more than that of the atmosphere, and at that pressure acts upon the piston of the low pressure cylinders, whose induction pipe, *g*, is always in communication with the receiver, H.

By the great degree of expansion which is allowed to the steam escaping from the high pressure cylinder by the large size of the receiver H, put little resistance is offered by the escaping steam to the movement of the piston in that cylinder, even while the cylinder is in communication with the receiver, H, which is but for a moment, as its eduction port, *b*, is very quickly closed to the receiver, and opened to the condenser by the upward movement of the valve, F, and in this condition the cylinder remains till the eduction from the other side of the piston commences. The reason for employing the large receiver, H, instead of exhausting directly from the high into the low pressure cylinder, is to relieve the piston of the high pressure cylinder of the back pressure of the exhausting steam, and to obtain a uniform pressure upon the piston of the low pressure cylinder throughout the entire stroke. In order to get the benefit of the vacuum before the piston of the high pressure cylinder during the whole stroke, the slide valve, B, of that cylinder may have a proper degree of lead, and the movement of the valve, F, may take place before the preceding stroke of the piston has terminated, and before the crank has arrived on its center. It will be readily understood by the foregoing description, that the valve, F, will have to make two movements for every one of the valve, B.

By removing the back pressure of the steam, as has been described, it is believed by the inventor that a great economy of power will be obtained. Other valves than those represented may be employed, while the principle of the improvements are preserved.

The slow exhaust, in other words the back pressure of the escaping steam from the high pressure into the expanding cylinder of a Woolfe engine, has always been a difficulty to its successful operation. This defect, it is presumed, is overcome by the improvement described in this engine. This class of engines has received but a partial trial in our country. The modifications and asrangements here illustrated and described may lead to its more extended use.

More information respecting the invention may he obtained by letter addressed to the inventor, at No. 8 Spring street Lawrence Mass.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING DEC. 25, 1855.

WROUGHT-IRON CANNON—John Griffin, of Safe Harbor, Pa.: Having thus discovered that the mode of preparing the pile or faggot above described, is specially adapted to being welded under the rollers, and that welding such a prepared mass, by means of rolling, is entirely practicable, and will secure a more homogeneous and perfect union of the parts, without weakening or rupturing the fiber. I do not desire to claim the described mode of preparing the pile or faggot, when the faggot so prepared is welded by blows or under the hammer.

But I claim the manufacture of wrought-iron cannon by forming the faggot or pile of longitudinal bars surrounded by a series of bands of iron, and then welding together the whole mass, by passing it between rollers.

ROTARY PUMPS—Thos. Crane, of Fort Atkinson, Wis.: I do not claim the eccentric hub, D, and annular piston, E, for they have been previously used.

But I claim the combination of the hinged valve, F, with the eccentrically moving round piston, E, when said valve is of the shape represented in the accompanying drawings, and is so arranged in relation to the pump chamber, A, the off-set chamber, B, the suction pipe, H, and the eduction pipe, G, as to render it impossible for said pipes to be, for an instant, brought into connection with each other during any portion of the revolution of the piston, E, substantially as set forth.

[This invention consists in the combination of an eccentric hub, annular piston, and reciprocating valve or cut-off, working within a cylinder chamber. The principal novelty in the present improvement exists in the peculiar operation of the cut-off valve, which opens and closes the eduction pipe at the proper moment, and prevents any re-action. Rotary pumps are in great demand; they work without noise, and in many situations are preferable to any other.]

COMBINATION OF INJECTING SYRINGES—Joseph Buhler, M. D., of New York City: I do not claim any of the parts of this apparatus.

But I claim the combination of the receiver, A, and pumps C and D, provided with cocks, a and g, in the manner and for the purpose set forth.

CRANES—Benijah J. Burnett, of New York City: I claim, first, the pendant segmental traveler, E, and back-stays, A, arranged to spread outwards, from towards the top downwards, as shown and described, and whereby the "tripping out," or lateral displacement of the foot of the crane, or segmental traveler, E, is obviated, all twisting or binding avoided and a perfectly free, but steady action given the same, either as regards pressure in the vertical direction, transferred to the top of the tower or horizontal swing, as set forth,

Second, the combination and arrangement with the segmental traveler, E, or swinging foot of the crane of the circular or revolving frame, H, of anti-friction rollers, freely suspended on the tower, and rotating round the same, together with the swinging foot or segmental traveler, by the horizontal pressure of the latter on the rollers, in contact with their bite, on or against the fixed bolt surrounding the tower, substantially as shown and described, for the purposes set forth.

CANDLE MOLD APPARATUS—Lewis C. Ashley, of Troy, N. Y.: I claim the combination of candle molds which have an opening in the side or tip end of each mold, to admit the melted tallow, with a device for temporarily closing the large open ends of said molds, and simultaneously centering the wicks thereat, substantially as described, to make the butt ends of the candles with a smooth finish; and this I claim, irrespective of the mode in which the parts of the candles at said side openings, are completed. And I claim the combination of said combined molds, and device for closing the large ends thereof with the stoppers or slides, for temporarily closing the side or tip ingate openings in said molds, substantially as described, to complete the formation of the parts of the candles at said ingate openings, by which the operation of scraping to complete the finish of the candles at these places, is avoided.

PIPES OF A VAPOR BATH—Joseph Buhler, M.D., of New York City: I claim the back distributing pipe, G, with its sleeve, H, operated by a cord, with a handle and weight, or by any equivalent means, the said sleeve having perforations, f f, out of line with the perforations of the pipe, to allow the patient to direct the concentrated vapor to any part of his back, substantially as set forth.

[The apparatus constituting a vapor bath consists of a small box-like compartment, in which the patient sits, a small retort connected by a pipe with the box, a spirit lamp, &c., for heating the retort. If sulphur, for example, is placed in the retort, and the lamp applied, sulphuric vapor will be produced and forced into the bath box.

The present improvement consists in applying a sleeve pipe to the end of the retort pipe where it enters the bath. This sleeve pipe is movable in different directions at pleasure, and is perforated with small holes. Its use is to enable the patient to control the direction of the vapor —move it up and down the back, &c.]

DOUBLE-ACTING STEAM BRAKE—R. L. Currey, of Philadelphia, Pa.: I do not claim to have invented a double-acting steam cylinder with steam and exhaust at its center between the pistons.

But I claim the employment of such a cylinder in combination with the brakes on both sides of the wheels, in the manner and under the arrangement set forth.

WINDOW SHADES—Thos. Danforth, of Roxbury, Mass.: I claim making the frame, A, so as to be capable of longitudinal contraction and expansion, as specified, in combination with applying the gauze shade or curtain thereto, and so as to wind upon a roller, and be wound thereon by devices substantially as stated.

WHIPPING HAIR—Isaac Davis, of Mechanicsburgh, O.: I claim a combination of a series of long, slender, and elastic revolving rods, with a similar series of stationary rods, arranged and operating within a cylinder, as set forth, for the purpose of whipping hair.

I also claim, in combination with the foregoing, a register in the bottom perforated head of the cylinder, for the purpose of regulating the strength of the downward current in the cylinder, and insuring a due admixture of air with the whipped hair, as it leaves the machine.

HANGING SAWS—Soranus Dunham, of North Bridgewater, Mass.: I claim, first, the improved mode described of hanging the saw, when the frame in which it is hung has a reciprocating curvilinear motion, so as to provide for the necessary play of the same at its ends, said improved mode consisting in supporting and confining the saw at one end, or both its ends in wedge-shaped steps, arranged to tilt in proper grooves, in the manner and for the purpose explained.

Second, I claim the vertical stiffening and regulating bar, with its ends arranged in the wedge-shaped steps, and with one end made susceptible of the adjustment as explained.

TIME INDICATORS—Geo. Byington, of Rochester, N. Y.: I claim the wire or ribbon, 3, arranged in the manner and for the purpose substantially as described.

STEAM BOILER FURNACES—Henry F. & Louis A. Gossin, of Thibodeaux, La.: We claim constructing the flues of boiler furnaces with cross walls, or diaphragms perforated with passages, substantially in the manner and for the purpose described.

HOISTING BLOCKS—Wm. H. Merrill, of Taunton, Mass. By the cap protecting the upper journal or pintle, and the roll, the lower pintle, the dirt, or any other obstruction, is prevented from getting into the bearings and clogging the roll.

I do not claim the use of friction rolls upon the cheeks of blocks, for these have long been in use.

But claim the roll, fig. 2, the upper socket or cap, fig. 4, and the lower pintle or step, fig. 3, used together, for the purposes and in the manner substantially as set forth.

SEEDING MACHINES—Reuben Hurd, of Spring Hill, Ill.: I do not claim the employment of an endless belt, or elevator, with its cups, or buckets, for taking the seed from the hopper and depositing it, by the inversion of the buckets, down a converging tube, to the hollow share, as such, under a different construction, arrangement, and operation of parts, has before been done.

But I claim the arrangement substantially as shown and described, of the elevator or belt, with its buckets or seed cups, m, with the conveying spout, M, and seed box, F, the latter being provided with a spring valve, Q, or movable bottom, opening upwards, and the said cups or buckets, passing through said bottom, exclusively in or during the upward travel of the elevator, as specified.

[An endless belt, provided with small cups, somewhat like a flour mill elevator, is employed in the above drill, to convey the grain from the seed box to the top of the pipes or channels down which it falls into the ground. There is a peculiar arrangement of parts for throwing the belt out of gear, regulating the speed, &c. This machine sows in continuous drills or in hills, as desired. It is cheap in construction, simple, and not likely to get out of order.]

DRESSING MILL STONES FOR SCOURING AND HULLING BUCKWHEAT, &c.—B. J. Harris, of Auburn, Pa.: I claim the smooth and beveled dress of mill stones, for scouring and hulling buckwheat, by which method the buckwheat is longer retained within the bosom of the stones, and more effectually scoured, without injury to the kernel, than by any other known mode.

MAKING SALT—J. P. Hale, of Kanawha Court House, Va.: I do not claim the process of manufacture described, irrespective of the means employed for carrying out the process.

I claim the two pans or kettles, A C, placed one over the other, on a fulcrum, B, in combination with the vat, F, the parts being arranged as shown for the purpose specified.

[Where artificial heat is employed to produce salt, the brine is placed in large kettles, and the fire applied beneath. After the brine has become reduced to what is called "strong brine," and begins to crystallize, it is liable to cake up and collect on the bottom of the kettle. It is in part kept clear by attendants, who stir up the mixture, scrape it off, &c. But in nearly all cases there is some caking and a partial discoloration of the salt, which tends to diminish its selling value.

The present improvement consists in the use of two kettles placed one inside of the other, a space being left between. The weak brine is boiled in the lower kettle against which the fire is applied. After the liquid has boiled down into "strong brine" it is drawn off into a vat, where it remains long enough for its impurities to settle. It is then pumped into the upper kettle and crystallized, no stirring being required, as no caking or discoloration occurs. The upper kettle is heated by the hot brine between it and the lower vessel.]

HULLING MACHINES—Charles Miller, of Carroll Township, Pa.: I claim the application of the block, e e, and adjustable slides, c d, by means of which I can regulate the machine so as to retain the seed in the huller until it is perfectly shelled.

COMBINED LOG AND SOUNDING LINE—Adolphe Pecoul, of Marseilles, France: I claim the sounding log, constructed substantially as described, that is to say, being composed of a buoy having applied to it a weight, e, attached to a line passing between a pulley, i, and a spring, m, or its equivalent, at the bottom; and this, I claim, whether used with or without a connection, g h, to connect the line with the top part of it; the whole constituting an instrument by which the speed of a vessel may be measured, or by which soundings may be taken, without stopping or heaving to, as fully set forth.

[This instrument, which the inventor terms a sounding log, serves the purpose of the common log, viz, that of ascertaining the speed of a ship, and also to take soundings without "heaving the vessel to." It consists of a buoy and a lead line, with some other simple appendages. When used as a log, the line is fastened to the bottom of the buoy with the lead hanging some distance below it, the other end of the line being wound on a reel like the common log reel. When the lead and buoy are thrown overboard, the log remains stationary on the surface of the water, where it is held upright by the weight of the lead, which is held suspended from it, and the line is unwound by the motion of the vessel, the same as the common log line. The only difference between this line and that of the common log is that this has colored marks in place of knots, as knots would interfere with the operation of sounding. When the instrument is to be used for taking soundings, the line is allowed to run over a pulley at the bottom of the buoy, the freedom of its movement being only very slightly checked by the friction of a spring. The lead is drawn by the line close up to the buoy, and both are thrown overboard; the vessel still continues on its course, while the reel is held for the line to run out The buoy remains on the surface of the water where it was thrown in, and the weight of the lead keeps the buoy upright, and throws the line over the pulley of the buoy until the lead touches the bottom, which is known by the buoy turning over on one side, in consequence of the weight no longer acting upon it. When the buoy falls over, the friction of the spring on the line is so much increased that the buoy remains fast on the line while line and lead are drawn overboard the vessel. The distance from the buoy to the lead is of course the depth of water.]

PROPORTIONAL DIVIDERS—H. M. Parkhurst, of Perth Amboy, N. J.: I claim providing an ordinary pair of dividers, with the secondary legs, which have their joints, equi-distant from the primary joint, and at right angles thereto, substantially as and for the purpose set forth.

[The nature of this invention consists in providing each of the legs of common dividers with a short adjustable secondary leg, jointed at right angles to the middle of the primary legs, and so arranged as to open and close parallel with the latter. When the dividers are opened or closed, the secondary legs will move, more or less, proportionate to the distance of their points from the joint of the original legs. If the points of the secondary legs are set at precise right angles to the other legs, the secondary pointers will move just one half the distance of the other points. The secondary legs can be set so as to exhibit any desired proportion with the utmost exactness. There is a scale, set screw, &c., for adjusting the angle of the secondary legs, which facilitate accuracy. The improvement is a simple one, not expensive in manufacture, and no doubt highly useful for draughtsmen.]

CORN SHELLERS—James Robb, of Lewistown, Pa.: I claim the hood or casing, G, in combination with the concave, F, fender board, or cob arrester, h, and cylinder, B, for the purpose of directing a blast. and separating or cleaning the corn and cob, substantially as described.

EXTENSION BIT—J. P. Rollins, of Boston: Mass.: I do not claim the invention of movable cutters.

But I claim the manner in which the lip and cutter are set, or secured, for operation, when being adjusted, without the use of separate screws for that purpose, and in the manner described.

HAND SEED PLANTERS—Ancil Stickney, of Concord, N. H: I claim in a seed planter having a wedge-shaped planting receptacle, whose hinged side is closed by the action of a spring, combining the plunger of said planter to any suitable portion of the seed box by means of a spring of sufficient thickness to prevent said plunger in operating the planter from sliding downwards on the seed box, and opening the planting receptacle before said receptacle has penetrated to the desired depth into the ground, to deposit the seed contained in it, substantially as set forth.

BREECH-LOADING FIRE ARMS—Gilbert Smith, of Buttermilk Falls, N. Y.: I claim the eccentric and traverse motions combined, for opening and closing apertures, by means of a cap perforated eccentric, to itself, as described.

Second, I claim closing the aperture, by means of an inserted screw I in being screwed forward, direct from the cap, when the eccentric throws it direct over the axis of aperture, as described.

REVOLVING FIRE ARMS—E. K. Root, of Hartford, Ct.: I claim combining the driving pin that works in the grooves, to rotate and hold the breech in line with a slide below, adapted to the reception of and to be operated by the trigger finger, and acting on the lock at the end of the back motion, to liberate the cock or hammer, to discharge the load, substantially as described.

LOOMS FOR WEAVING WIRE—G. W. Smith, of Mauch Chunk, Pa.: I claim, first, giving the reed two movements, substantially as described; the first, for squaring the filling with the warp, and bringing it to a suitable position to be operated upon by the crimpers, and the second to beat it up to its place.

Second, giving the crimpers a movement, laterally to the warp, in opposite directions, alternately, after the crimping operations, for the purpose of making them adapt themselves to the varying intersections of the successive wires of the filling and the warp.

[The object of this invention is to crimp the wires while in the loom and during the operation of weaving. To effect this, a pair of crimping jaws, having their faces of a proper form to crimp the filling wires, are arranged in the loom transversely to the warp. After a filling wire has been passed into the open shed, and brought square with the warp by a half-way movement of the reed, these jaws close upon it and crimp it to the proper form, and then the lay makes a second movement to beat it up. The crimping of the warp is performed by the filling wires. The crimpers have a reciprocating movement laterally to the warp after every crimping operation, for the purpose of making the depressions in each wire opposite the elevations, in its predecessor and successor, as is requisite, to enable the warp wires to pass severally over one filling wire and under the next.]

SAD IRON HEATERS—Jesse D. Wheelock, of Mayville, Wis.: I claim the use or application of the spiral springs within the tubes, d, in combination with the tube E, and lids, c c, in the manner substantially and for the purposes specified.

HYDRAULIC OIL PRESSES—Wm. Wilber, of New Orleans, La.: I am aware that in tobacco and other presses of a similar character, staves of wood have been used, hooped simply on the outside with iron. This I do not claim.

But I claim the manner of constructing the cylinder of a hydraulic press, viz., of staves of wood when lined with copper, or other suitable metal, as well as double banded, in the manner and for the purpose set forth.

I also claim the making of the bed plates, M, of sections of wood, having the end of the grain of the wood in a line with the thrust, with the piston or platen, for the purpose of using the elasticity of the wood, and thus relieving the press from the rigidity of metal, and for lightness and cheapness of construction, and also for enabling me to arrange the through bolts so as to divide the strain upon them and prevent their crushing the wood, as described.

I also claim the manner of uniting the through bolts or rods with the bed plates, viz., by means of the collars let into the separate sections of wood for relieving the heads of the bolts of the strain, and distributing the strain throughout the bed plates, substantially as described.

I also claim, in combination with the seed boxes, the introducing of steam directly into the seeds in said boxes, in contradistinction from heating them by conduction or radiation, so as to have both heat and moisture in the boxes, as described.

I also claim the hinging of the door and one of the sides of the box to the other sides, so that drawing out the rod, R, the door of the box will spring away from the plates, and one side will, at the same time, give slightly, but sufficiently to release the cakes from the said pressure, thus allowing them to be easily lifted out or removed, as set forth.

CORN AND COB MILLS—Thos. B. Stout, of Keyport, N. J.: I claim the adjustable "regulator," D, regulated and operating in connection with the bur, G, and shell, F, substantially in the manner and for the purposes set forth.

I also claim coupling the spindle to the bur, and adjusting it therein by means of the recess and pin, d, and the radial regulating rods, S S, substantially as described, and in combination therewith the adjustment of the upper end of the spindle in the frame by the rods P P, or their equivalents, so that the two adjustments may harmonize with each other, and no disarrangement of the bur in its shell may arise in the application of the power to the upper end of the spindle.

I also claim the auxiliary loose bur, I, dressed in the direction opposite to that of the main bur, G, and so arranged that it may revolve nearly or quite in contact with, and adapt its position to that of its shell, H, unrestrained by the parts by which it is attached and driven, substantially in the manner and for the purposes set forth.

[One of the greatest difficulties experienced in the construction of cast-iron grinding mills, is to get the grinding plates true. In the operation of casting they warp more or less out of the proper level, owing to the shrinkage of the metal in cooling. The slightest irregularity of the plates prevents them from doing good work: this is one of the chief objections to their use. Mr. Stout's method of connecting the plates is as follows: after casting, they are placed in an oven and again heated; they are then placed between heavy metallic disks and firmly clamped, the whole being then immersed in water. The disks are perforated with holes, through which the water has access to the plates. The clamping renders them perfectly true, while the water imparts the necessary hardness.

This process appears to be easy, as well as effectual, for the purposes intended.]

GUARDS FOR LANTERNS—Charles H. Butterfield, of Nashua, N. H., (assignor to Amory Houghton, of Boston, Mass.): I do not claim making the guard movable, by means of hinges and catches or other contrivances equivalent thereto.

But I claim my improved mode of making the guard elastic, as set forth, or with springs at top and bottom to embrace the neck and lower part of the lantern, the same not only dispensing with hinges, but serving to maintain the guard in place even when its clasp may be unhooked.

REVOLVING GRATES—Chas. Evans, of Charlestown, Mass., (assignor to himself and Geo. K. Goodwin, of Roxbury, Mass.): I claim the method described of hanging the cylinder within the recesses in the sides of the stove, and of raising the grate to its upright position, as set forth.

MILLS FOR GRINDING GRAIN, &c.—Ezra Ripley, of Troy, N. Y.: I do not claim the combination of two or more cylinders for grinding, when such cylinders have each of them a continuous rotary motion.

But I claim combining with a continuous rotating grinding cylinder, or plates, one or more grinding cylinders, which have a partially rotating reciprocating motion, in opposite directions, given to it or them, by the cams, lever and spring, as described, or by other analogous devices, for the same purpose, the combination being substantially in the manner and for the purposes as set forth.

MINCING MEAT—Alex. Lightheiser, of Reading, Pa.: I do not claim any particular shape for the cutting edge of the knives or blades, K K K.

But I claim the placing of the knives or blades, K K K, in an inclined position on the surface of the cylinder, for the purpose of propelling the meat through the machine.

FOUNTAIN PENS—N. A. Prince, of Brooklyn, N. Y.: The claims I now make are for improvements, in addition to those already made and patented Jan. 23rd, 1855.

I claim, first, the elevation or bead, on the back part of the pen, near its heel, being designed to keep the pen, by coming in contact with the inside of the main reservoir tube from lifting too much, substantially the same as set forth, as described and shown.

Second, I claim the pen notched near its heel, and the combination of the same with the feeding tube, correspondingly notched, so that the two placed together and infixed in the main reservoir tube, the pen cannot get out of its position, substantially the same as shown and described.

PADDLE WHEELS—Benj. Hill, of Rochester, N. Y., I claim the radially hinged valves, used as substitutes for paddles, said valves being attached to disks or rings, and supported thereby, substantially as described.

HANGING CIRCULAR SAWS—W. W. Hurlbut, of Boonville, N. Y.: I claim the arms, H I, as connected with the saw guides, L L', the bearing, F, and the opening wedge, K, in such manner as to adjust with the movement of the saw, D.

RE-ISSUES.

SPARK ARRESTERS—Wm. C. Grimes, of Philadelphia, Pa. Patented originally Feb. 12, 1842: I claim the combination of the central chamber, C, the series of tangential openings, E E, the larger circular chamber, A, furnished with a series of vertical openings, f f, leading into exterior chambers or channels for separating sparks and other particles of matter from the gaseous current discharged from locomotive or other chimneys, substantially in the manner set forth.

SOFA BEDSTEADS—Charles F. Martin of Boston, Mass. Patented originally June 6, 1854: I claim drawing down or depressing the cushion at the joint between the back and seat by means of the cords, b, or their equivalents, constructed automatically with the seat, A, and back, B, for the purpose set forth.

DESIGN.

TABLE KNIVES AND FORKS—Joseph W. Gardner, of Shelburne Falls, Mass., (assignor to Lamson, Goodnow & Co., of same place.)

American Fire Arm Machinery for Great Britain.

Heretofore, the manufacture of army small fire-arms in England has been carried on without any government system, but learning of the superior modes of constructing army muskets and rifles, Uncle John has shown good sense in adopting our system. About two years ago a commission of British officers and mechanics were sent out to inspect our armories, and make the necessary arrangements and contracts for American machinery. They had free access to our establishments, and, as we learn by the Springfield *Republican*, they engaged James M. Burton, chief engineer and mechanic at the Harper's Ferry, (Va.) Armory, to take a like position in the new English armory, and he is now in that country. They also ordered complete sets of the machinery in use at our armories. Robbins & Lawrence, of Windsor, Vt., were employed to build some 100 "milling machines," used to cut the gun locks and execute the other iron parts of the gun.

The intricate machinery for the manufacture of the gun stock, was entrusted to the Ames Manufacturing Company, of Chicopee. This has just been completed and dispatched to England. It consists of 25 different machines, 3 of which are duplicates. Oramel Clarke, one of the best workmen in the stock department of the armory, has been employed to go to Europe, and take charge of the machinery and its operation.

The new government armory of England is located at Enfield Lock, nine miles north of London. It is intended to employ 800 operatives, and turn out 500 muskets daily. A contract for 25,000 rifles is now being filled at Windsor, Vt., and Hartford, Conn., for the British Government.

Great Engineering Works in India.

The Government have recently constructed an immense weir across the Godavrey river in Madras, for collecting and distributing water for the purposes of irrigation. Canals or conduits are built, to distribute the water for irrigating the immense area of 1,200,000 acres. The water will be supplied at the rate of 200,000 cubic yards for about four dollars, or about one-thirtieth the price which it costs the natives to draw it by bullocks—according to the old plan. Severe drouths take place in sections of the Madras territory every few years, and famines are sure to follow. This great work will be the means of benefiting the people on the delta of that river beyond all calculation, as it is believed that their crops will hereafter be multiplied seventy-fold by such an abundant water supply.

Discovery of Nitrate of Lime.

There has been discovered on the farm of Mr. James Peage, near Staunton, Va., an apparently inexhaustible supply of nitrate of lime. Some specimens, on examination, proved to contain large portions of pure saltpeter, and in all the nitrate is strongly evident.—[Ex.

[The nitrate of lime occurs native in calcareous soils, and in old mortar. It is a white soluble salt, and may be decomposed by the carbonate of potassa. It is sometimes used as a source for obtaining niter.

Overland Arctic Expedition Returned.

The Montreal *Herald* gives an account of the recent return of the overland expedition fitted out in the latter part of 1854 by the Hudson Bay Co., to ascertain, if possible, some information relative to the fate of Sir John Franklin. The party was composed of some hardy trappers and Indians. They found many things belonging to the Franklin Expedition, and the place where it is supposed the last of them died from starvation, but no papers or books. The place where they were found was Point Aigle, opposite Montreal Island, a dreary, desolate place in the Arctic Regions, to which they were directed by Dr. Rae, who had obtained information from the Esquimaux that a party of white men had perished there in 1850. There can be no doubt, we think, but that Franklin and all his party perished, as it is twelve years since they left England, and ten since any account of them was received. It would afford satisfaction to the living, however, if something else belonging to them were discovered, than tin provision boxes, pieces of iron, &c., which no doubt belonged to Franklin's party, but do not satisfactorily reveal their fate. Books, papers, or the remains of their bodies, would be incontestible proof,—but none of the expeditions fitted out have returned with such memorials. A mystery still envelopes their fate.

The Arctic Regions.

It is impossible, from anything we are yet in in possession of, to form an opinion as to what exists beyond the parallel of 82° 30' north, or beyond that of eighty degrees of latitude south.

The north magnetic pole has been discovered and examined—it is elevated but a little above tide, in lat. about 70° N., long. about 98° W. The magnetic pole of the Antartic has not been reached, for it is walled in by ice and is situated in lofty mountains not yet explored; its position, however, is further from the equator than the north magnetic pole, and is in the vicinity of two lofty mountains, in which volcanoes are in an active state at an elevation of more than ten thousand feet above the sea.

The atmosphere of the Arctic is unlike our atmosphere. Lieut. Parry when on Melville Island in the winter of 1819–20, lat. about 75° N., long. about 111° W., says: "We had frequent occasion in our walks on shore, to mark the deception which takes place in estimating the distance and magnitude of objects when viewed over an unvaried surface of snow. It was not uncommon for us to direct our steps towards what was taken to be a large mass of stone at the distance of half a mile, but which we were able to take up in our hand after one minute's walk. This was more particularly the case when ascending the brow of a hill, nor did we find that the deception became less on account of the frequency with which we experienced its effects."

Interesting Account of the Great Polar Sea Discovered by Dr. Kane.

At a late meeting of the American Geographical Society, in this city. The interest of the proceedings was enhanced by the presence of Dr. Kane, the Arctic explorer, who gave an outline of some of his discoveries.—His remarks commenced by allusions to the mountain ranges in North Greenland:—

"After leaving New York, we made the coast of Greenland at its most southern point. We then continued on our voyage to Uppernavick, and then to Smith Sound. On reaching Smith Sound we expected to have an open sea. The reverse was the case. A boat was launched and landed on the nearest great island, to lay a store of provisions to fall back upon, in case of a retreat, and then we pushed on our ship further to the northward. From this point our vessel was forced up to our winter harbor. When we reached this winter harbor the difficulties of going further north were so great that my officers addressed me a letter requesting a return to the south. This was not in accordance with my instructions, and I declined to accede to the request. At this point we have a constant glacier stretching out. With great difficulty here we were enabled to travel by sledges, and in this way parties set out for exploration, and in this way we reached the latitude of 80 degs.—the most northern point which had yet been reached. At this point our parties were compelled to return, and did so with the intention of renewing the exploration when the winter was over. In our winter harbor we established an observatory, by means of a theodolite and a common pocket glass. We established a magnetic observatory and meteorological observatory, the records of which are now deposited in the office of the Coast Survey. Our alcoholic thermometers we found to be utterly unavailable, and the only way we could get at the temperature was by a comparison of instruments, and this with great care. Our lowest recorded temperature was between 70 and 80 degrees below zero. At this temperature chloroform was almost solid.

This was the temperature in which we made our explorations. Our first party was unfortunate. They set out in March. Storms overtook them, and they finally got back to the vessel, where three of the number underwent amputation, and two died. It was three weeks before we were able to start out again, and when we did so, we found that the coast of Greenland did not, at this point, run in a course represented on the maps, but it presented a coast running almost east and west. Here we discovered a new land, which we named Washington. This land was flanked by a range or lofty mountains, 2,800 feet in hight, and these ranges stretched out, apparently, far to the north. The latter portion of this travel was the most interesting. We found before us a field of ice, and over this we found an open water, which has since been called the open Polar Sea. This water appeared iceless. It was apparently without ice. Not a particle of ice lined its shores. At an altitude of 300 feet, as far as we could see, an open sea met our eye. A gale of long duration swept over this water, but brought no drift along with it. All animal life resorted to these waters. The seal was shot upon its shores, and the duck resorted to it from every direction. We could not tell the exact temperature of this water, but it was warmer than any other found below.

A British Exploring Ship Found Abandoned in the Arctic Seas.

In 1852, the British Government dispatched a fleet of five vessels to the Arctic regions, for the purpose of searching out Sir John Franklin. The fleet consisted of the *Pioneer*, *Resolute*, *Intrepid*, *Assistance*, and *Investigator*. The progress of the ships was very unfavorable. They became frozen up in the ice almost before the searching ground had been reached, and after remaining in that condition for about a year, government sent out two other vessels, with orders for the abandonment of the interlocked ships, and the return home of the officers and men. This was accordingly done on the 15th of May, 1853.

On the 10th of September, 1855, the American whaling bark *George Henry*, Capt. Buddington, of New London, Conn., while cruising in Davis Straits, lat. 67, 20 miles from land, espied a ship which had the appearance of being abandoned. On boarding her she proved to be the British searching ship *Resolute*, late commanded by Capt. Kellett, R. N. She was about half full of water, but this was soon pumped out. Says the New York *Herald*:—

"The appearance of things on board, as represented by Capt. Buddington, was doleful in the extreme. Everything of a movable nature seemed to be out of its place, and was in a damaged condition, from immersion in the water. The cabin was strewed with books, clothing, preserved meats, &c., interspersed here and there with lumps of ice. There was one thing, however, which struck Capt. B. as being very remarkable, and this was the presence of ice for several feet in thickness on the larboard side, while there was not a particle on the starboard. The only argument that can be presented to explain this curious freak of the element is, that the *Resolute*, lying with her head to the eastward for probably more than a month, received the direct rays of the sun on the starboard quarter, and nowhere else, of the ship, while the other side, being without this heat, became as solidified with ice as though the sun never shone on it.

In the course of the search a little coal was discovered in the hold, but the quantity was very small, and entirely inadequate to supply the vessel more than a week. Of provisions, there was enough, perhaps, to last a crew of seventy-five men (the number originally carried by the *Resolute*) for nine months. The salt meats were the only articles that were at all in a state of preservation. Everything had gone to decay. Even the ship's sails, found between decks, were so rotton that the sailors could thrust their fingers through them like so much brown paper. The lower hold was found to contain the library of one of the officers, valued at over a thousand dollars. The books were entirely valueless when discovered by Captain Buddington, and subsequently thrown overboard as worthless rubbish."

Finding the vessel to be staunch and seaworthy in every respect, Capt. Buddington resolved to bring her to the United States as a prize. He accordingly transferred himself and a small crew, with the necessary accoutrements, to her decks, and set sail for home. She arrived at New London on the 24th of December last, his consort, the *George Henry*, having reached that port a day or two previous.

The *Resolute* now lies anchored in the stream off the town of New London, and is the chief object of attraction in that neighborhood. She is about 600 tuns burden, and is built in the strongest manner. Her bows are sheathed with iron, while her entire frame is coppered, and copper fastened and bolted.

It is the opinion of Capt. Buddington, that if the crew of the *Resolute* had remained on board of her with the hope of eventually releasing her, they could not have effected the task any sooner than it was performed by the natural causes which eventually freed her, and hence, he thinks that Sir Edward Belcher, who had command of the squadron, acted perfectly right in abandoning the vessels, under the circumstances."

Among the articles found on board of the *Resolute*, was a pair of Capt. Kellett's epaulettes, which have been forwarded to him.—The New York *Times* remarks, the finding of the ship and her safe voyage to New London, adds another romantic episode to the history of Arctic navigation. By a remarkable coincidence, the intelligence of the discovery of the remains of Sir John Franklin, and the recovery of the *Resolute*, which had been sent out to his rescue, both reached this city in the same hour, and were carried to England by the same steamer; the *Resolute* sailed from London, and was brought back to New London.

Drouth and Vegetation.

The Annual Report of the Massachusetts Board of Agriculture devotes considerable space to discussion of the drouth of 1854: "There can be no doubt," it is remarked, "that the destruction of our forest has much increased the severity of our summer drouth. Forests have a tendency, by protecting the earth from the scorching rays of the sun, to prevent a large amount of evaporation, and thus lower the temperature of the soil. When standing upon elevated grounds, the sources of rivers are found in them, and they determine the direction of the prevailing winds and rains. The winds which blow over forests become impregnated with moisture, which they spread over the country, giving freshness and life to all vegetable creation. But where there are no forests, the clouds sweep over the country without finding any obstacle to arrest their progress and resolve them into rain. The streams become dried up, the soil is heated, and the winds, passing over large extents of country parched by the sun, become hot, and bear with them heat and sterility." The report recommends, among the most practicable methods of preventing suffering by drouth, that irrigation be introduced more generally among our farmers, and that they take more pains to reclaim and cultivate low lands, which at the same time that they retain moisture better than others, will not fail to pay a very large profit to the cultivator, year after year.

The recommendation to pursue the practice of irrigation is good advice for dry seasons, but the theory respecting the absence of forests causing the drouth of 1854, should also have caused one in 1855, which, as we all know, was exceedingly wet.

Nasmyth's Process of Puddling Iron.

In Vol. 10 Scientific American, we noticed a patent which had been granted in England to Nasmyth, the inventor of the steam hammer for refining iron by injecting jets of steam into it when in a molten state, and we stated that the principle of the invention was not new, but had been applied by one of our inventors before Nasmyth. Nasmyth applied for an American patent through Merrick & Sons, of Philadelphia, and was rejected. Our American inventor was more fortunate, he obtained his patent for the process as a mechanical one. The following letter in the last number of the *Journal* of the Franklin Institute will be of great interest to all our iron manufacturers:—

"The announcement made in the September number of the *Journal*, page 209, under the above caption, that we were assignees of the patent for the United States, was an error which has arisen probably from the fact that we had, in Mr. Nasmyth's name, applied for such a patent in this country.

Mr. Nasmyth's claim has, however, been rejected by the Patent Office, on the ground that it conflicts with the patent issued to Guest & Evans, by the English Patent Office, in 1840, and described in the *London Repertory of Patent Inventions*, Vol. 16, page 341, by reference to which it will be perceived that the principle both possess, viz., the application of steam beneath the surface of the molten metal, is the same, although in our judgment, Mr. Nasmyth's application is far more simple, and less likely to derangement than the former, and perhaps these advantages may be all that is required to bring the process into general use. Be that as it may, we take occasion to say that Mr. N.'s accounts of his success in England in producing by this method a cheaper and better iron, are such as to warrant us in expressing the hope that some of the leading iron firms in this country may take it up.

Merrick & Sons.

Philadelphia, Nov. 15, 1855."

Cotton Gins.

Messrs. Editors.—A recent number of the Scientific American, page 49, in the article "Saw Cotton Gin," your correspondent has fallen into some errors, I think. I have been engaged for the last twenty-five years in manufacturing the saw gin, and in all that time have watched closely the operation of my own machines, and others, on the fiber of cotton with the view of improvement, wherever it could be done. I make this statement for those who may differ with me in regard to the operation of the gin. It is hardly possible to overrate the importance of this machine. The Saw Gin, as it came from the hand of Whitney, admitted of but few improvements, and though many have been attempted, they have mainly aimed at (and accomplished) the making a fairer article of cotton, but always at the expense of the fiber. In proof of this there is in Georgia a gin which was made in Whitney's time, and under his patent,—it has iron saws, and very coarse teeth, but the cotton ginned by it brings from one to two cents per lb. more than from the best improved gins.

Your correspondent, Mr. Du Bois, is right in saying that no two saws catch the same fiber, but I cannot think he has investigated closely when he decides that the saws never break the cotton Let Mr. Du Bois examine samples under a magnifying glass, from different gins, and he will change his views; let him examine carefully the fiber or the seed, and he will find but a very little difference in the length, and none quite short. But the best proof that the saw cuts cotton, is Fultz's improved feeder, which he says separates the long from the short cotton, thus making two qualities, the long being delivered at the end where it enters, and the short at the other, showing conclusively that the cotton which is first taken from the seed is but little cut, while that which runs the gauntlet of fifty saws, comes out a low quality. I have no hesitation in saying that there is no machine which approaches to a saw that can clean the Upland cotton without injury to the fiber, to say nothing of the Sea Island cotton, which has a much finer and more tender fiber; indeed, the only perfect operation in ginning cotton is the roller principle, therefore, whoever will invent a roller gin that can compete in speed with the saw gin, will increase the value of the Upland crop ten per cent., or ten millions of dollars annually, to say nothing of the advantage to the inventor. H. Clark.

New Port, Fla., Dec. 4th, 1855.

New Inventions.

Improvement in Reversible Wrenches.

The accompanying engravings represent the adjustable reversible ratchet Wrench for which a patent was granted to John D. Dale, of the city of Philadelphia, on the 21st of August last.

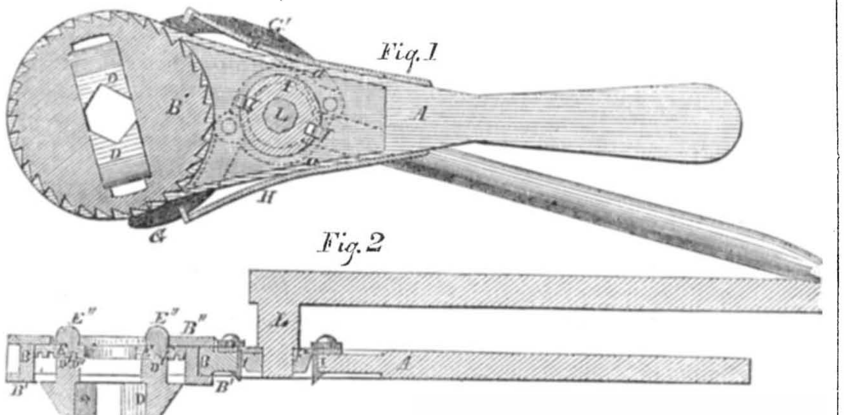
Fig. 1 is a top view of the under part of the wrench, arranged to turn a bolt or a nut, and fig. 2 is a vertical longitudinal section of the wrench, adjusted to turn a bolt or nut. The same letters refer to like parts on both the figures.

The nature of the invention consists in combining in the wrench adjustable jaws, capable of grasping square, round, or other formed nuts, bolts, &c., with ratchet wheels notched in a reverse direction, and a series of parts for giving motion to the ratchet wheels and jaws, either to the right or left at the will of the operator, from the end of the handle of the main body of the wrench, and with an increased leverage without moving the main body of the wrench, and in such a manner as to cause the nut, bolt, or drill, or other object to be turned without disengaging the jaws from their grasp of a object, simply by the vibratory motion of the lever or handle arranged above the wrench handle, and capable of being worked (when the nut, bolt, or other object is difficult of access) where the ordinary wrench could not be operated.

The main body, A, of the wrench is cast in one piece with a handle at one end for holding it while working. B is a circular rim in the enlarged, or box end of the wrench. B' is a ratchet wheel, snugly fitting in this rim. The upper surface of this wheel—oustide the rim—rests against the lower surface of the enlarged part of the wrench. The upper edge of the rim is on line with its upper surface, so as to cause the lower surface of an upper ratchet wheel, B'', outside of the rim, to rest on the upper surface of the enlarged part of the wrench. The rim and the ratchet wheels, B1 B2, are confined and turned within the circular box of the wrench. C is a slot in the lower ratchet wheel, B1; it extends across it from one side of the inner periphery of the rim, B, to the opposite side, and the edges enter grooves in the sides of the two adjustable jaws, D D, which extend above and below the slot. These jaws are formed strong, and move parallel. Their office is to grasp the article—bolt, nut, &c.—to be turned. On their upper part they are made convex; their outer and inner sides are concave. They have curved cogs or lips, D1, projecting from their upper surfaces—two cogs being near the outer and inner sides of the other. These cogs enter helical grooves formed by a thread, E, on the lower surface of a circular plate, E1, which is confined between the upper surfaces of the jaws, D, and the lower surface of the upper ratchet wheel, B2, inside of rim B. Its periphery fits exactly within the rim, and it has finger holds, E2, for turning it, which thus expand or contract the jaws, D D, to grasp and set free articles of various sizes. The worm, E, acts upon the cogs, D1, of the jaws to operate them. F is a hub fitting in a circular opening. It has a flange at its upper part, and has ears projecting therefrom. G G' are pawls secured to these ears by pins. The pawl, G, is attached to the ear nearest wheel B2, and is curved round its periphery and made like a bill hook tooth to engage in the notches of the wheel against which it is pressed by a curved spring, H. Another pawl, G', is attached in a similar manner at the other end, and engages with the notches of wheel B1, on the opposite side to that on which the pawl G is situated; it is also constantly pressed by a spring, H2, secured to the side of the wrench, and is like the opposite spring in form and office. The flanged hub, F, to which the pawls are attached, is held in place by springs, I, while at work. L is a lever, with its axis secured in the hub, F; its office is to operate the pawls, G G', to turn the ratchet wheels by successive vibrations.

Operation—To turn the nut, bolt, &c. to the right, the flange hub, F, is inserted in its opening from the upper side, as represented in the figures. The jaws, D, are then made to grasp the nut or bolt by turning the circular plate, E', to the left. A vibratory motion is then given to the end of the lever, L, by one hand, while the handle of the wrench, A, is held in the other, by the operator, which causes the flanged hub, F, to move in a corresponding manner, and to alternately move the ends of the pawls, G G', against the teeth of the ratchet wheel, B2, and over their inclined portions in their backward and forward motions, and thus give the ratchet wheel, B2, a rotary motion, and with it the jaws, D, and nut or other object grasped. In case it is desired to turn the jaws, D, with the nut or bolt embraced by them in a reversed direction (to the left) the pawls, G G', are discharged from the springs, H, and the projections on the flexible ends of springs, I, are pressed in the countersinks in the periphery of the hub, F, so as to disengage them from contact with the under surface of the wrench. The hub, with its pawls attached, is now withdrawn, and again inserted in its opening from the opposite side, in an inverted position, and held therein by the notches of springs I. The pawls are then pressed against the teeth in the periphery of the lower ratchet wheel, B', which teeth, being in a reverse position to those on the wheel, B2, and thus made to conform with the reversed position of the pawls, G G, &c., will be operated upon alternately by the pawls, as their ends are pushed forward and back by the vibratory movement of the hub and lever, and a continuous motion to the left will be given to the jaws, D, and the nut or bolt.

DALE'S PATENT REVERSIBLE WRENCH.

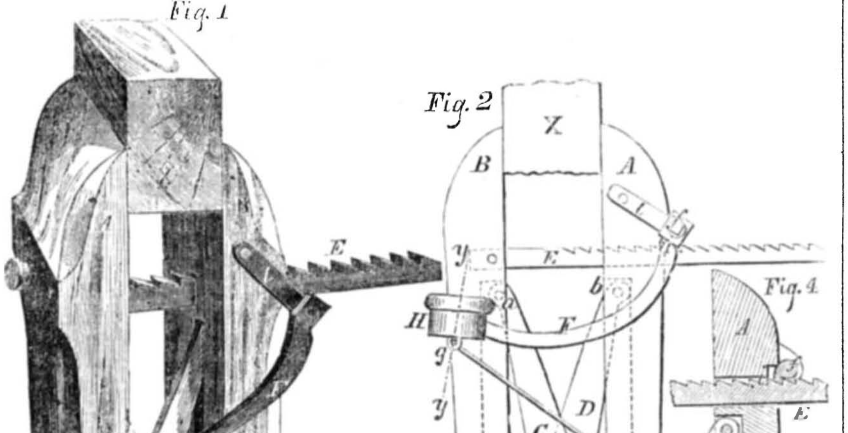


Instead of operating the ratchet wheels, B' B'', by the lever, it may be detached from the hub, F, and the wings of it may be allowed to turn against the projecting edges, *a*, on the side of the main body of the wrench, between which they are situated, and by vibrating the handle of the wrench, the pawls, G G', will be caused to act alternately against the teeth of the ratchet wheels, in such a manner as to give a continuous movement to the wheels and jaws, and the nut or bolt—the direction in which the ratchet wheels and jaws move, and the object grasped being reversed in this case.

This wrench may be used for turning drills or other tools, the spindle passing through the openings in the center of the ratchet wheels, B1 B2, and circular plate, E, and being grasped firmly by the jaws, D, in the manner described for operating nuts and bolts.

More information may be obtained by letter addressed to the patentee, at Philadelphia.

JOHNSON'S PARALLEL VISE.



The accompanying engravings represent the improvement in Parallel Vises, for which a patent was granted to Jasper Johnson, of Geneseo, N. Y., on the 16th of October last.

Fig. 1 is a perspective view of the vise. Fig. 2 is a side elevation; fig. 3 is a top view; fig. 4 is a vertical section on the line, *x x*, fig. 3; and fig. 5 is a section on *y y*, figs. 2 and 3.—Similar letters refer to like parts on all the figures—excepting A B on fig. 1, which are misplaced.

The nature of the invention consists in so constructing parallel vises that their jaws shall be tightened by pressure upon a simple lever, without the agency of screw power in any form; a gathering pawl which constitutes one arm of said lever, acting upon a rack bar attached to the movable jaw, to tighten the vise, the lever being held in any given position, by means of a sliding rack, so connected with a rocking head at the extremity of said lever, as to be susceptible of a lateral motion of sufficient degree to engage or disengage the securing stud at the will of the operator.

A is the stationary jaw of vise, B the movable jaw. These jaws are connected by the cross levers, C and D, secured by bolts, *a b*, so that jaw B, always moves parallel to the jaw, A, by reason of the lower extremities of said cross levers rising in grooves, *c c*. E is a rack bar, secured to jaw, B, and passing through the stationary jaw, A. The opening through A, may be such as to permit in the rack bar a lateral motion, sufficient to allow the holding between the jaws of an article whose opposite faces incline towards each other. F is a lever, secured to the extremity of the shaft, *f*, which is held by the lugs, *l*, connected with jaw, A, by bolts. Upon the shaft, *f*, is a pawl, *i*, capable of engaging rack bar E, under certain circumstances, said pawl constituting the short arm of the operating lever. H is a rocking head resting upon the lever, F, having the sliding rack, *h*, in a direction from the side of the head pressed. This rack, *h*, passes through a slot in stud *m*, of the stationary jaw, and engages the inner edge of the slot when forced towards it. The lower extremity of the rack, *h*, has a spring, *n*, which, when drawn into the slot of stud *m*, will preserve the lever, F, in an elevated position, and lift the pawl, *i*, clear of rack bar, E.

Operation—Before inserting the article, X, between the jaws, the lever, F, is sufficiently elevated to cause the spring, *n*, to enter the slot of stud *m*, the effect of this being, as before stated, to lift pawl *i* into recess *r*, and leave the rack bar, E, free to move. The jaw, B, is then drawn out, and X inserted in the opening between the jaws; the jaw, B, at the same time, closing by its weight, the cross levers maintaining it in a position parallel with A throughout its length. The hand of the operator is then placed upon the head, H, causing it to drop, and the pawl, *i*, to engage the rack bar, E. A slight pressure on the said head causes the pawl, *i*, to draw powerfully on he rack bar, and compress X between the jaws. The side, 1, of fig. 3, of the head H is then pressed with greater force than is bestowed on side 2, which forcing rack *h* against the edge of its slot, causes one of its teeth to engage the stud, and the operation is complete, the several parts of the vise then having the positions shown in figs. 2, 3, and 4. To release X, the reverse action takes place. Side 2 of H is pressed upon moving the rack, *h*, outward, and disengaging its tooth from the standard. The lever, F, is then raised until spring *n* engages the slot of stud *m*, when the jaw, B, is free to move outward as described.

The lever, F, may be carried to the lower portion of the vise, so as to be operated by the foot, a spring being employed to carry it up when the vise is to be opened. The lugs, *l*, are movable about their bolts, the weight of the shaft and lever always keeping them in position. This construction of vise, by rendering the fulcrum movable, gives the system of levers, when in operation, the effect of the toggle joint, and also insures the taking of the pawl into some tooth of the rack for holding an article of any desired size.

It will be observed that the construction and action of this parallel vise, differ essentially from that of the vise of Messrs. Davis, in the last number of the Scientific American; the feet of the levers, C D, in this one rise up; in the other the top ends of the levers were unbolted and slid down. The other devices and combinations are also quite different. This vise has been recommended for the convenience it affords to the operator, and the rapidity with which he can work it, to open and close the jaws, and to adjust the distance between them, for the reception of articles of different sizes.

More information may be obtained respecting this invention by letter addressed to the patentee, at Geneseo.

Breech-Loading Rifle.

We have lately examined a new breech-loading rifle, the invention of Mr. John Swyney, of Boston, Mass., patented in August, 1855. It belongs to the class known as magazine fire arms. The cartridges are all contained in a round longitudinal magazine, which extends the whole length of the implement below the barrel. Percussion caps are used, and they are stowed in the gun stock. The loading and capping is done with great rapidity, safety, and certainty, by means of simple, easily operated mechanism.

Scientific American.

NEW-YORK, JANUARY 5, 1856.

Progress of Invention During 1855.

The year eighteen hundred and fifty-five is now numbered with the past, and its days, hours, and minutes never will return again. But if time is evanescent, and is continually fleeting backwards, the actions of the present, on the contrary, surge upon the future and affect the destinies of coming generations. No man can live to himself; his actions affect others for good or evil; and their influence extends far beyond his own brief term of life. Every man, therefore, should do his best every day; and whatever good thing his hands find to do, he should do it with all his might. The present is a good and proper time to take a look behind, and briefly review the actions performed in the world of science, and art, during the circle of time which has just been completed.

The year that is gone has been prolific in invention, discovery, and industrial improvement. No less than one thousand nine hundred and forty-six patents (not including forty-nine re-issues) were granted by our Patent Office from the second of January last year, up to the date of the list of patent claims on another column this week. This is the greatest number ever issued in one year from the Office—one thousand nine hundred and two being the number. issued in 1854. The great majority of these were for improvements on well known machines, for new machines applied to accomplish results for which machinery had not previously been adapted, are necessarily few in number. Some improvements on machinery, however, are of more value and importance than the conception and construction of the original machines. This was the case with the improvements of Watt on the steam engine, and Morse on the telegraph, and no doubt many of the improvements for which patents were granted last year, will effect corresponding results in the machines which have been improved. A very remarkable number of patents were granted for improvements on the oldest of all power motors—the windmill. On many of the vast plains of our country, and along our extensive sea coast, where fuel is expensive, and where no water power can be obtained, the supply of wind power to drive machinery for pumping water, grinding grain, sawing and planing timber, and many other useful purposes, is abundant. It is to be hoped that recent windmill improvements—the majority of which have been illustrated in our columns—will be found, in practice, to have removed old defects, and so perfected this venerable motor as to render it of as great value to thousands of our people, in many sections of our country, as the water wheel is to thousands in other sections. It is impossible for us to refer however succinctly, to the distinct classes of inventions for which such a great number of patents were granted; we present the number issued, well knowing that from this data, the solid inference to be drawn, is, that every department of mechanism must have been greatly enriched by contributions from the brains and hands of our acute-thinking, deep-designing, and hard-working inventors.

Next to the World's Fair in London, in 1851—which it surpassed in some respects—the greatest Exhibition of Industry ever held in the annals of history, was the one in Paris during the past year. At that exhibition, America, though represented by few of her children, stood out pre-eminently among the nations of the old World; and her sons of mechanical genius were awarded more prizes in proportion to their number than those of any other country. If there were nothing else to record at the end of the year than these triumphs—these monumental milestones marking the progress of invention—of our countrymen, it would be enough to give us abundant satisfaction.

A chaplet has been won by the efforts of our daring navigators, in the discovery of the open Polar Sea by Dr. Kane; and the nation's heart has been thrilled with gratitude for his safe return with his adventurous compatriots.—The last link has been added to the continuous navigation of the chain of great lakes from Superior to Ontario, by the completion of Saut St. Marie Canal. The great suspension bridge by Roebling, across "Niagara's waters dark and deep," has also been completed, and the locomotive now whirls his ponderous train over the boiling abyss. The largest steamship ever launched on our continent—the *C. Vanderbilt*—has recently been added to our commercial marine. The U. S. Exploring Expedition in the Pacific Ocean has added a new fact to zoology in bringing up the living zoophyte from vast depths of the ocean, where it was supposed no animate creature could exist.

A challenge to the inventive genius of our country was thrown out through our columns, to construct a machine for sawing correctly the two sides of a marble pyramid, and soon afterwards it was accepted by scores of inventors, who had devised nearly as many different methods of accomplishing the object.

An engine actuated by the explosion of the gas which lights our streets, has been running in this city for the past two months; and another moved by the bi-sulphuret of carbon has been in operation for a somewhat longer period.

Turn to whatever hand we may, we find prominent time-marks of progress in the field of invention and discovery. Our country now ranks high for almost every kind of machinery, and for some kinds it stands without a peer. Only last week two English gentlemen, extensively engaged in agricultural pursuits in Australia, called upon us, and in the course of conversation, stated that it was the superiority of our agricultural machinery which had attracted them here as purchasers on a large scale. They had witnessed some of our implements at the World's Fair, in 1851, were pleased with them, and resolved then to visit our country at some future time. When they arrived here they found that the number and excellence of our machines far exceeded their expectations; this led them to prolong their visit, and greatly increase their purchases. They confessed that for all kinds of agricultural implements and machines, the United States were very far in advance of every country on the globe. This is a high tribute of praise, coming as it does from such a source.

Our inventors, mechanics, and men of genius have now gained a deservedly high reputation. This must not lull them to inactivity, but incite them to renewed efforts. Let us all begin this new year with a higher resolve to improve upon the past, so that those of us who may see its end, may be able to look back with some satisfaction upon the marked progress we have made in every good thing we found to do.

The Paddle Wheel and Screw.

The last number of the London *Artizan* contains an article on the performances of the *Himalaya*, screw steamer, and the *Atrato* feathering paddle wheel, in which the palm of superiority is awarded to the screw. Both steamers are of huge proportions, the former being 340 feet long, and the latter 318. They are built of iron, and have been running for about two years, exhibiting great speed. To produce an identical speed, the paddle wheel steamer absorbed 966 more horse power than the propeller. The *Himalaya* has direct acting engines, and its propeller only weighs ten tuns. The paddle wheels of the *Atrato* weigh seventy tuns, and her engines are side levers. It is our opinion that the propeller steamers have not yet had fair play in comparing them with paddle wheel steamers. Thus, it is well known that in two vessels of the same size—one a propeller, and the other a paddle wheel steamer—the custom has been, and now is, to put engines of about one-third less in the former than the latter. If the same power be applied to a propeller as to paddle wheels, and the surface of the screw to have the same velocity as that of the wheels combined, what would be the result? Why the speed of the two must be equal—all other things being equal—excepting loss by slip. Now what is the amount of slip attending each—paddle and screw? Well this has not yet been established, for it has been found to differ in different vessels of both classes. The slip of the *Himalaya* was found to be 15 per cent., by experiments, while that of the *Atrato* amounted to 23 per cent., thus proving an immense economy of power by the use of the screw in this particular instance, but in other cases, the amount of slip has been against the screw. More light is still wanted on this all-important subject. Improvements to economize fuel in long sea voyages is one of the greatest, if not the greatest question of the present day, relating to international commerce.

Clarke's Railway Machinery.

Many works on railway engineering have been written and printed, but with the exception of the one bearing the above caption, they are all crude and unreliable. The author of it is a railway engineer, of great intelligence and scientific attainments. The publishers are Messrs. Blackie & Son, of London and Glasgow, Britain, and No. 117 Fulton st., this city (N. Y.,)—a house pre-eminently distinguished for publishing the best of works on mechanism. We feel a pleasure in recommending solid reliable works of this kind to our engineers and machinists.

In 1849 the author—D. K. Clarke—commenced the work during an interval of leisure caused by *dull times*. In making investigations he found great and antagonistic differences existing in constructing and working the locomotives on different lines of railroad; and having applied for information to acknowledged authorities on railway mechanical questions, he found them holding very contrary opinions. This made him feel dissatisfied with public professional opinion in England; he saw there was no proper standard nor scientific data established. Being aware that positive experimental research and practical observation constituted the only basis on which a sound practical system of railway machinery can be constructed, he devoted himself unreservedly to the prosecution of railway mechanical engineering as a study, and entered upon an extensive course of investigation. He visited all the great railway stations of Great Britain, and acquired an intimate knowledge of their operations. He was assisted frankly by all the ablest engineers in England—especially by Robert Stephenson—and they freely furnished him with drawings of engines, tables of their performances, &c. Of the knowledge thus acquired he has made excellent use. The engravings of "rolling plant" (locomotive tenders and cars) as they call it in England, are numerous, large, and well executed. The defects of different styles are pointed out, and general principles (much wanted before) are laid down with precision and clearness. The lap of the valve; link motion; inside and outside cylinders; the action of steam; the capacity of the boiler, fire box, and heating surfaces, resistances to motion; in short, every question connected with railway engineering is discussed, old errors pointed out, and correct views given. The work has consumed four years in publication, and the author says it has cost him unremitting personal labor during the past six years. It is one of the most valuable, if not the most valuable contributions ever made to mechanical literature, and without it no mechanical or civil engineer can be intelligent and posted up in railway engineering.

The cost of the work in numbers is $22 50—thirty numbers at 75 cents each. We could wish it were cheaper, for the sake of many mechanics who desire and need the work, but are unable to purchase it at so high a rate; but considering the number and beauty of the engravings, and the size of the volumes, it is cheap.

Sharpe's Rifle.

A great number of our papers have recently contained wonderful accounts of the above-named rifle, and some of our enterprising daily papers have exhibited a vast amount of Rip Van Winkle knowledge respecting it, by depicting it as a new and strange rifle, just brought out, and possessing the power of far greater range than any other fire-arm in the world. Those who wish to obtain correct information respecting this rifle will find it illustrated by three engravings on page 193, Vol. 5, Scientific American, and on page 196, (with Maynard's primer attached) in Vol. 6. The inventor is Christian Sharpe, who obtained his patent for it in 1848. It is an excellent breech-loading rifle; but we cannot perceive how its range can be greater than any other rifle. Its accuracy depends entirely on the skill and care exercised in its construction; not, so far as we have been able to learn, on any principle not belonging to other rifles.—Old crack rifle shooters say that breech-loading rifles are not so good for accurate shooting as the common rifle with Clarke's patent muzzle. Sharpe's rifle, however, with its conical charge chamber, embraces the feature of the loading muzzle. Breech-loading rifles are, certainly, the most convenient kind, and will, no doubt, yet supersede the old rifles, at least, for rapid firing.

New Year's Resolves.—A Suggestion.

The commencement of a new year is a sort of starting point with almost everybody for the organization of new enterprizes, the formation of new habits, and the correction of old failings.

If any of our readers are inclined to charge themselves with too much selfishness—with having too long lived without endeavors to benefit others around them—we hope they will begin the present year by trying to do better. We can suggest one direction in which any efforts in this respect will be sure to give satisfaction. Let them select from their circle of friends the names of such as would be likely to be benefited by a reading of the Scientific American, send the addresses to our office, with $2 each for a year's subscription. New Year gifts of this kind would be, to most persons, not only acceptable, but in the highest degree beneficial. Many an individual has had occasion to be deeply thankful that the Scientific American was ever thrown in his way. Either he has been directly benefited by something observed in its pages, or it has set in motion new trains of thought, or inspired new impulses; the resultants have been seen in intellectual improvement, or in other successes of a substantial character. We venture to say that there is not a young man in the country but would be profited by a regular reading of such a work as our journal. Its tendency is to draw away the mind from unprofitable pleasures and frivolities, and attract it towards the consideration of subjects of a high, but truly interesting nature.

Those who are not already subscribers to the Scientific American, should now resolve to enroll their names; those who already enjoy the privilege should forthwith resolve to extend the same to all their friends.

Duty of Cornish Engines.

In our last number, is a communication from J. West, of Norristown, Pa., on the above subject, in which the duty of the Cornish engine is compared with the condensing steam engine, but the duty of the former, by the consumption of a bushel of coal is not given. The following will throw some light on the subject.

The number of pumping engines reported by *Lean's Engine Reporter* for the month of October is 17. They have consumed 1,189 tuns of coal, and lifted 9,000,000 tuns of water 10 fms. high. The average duty of the whole is, therefore, 45,000,000 lbs. lifted 1 foot high by the consumption of a bushel of coal, weighing 94 pounds.

The duty of Cornish engines increased from 26,400,000 lbs. in 1812, to 84,200,000 in 1838, according to Dr. Lardner.

Award of Prizes.

Our prizes, it will be remembered, were announced to be awarded on the first day of January, 1856. The present number of our journal, although bearing date January 5th, was put to press before the 1st inst., consequently the list of prize awards does not appear this week. We shall publish them next week. The large circulation of the Scientific American compels us to begin to print the edition several days previous to its actual issue.

We make this statement in order to relieve anxiety of any who might be expecting to see the names of the successful competitors published in this week's number.

Preserved Fruits.

To Mr. A. Cratey, of Brooklyn, are we indebted for some beautiful specimens of preserved strawberries and raspberries cured by a receipt which we are promised a copy of to publish in a few weeks.

A New and Improved System of Numeration and Measurement.

The evils of our absurd system of weights and measures have been frequently pointed out and alluded to by us, and we hope the present Congress will do something to reform the laws relating to them. The American Association for the Advancement of Science has discussed the necessity of such a reform in our country, and the British Scientific Association has done the same for Britain, and the subject, we understand, will be discussed at the next meeting of Parliament. We hope our Congress will not be so pre-eminently fogyish as to follow in the wake of all other civilized nations.

The author of the following article on this subject has devoted much time and study in the investigation of the systems which he discusses, and his views deserve attention. He believes that a more perfect system of numeration would be the adoption of the square, instead of the centesimal; and we think he is correct in his views, that is, to throw away the figures 8 and 9, and use only eight figures, the last being 10, instead of 8. This might be like the scale of music, the eighth figure being an *octave*. The centesimal system, however, is much better than the one we have at present.

NUMERATION—I am not a revolutionist or reformer, in the general sense of the word, but I agree with the almost unanimously-expressed voice calling for a reform of our absurd system of computing and measuring. No doubt the reformation will be made; let us make it as perfect as possible. The English are weary of their "£ s. and d.," and show a strong desire to have a decimal coinage, which will much facilitate accounts. At the same time they and we should get rid of our absurd troy weight, avoirdupois weight, and apothecary's weight, and adopt instead a universal decimal system for all sorts of substances, liquid or solid. At present it is hard to say what should be weighed at 12 ounces to the pound, and what 16 ounces to the pound. We do not need one pint measure for ale, and another for another liquid; let us have all liquid measures decimal and uniform. Let us, too, discard a table which requires 5 1-2 times one measure to make the next—as 5 1-2 yards are one rod. There is no sufficient reason for all these oddities; let us get rid of them and take a simpler, easier, better plan. How much a poor lad has to learn in order to know a little.

The French have vastly improved upon the English methods, simply by decimating; we can improve upon the French by adopting a more suitable decimal. From time immemorial men have made 10 the key of a whole system; but why they began with 10 instead of 9, 11, or 12 for the first double number there is no reason, except that they had 10 fingers and 10 toes, and when they had counted all their hands contained they would continue with the resources their feet supplied. This was reason sufficient for them, but it is *not* sufficient reason for the requirements of the present day. This practice of separating by decimals, which are not themselves divisible, by divisible numbers in series, is a radical defect. Eleven, thus, would have been worse than 10 for the key, and 8 better. We divide 10 into 5 by 2, and then stop; whereas we would divide 8 into 4 2, 1. It would be far better to sweep away 9 and 10 from the system, and write 10 where we now write 8, thus, 1 2 3 4 5 6 7 10. The quantity 64 would then be written 100, and our hundred would have a square-root divisible in series, and would be divisible itself *ad infinitum* without a fraction, thus, 64 32 16 8 4 2 1. We could then discard the whole system of vulgar fractions, and compute entirely by decimals—the simplest and most perfect method. There is a very great amount of calculating to be done in the world, and a better decimating system would be the greatest labor-saving machine ever invented, besides avoiding greater liability to error. The smallest hundred (64,) is a more tangible, handy one than the present one. There are many reasons for this change, which will suggest themselves to the mind of every intelligent person, besides many more which would be appreciated only by men of science. Of course we would have to change the manner of writing figures, to avoid confusion, whilst the change of system is being established. This at first seems discouraging; but adopt a new name for 8, the first double number, and the whole change is made; thus suppose we say ter instead, and we would make terone, tertwo, terthree, &c., instead of teens, and then twoter, threeter, fourter, fourter-one, fourter-two, &c.

As the French have set the example of adopting the Latin to express diminution and the Greek to express increase, we would do well to adopt them similarly. We might call the first great round number 100 (now 64 in quantity,) from the Greek, heckton, and 1,000 kilion, and we would form a table, thus:

10 hectons	make	1 kilion.
1,050 kilions	"	1 disilion.
1,000 disilions	"	1 trisilion.
1,000 trisilions	"	1 tetrakilion.

(*Concluded next week.*)

Mercury or Quicksilver.

This metal differs from all others in remaining liquid at ordinary temperatures. It has a silvery-white color, with a strong metallic luster, and is not, if pure, tarnished by exposure in the cold to a moist atmosphere. If, however, it contains traces of other metals, the amalgam is rapidly oxydized, and the surface quickly covered by a gray colored powder. This metal is solid at 39° to 40° below zero, and is then both ductile and malleable. In polar latitudes the cold is sometimes so intense as to cause the congelation of mercury, and a similar result may be obtained by artificial freezing mixtures. Considerable contraction takes place at the moment of congelation, for while its density at 47° is 13·545, that of frozen mercury is 15·612. It is sometimes adulterated with lead and bismuth, but such impurities may be readily detected, both by the less perfect fluidity of the mixture, and also from its leaving a residuum, when sublimed in an iron spoon. The mercury of commerce, as it comes directly from the mine, is, in most instances, nearly pure, but when found to be adulterated, it should be distilled in an iron retort. For this purpose, one of the iron bottles in which it is imported may be conveniently employed. One of these, half filled with mercury, should have attached to it a piece of iron gas pipe, bent at right angles, and furnished at its open extremity with a tube formed of several layers of linen, or cotton cloth, the end being plunged in a basin containing cold water. This end of the pipe and the hose are constantly kept cold by a stream of water made to flow over them from a stop-cock; the iron bottle is heated in a furnace, when the vapor of mercury will be plentifully given off, condensed in the water, while the foreign impurities will be left in the retort. A certain portion of the impurities is, however, by this process, carried over, though small; and if a perfectly pure specimen is required, it must be treated by nitric acid. When merely soiled by a slight admixture of oxyd, it is readily removed by brisk agitation in a glass bottle, with sulphuric acid; at the expiration of three or four days the acid may be poured off, and the purified mercury washed and dried. Mercury combines readily with other metals, as gold, silver, zinc, tin, lead, arsenic, and bismuth, and forms, when in suitable proportions solutions of those metals. This amalgamating property causes it to be extensively employed in extracting gold and silver from their matrices; also in gilding, plating, and the manufacture of looking glasses.

The process of obtaining gold from other mineral mixtures is pretty well known, but the process of obtaining silver by amalgamation we believe, is known to but a limited number. In Mexico the process is conducted as follows: Mineral having been reduced to a fine powder, is spread on the ground in large circular patches from thirty to fifty feet in diameter, and one foot thick, called "tortas." At Zacatecas, each torta contains sixty tuns. In the center of the heap is thrown one hundred and fifty bushels of salt, mixed with earthy impurities, and is intimately mixed first by wooden shovels, and afterwards by the treading of horses or mules. When thus mixed, they are allowed to remain until the next morning, when, after an hour's treading, from 1-2 to 1 per cent. of copper pyrites, called "magistral," is added, containing about ten per cent. of sulphate of copper, which appears to be the active principle that effects the subsequent chemical changes. The torta is again well trodden by horses or mules; and, when perfectly incorporated, a quantity of mercury is added through a canvas bag, which delivers it in innumerable small jets over every portion of the surface. It is then alternately trodden and turned by wooden shovels, until the silver has taken up all the mercury. A second portion is added, and the same process repeated until no more mercury can be absorbed. The duration of the operation varies considerably in accordance with the nature and richness of the ores and the temperature of the atmosphere; in winter the re-actions proceeding less rapidly. The amalgam is then washed, the free fluid mercury separated by leather or canvas bags, and the amalgam sublimed in a furance producing the resulting metals in a solid state.

Recent Foreign Inventions.

CAST-IRON PENS—Thomas Lees, of Birmingham, Eng., has secured a patent for the use of malleable cast-iron pens. By malleable cast-iron, the inventor means such cast-iron as becomes malleable after having been heated, or annealed, in contact with the iron ore called hematite, or per-oxyd of iron. In carrying his invention into effect, the inventor casts into ingots any of those varieties of cast-iron which are capable of being annealed or rendered malleable by being heated in contact with hematite or peroxyd of iron; the ingots are annealed or rendered malleable, as commonly practiced in the manufacture of articles of malleable cast-iron. After the annealing the ingots are rolled in sheets of a thickness proper for the manufacture of pens therefrom. During the annealing of the ingots the cast-iron is made soft and malleable, and during the rolling of the same a partial hardening is effected on the iron, which renders it elastic, and fitted for the manufacture of pens therefrom. In converting the sheets of malleable cast-iron into pens, any of the machines may be employed which are, or may be now used in the manufacture of steel pens.

LITHOGRAPHIC PRINTING PRESS—J. C. G. Massiquot, of Paris, has obtained a patent for improvements in lithographic printing presses. These may be summed up as follows:—A sliding carriage, which travels over the stone or other engraving, and carries along the printing scraper, to take off the impression, and which is moved to and fro by a crank on a shaft; a loose tilting frame which carries a plate and sheet to lie down upon the paper that has been put upon the plate to be printed, from the printing scraper passing over the sheet with the necessary pressure, and the loose tilting-frame being raised or tilted up by the said carriage at the end of each backward and forward stroke, so as to allow putting a fresh sheet of paper on the stone or plate engraved upon.

FURNACES FOR REDUCING LEAD AND COPPER ORES—A Jenkins, of Zell, Prussia, has taken out a patent in England for the following improvements in the above-named furnaces:

The principal feature in the improved reverberatory furnace is, that one fire serves the double purpose of reducing and calcining the ore. The fire is contained in an ordinary fire-place situated at one end of the double furnace. The gases and flame from this fire pass through a lateral opening or flue into the reducing or flowing furnace, and, after passing over the surface of the ore contained therein, enter by another opening or openings into the calcining furnace, which is placed upon the same level, or nearly so, with the flowing furnace, the gases passing off by a suitable flue or flues to the chimney. In the passage or passages which conduct from the flowing furnace to the calcining furnace there are placed suitable doors or dampers, which are so arranged that by opening or closing certain of them, the the gases or flame may either be directed into the calcining furnace or cut off and turned into a waste flue leading to the chimney.

FIGURED FABRICS—James Templeton, of Glasgow, Scotland, has obtained a patent for improvements in manufacturing figured fabrics embracing the following claims:

1. The manufacture of a solid or undivided fabric, having a dead inner or center warp, and with a complete and distinct pattern or device on each surface. 2. The use of a dead inner or center warp, operated upon by a Jacquard or other pattern-working mechanism, for the purpose of producing a solid or undivided fabric with a complete and distinct pattern or device on both surfaces.

Wearing Flannel.

Put it on at once: winter or summer, nothing better can be worn next the skin than a loose, red, woolen, flannel shirt; "loose," for it has room to move on the skin, thus causing a titilation which draws the blood to the surface and keeps it there; and when that is the case no one can take a cold; "red," for white flannel fulls up, mats together, and becomes tight, stiff, heavy, and impervious. Cotton wool merely absorbs the moisture from the surface, while woolen flannel conveys it from the skin and deposits it in drops on the outside of the shirt, from which the ordinary cotton shirt absorbs it, and by its nearer exposure to the exterior air, it is soon dried without injury to the body. Having these properties, red woolen flannel is worn by sailors even in the mid summer of the hottest countries. Wear a thinner material in summer.— [Hall's Journal of Health.

[The above is good advice, but most persons, we suppose, would prefer to wear white in preference to red flannel, were it possible to prevent it fulling up. Red flannel discharges its color by perspiration; this is an evil which does not belong to white flannel. Red flannel soon loses its bright appearance, and becomes a dull dirty-looking crimson; this is also caused by the perspiration. White flannel, when washed, always looks clean. Old red flannel cannot be made to look clean by all the waters of Lake Huron: white flannel, therefore, has much to recommend it over red, and for under-shirts nothing else should be worn. It can also be prevented from fulling up, as well as red flannel. What property does the latter flannel possess over the former that prevents it from fulling up by frequent washing? It is made of the same materials, consequently the cause cannot be in any difference in the quality of the wool. Red flannel, however, undergoes boiling for about an hour in the act of coloring, and this alone, we conceive, is the cause, why it does not full up so readily, as the white. Let white flannel be boiled in clean soft water for an hour, then dried, before it is made up into shirts, and it will be found no more liable to *full* (thicken) than red flannel.

HOW TO WASH FLANNEL—Some washer-women possess quite a *knack* in washing flannels, so as to prevent it fulling. It is not the soapsuds, nor rinsing waters that thicken up flannel in washing, but the *rubbing* of it. Cloth is fulled by being "pounced and jounced" in the stocks of the fulling-mill with soapsuds. The action of rubbing flannel on a wash-board is just the same as that of the fulling mill. Flannel, therefore, should always be washed in very strong soapsuds, which will remove the dirt and grease, by squeezing, better than hard rubbing will in weak soapsuds. It should also be rinsed out of the soap in warm water, and never in cold, as the fibers of the wool do not shrink up as much in warm as in cold water, after coming out of warm soapsuds. Great care should be taken to rinse the soap completely out of the flannel. This advice will apply to the washing of blankets, the same as it does of flannel.

The Color of Copper.

Our copper is all of a red appearance, but is this the natural color of the metal? Like diamonds, may it not have a variety of colors, such as "red and white." In China there is plenty of white copper; this has generally been believed to be as pure a metal as the red. A correspondent of the London *Mining Journal*, however, throws some more light on this matter than has been possessed hitherto. He states, that when raised in the mine, in a particular district of China, the ore from which it is made is of a red color, but by a peculiar method of treating it in smelting, and the addition of 1 1-4 per cent. of tin, it becomes white. This metal is common in China; is of a beautiful fine grain, and harder than red copper; this, no doubt, is due to the admixture of tin.

A late number of the *Collegiate Mirror*, published at Holly Springs, Miss., announces that the honorary degree of "Mistress of Arts," has been conferred upon Mrs. Hale and Mrs. Sigourney.

TO CORRESPONDENTS.

I. C., of N. Y.—The proposition you suggest to us, to publish a volume embracing engravings and descriptions of all the machines that have appeared in the Sci. Am. since its commencement, could not be carried out without a vast expenditure of money. In proportion to the vast number of engravings that have been published, we have but a small portion of them on hand ; besides this objection, a work containing them all would be very large and expensive.

J. G., of Ind.—Iron is chilled by being cast in iron molds ; the chilling is caused by the surface being rapidly cooled—made into hard steel ; the outside of the mold must be kept cool with water. The person who sold you the receipt described for preventing scale in steam boilers, obtained it from our columns. The water of the Niagara river will yet no doubt be used very extensively near the Falls.

Robert Barber, of Bridgewater, N. J., wishes to obtain he address of Messrs. Sandford & Wakefield, who have patents on corn planters.

S. B. W., of Mass —We are not aware of the existence of any journal in this country devoted to the interests of gas lighting. Mr. Barlow, of London, publishes a journal on gas lighting, which, we believe, is very good,

J. M., of Cal.—The information you want about tallow candles is scattered through various publications and cann be furnished as you want it. You had much better detail to us as briefly as possible the result of your experiments and we will examine and give our opinion in regard to the novelty of your process.

R. D. B., of Nova Scotia—The sketch of your alleged improvements in rotary steam engines has been carefully considered : we do not discover much novelty in it, and should consider an application for a patent as unwise. It does not possess, in our opinion, any advantages over other plans which have been abandoned as impracticable.

J. H., of Pa.—A pistol ball should penetrate further into a plank at one-sixteenth of an inch distant than into one at twenty yards distant.

J. S., Jr., of Mass.—Blanchard's claim is a peculiar one, but it does not cover the copying of all forms of patterns, but it does if the pattern and article to be turned rotate. We are of opinion you cannot get a machine equal to the Blanchard lathe for turning axe handles,

We have foreign patents belonging to the following persons, which they will please to order, directing us, at the same time, how we shall forward them :—

Ephraim Brown ; J. W. Hoard ; William Elliott ; G.H. Talbot : Caleb Winegar ; L. W. Boynton ; J. C. Day ; A. E. Burnside, and Ferdinand Davidson.

G. P., of Montreal—We have no information about Mr. Wilmot's apparatus in addition to what is published in the last Vol. of the Sci. Am. We have not heard that he has as yet done anything with it. We cannot answer your inquiry about cutting wood.

J. L., of Pa.—The Minie rifle loads at the muzzle : there is no peculiarity in the breech. Your subscription expires with No. 19.

A Subscriber informs us that Grier's "Mechanics' Calculator" was published in 1848, by Sumner & Goodman, of Hartford, Ct. For sale by Blackie & Sons.

J. F. N., of N. C.—You will not be able to find a work on cotton manufacturing which embraces the latest and best improvements employed in the business.

H. K., and Son, of Ohio—We cannot give you any information in addition to what is contained in the articles to which you refer. We would be very glad to do so if it were possible.

U. B. V., of Pa.—Your ideas in regard to ruling bank bills so as to prevent their alteration are new so far as we know, and appear to be very good. We do not think there is any chance, however, for a patent upon the system.

S. S., of N. Y.—In the construction of journals you propose to dispense with the cotton waste, and employ in stead a roller placed underneath the journal, and in con tact with it, for carrying up the oil. This device is not new. The same thing essentially has been presented to us on former occasions.

C. C., of Pa,—We have not much doubt of the novelty of your trip hammer improvement. Send us on a model at once.

J. C., of Florida—A machine for turning wooden bowls was patented in 1850, by Addison Everett, of Middlefield, Mass., an engraving of which appeared in No. 52, Vol. 5, Sci. Am. We are unable to give you any information in respect to its operation or cost of the machine. We would advise you to address Mr. Everett on the subject.

J. S. McC., of Md.—We co not know of any situation that suits your wishes.

H. C., of N. Y., & T. J. L., of Pa.—If you will refer to the history of Propellers and Steam Navigation published in the Sci. Am. You will find illustrations of endless chain propellers. This invention is very ancient, and possesses no advantages in comparison with the plan in common use.

P. D., of N. Y.—It would not be new to construct a mowing machine having two sets of knives cutting in opposite directions. We have seen machines having knives operating in this manner.

F. F. G., of Texas—Short stroke engines are used in saw mills, &c., because they are compact, and give a quick direct rotary motion to the main shaft. The flues of a boiler should never be carried above the water line. The boiler, however, may be enclosed with brick as safely as with felt. The most cautious engineers are sometimes guilty of neglect, and this may have been the case with the one to which you allude, who had charge of the exploded boiler.

H. S., of Va.—Ure's Dictionary of Arts will give you the necessary information about making chlorine gas. You can obtain a patent on the new article of manufacture, but not the process for making it, which is not new.

D. T. O., of N. Y.—The long pitman is subject to greater vibration than a short one, and is more liable to heat on that account. We cannot give you a rule for calculating the exact length of pitman in your case.

Y. N., of N. Y.—Every bullet in passing through a rifle barrel is feathered by the grooves, the barrel performing the office of a swedge. It might prevent the leading up of the grooves to swedge the bullets of breech-loading rifles. If cartridges are well made and greased, the barrel will be kept pretty well lubricated.

R. R. W., of Pa.—If the wheel had a throat and passage to allow all the water to flow through it freely, it would not move, the water would simply flow through it. Your wheel will be of the same power, whether large or small—the fall and quantity of water being the same. Your turbine having a six foot head, and openings having an area of 500 inches, will be about ten-horse power!

S. E. H., of Ohio—We have never published a description of the brake you refer to. By addressing the inventor in this city you can no doubt procure a descriptive circular.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Dec. 29, 1855:—

W. P., of Ct., $25 ; E. S., of N. Y., $55 ; L. R., of N. Y , $45 ; W. & G. B., of Pa., $25 ; M. S., of Wis., $30 ; H. & C., of O., $61 ; R. W., of Ct., $25 ; J. S., of N. Y., $55 ; G. W. B., of N. Y., $30 ; H. C. S., of N. Y., $75 ; A. W., of Ill., $27 ; L. V. B., of Ky., $55 ; C. H. D., of Vt., $30 ; E. A., of Ct., $30 ; O. B. W., of N. Y., $30 ; J. G., Senr., of Mass., $30 ; L. H., of O., $30 ; G. & J., of N. J., $25 : S. G., of Pa., $30 ; D. C. T., of N. Y., $45 ; T. B. W., of Pa., $30 ; G. C. H., of Mass., $25 ; J. B., of Pa., $45 ; J. S. G., of N. Y., $50 : W. A. B., of Mich., $35 ; W. H. B., of Pa. $30 ; J. P. S., of Tex., $50 ; M. F., of N. Y., $32 ; A. F W., of N. Y., $25 ; A. F.. & C. M. H. W., of N. Y., $55 ; J. W., of Mich., $27.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Dec. 29 :—

C. H. W., of R. I. ; R. W., of Ct. ; W. P., of Ct. ; E, H., of N. Y. ; W. & G. B., of Pa. ; J. S., of N. Y. ; M. F., of L. I. ; E. S., of N. Y. ; J. P. S., of Tex. ; J. McC., of Mich. ; G. C. H., of Mass. ; A. W., of Ill. ; A. F. W., of L. I. ; L. R., of N. Y, ; G. & T., of N. J.

Important Items.

Back Numbers and Volumes—The following numbers and volumes of the Scientific American, are for sale at this office, at the annexed prices :—Volume VI Vol. VII, Vol. IX, and Vol. X, complete. Price, *bound*, per Volume, $2,75. Numbers in sheets, complete, $2. Of Volumes IX. and X., we have also about 40 numbers each, not consecutive, which will be sent by mail on receipt of $1.

Receipts—When money is paid at the office for subscription, a receipt for it will always be given ; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds.

Binding—We would suggest to those who desire to have their volumes bound, that they had better send their numbers to this office, and have them executed in a uniform style with their previous volumes. Price of binding 75 cents.

Literary Notices.

The North British Review—This is one of that galaxy of foreign literature—the four Quarterlies—published by Leonard Scott & Co., No. 54 Gold street, this city. Its origin is due to the celebrated Dr. Chalmers, and is essentially the offspring of the Free Presbyterian Scottish Church, but is not a religious Review, exclusively, like the "Princeton." It is comparatively a young Quarterly, beside the old Edinburgh, but it ranks perhaps the highest for decided ability. The number for this quarter, just issued, contains ten excellent articles. The first is on education for the manufacturing population of Britain, and advocates the claims of a college in England something like that proposed in the State of New York, called the "Peoples' College." It is an article which we commend to the attention of our manufacturers, machinists, engineers, &c. This Review has some very eminent contributors, such as Sir David Brewster, Sir Wm. Hamilton, Drs. Cummings, Chandlish, Hannah, and others of fame.

Postal Reform—Its Urgent Necessity and Practicability : by Pliny Miles.—This is one of the most clear and emphatic exhibitions of the benefits of a cheap postal system that we have ever read. Mr. Miles tells us, among other facts, that, in 1839. before there was any reduction of postage either here or in England, the people of Great Britain wrote and sent through the post office 82,000,000 letters, and the people of the United States 40,000,000 ; and in 1852 the correspondence of Great Britain, fostered by their cheap and uniform postage, and the system of free letter delivery, had increased to 410,000,000 letters, while the number in the United States was only 102,000,000. During the period of 14 years, the population of this country increased 45 per cent.. while that of Great Britain increased less than 5 per cent. ; yet the increase of correspondence by mail in that country was, in round numbers, 400 per cent., while with us it was but 153 per cent. Stringer & Townsend, 222 Broadway. N. Y., publishers.

Great Work on the Arctic Regions—Dr. Kane has been busily engaged since his return, in preparing a full account of his wonderful voyage to ihe Arctic Regions. Messrs. Childs & Peterson—the enterprising publishers,—Philadelphia, have the work in hand, and are sparing no expense to make it one of the most magnificent ever issued from the American press. It will be illustrated with twenty-five steel engravings, and a great number of beautiful woodcuts, representing scenes drawn by Dr. Kane on his expeditions. It will soon be issued at the low price of two dollars and a half per volume.

Puntam's Monthly—The January number of this sterling original magazine opens with an article on Will. Shakspeare and his Plays, in which the great dramatic poet is treated in a very pompous Johnsonian manner—without the Doctor's logic. A review of Prescott's "Phillip the Second," is an able article. The editorial notes are excellent, and contain a fund of useful interesting matter relating to an innumerable number of subjects. As a whole, this number is a good one to commence the new year, and gives evidence of great ability on the part of its contributors.

Terms of Advertising.

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Advertisements exceeding 16 lines cannot be admitted, neither can engravings be inserted in the advertising columns at any price,

☞ All advertisements must be paid for before inserting.

Science and Art.

Oil of Nosegay.

Take one pound of the finest olive oil, and put it into a jar large enough to contain twice the quantity. Now, into this oil throw all the flowers that come to hand having a perfume, such as wall-flower, lilac, violets, May-blossom (hawthorn,) being careful to use the bud or odoriferous part only. After the flowers have been in the oil from twelve to twenty-four hours, they must be strained away and a fresh supply added. This operation, repeated five or six times, will be found sufficient to have impregnated the olive oil with the odor of the flowers used. When the oil is strained for the last time, it should be placed in a quiet situation for a fortnight, in order to clear itself, and, if not then bright, it must be filtered through cotton wool. If about ten drops each of essential oil of almonds and cloves be added to the above, the flowery smell will be much improved. Oil thus perfumed is sold in Paris and London under the name of *Huile de Mille-fleurs* (oil of thousand flowers,) and when good realizes from 16s. to 20s. per pound. As a dressing for the hair it surpasses all other preparations.

Essence of Nosegay—Take rectified spirit, one part; oil of nosegay, two parts; put them both into a bottle, and shake well together repeatedly for two or three days; then allow the mixture to stand quietly for twelve hours, and afterwards pour off the upper stratum. This portion will be the spirit highly charged with the odoriferous principle of the flowers used to prepare the nosegay oil.—[Piesse's Art of Perfumery.

Effect of Light upon Plants.

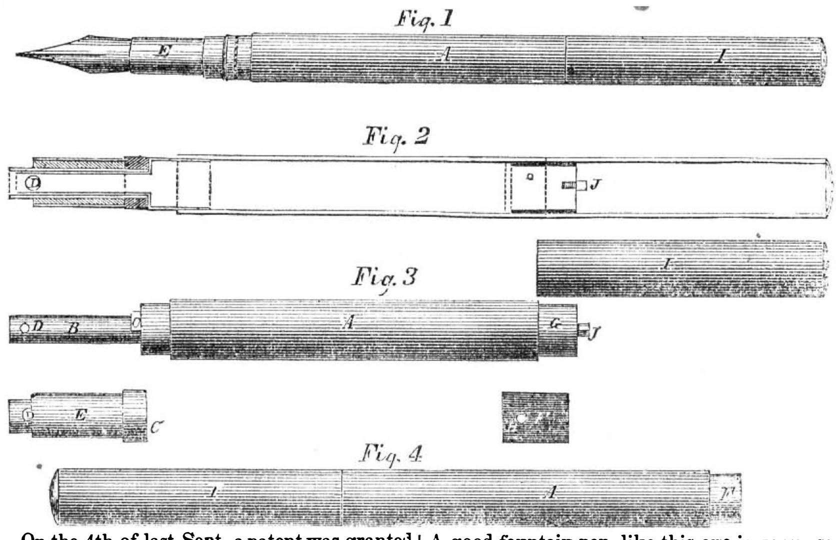
A plant will only grow under the influence of light. The plant is placed in the soil in darkness, when a chemical change takes place. If a plant is deprived of light it no longer forms wood. The quantity of light regulates the growth of the plant. Each year's growth of a tree is indicated by a series of fibrous rings, from which we can determine for every year the quantity of sunshine to which the tree has been exposed; also, which has been the sunny side. For the production of every cubic inch of wood a certain degree of chemical influence of the sunlight and calorific power, is essential. Timber is produced by the tree absorbing through the bark and leaves the carbonic acid (carbon and oxygen) from the atmosphere. Under the influence of light, the plant by its own vital forces decomposes the carbonic acid. In virtue of the vital force excited by solar influence the carbonic acid is decomposed, and the oxygen is set free for the use of the animal kingdom generally, and carbon goes to constitute the woody structure of the plant. If we ignite wood it gives outlight and heat, from which we can produce a certain amount of chemical effect, the same elements as from sunshine. The quantity of light and chemical forces arising from combustion, represent exactly that quantity which is necessary to occasion the plant to grow. The coal fields are formed by the chemical decomposition of fern-like flora of a peculiar kind. Vegetable life rapidly decomposed under the conditions of a tropical swamp—our coal is the produce of tropical forests. We employ coal in our domestic operations; we subject it to distillation, obtain from it a fluid which circulates through our streets and our dwellings. We ignite it, and obtain that light which was once derived from sunlight and solar heat, which in countless rays had fallen upon these lands ere yet man had set his foot upon them, in ages long past and gone.

Hydrogen, Charcoal, and Platinum.

If we take a piece of charcoal from the fire, and carry it into a vessel containing sulphuretted hydrogen gas, or vapor of ammonia, we shall find that charcoal has the power of absorbing about 00 times its own volume of these gases. Dr. Stenhouse finds that this peculiar property depends upon its establishing a low combustion, which is referable to a process somewhat analogous to that of combustion in a burning body. It occurred to him, on seeing that spongy platinum possesses the power of condensing oxygen and hydrogen (as in the Dobereiner night lamp,) that a piece of spongy platinum should be subjected to a jet of hydrogen gas. This became condensed so violently by the peculiar power brought into union with the oxygen of the air by the heat liberated during the condensation, that the platinum became incandescent, and then ignited the jet of hydrogen. By taking pieces of charcoal, connecting them with a voltaic battery, and plunging them into a solution of chloride of platinum, taking care that every part of the porous charcoal should be covered, then this platinumized charcoal acts so powerfully upon the sulphuretted hydrogen gas, that a chemical change is rapidly effected, and the charcoal takes fire from the heat produced.

A Genoa paper announces a discovery at Rancla, in Egypt, of a great number of coins of the period of the Ptolemies, together with other Egyptian antiquities, said to be of great interest. A guard has been placed over the ground to prevent the dispersion of these treasures.

PATENT FOUNTAIN PEN



On the 4th of last Sept. a patent was granted to George W. White, of Mount Vernon, Westchester Co., N. Y., for the improved metallic Pen illustrated by the annexed engravings.

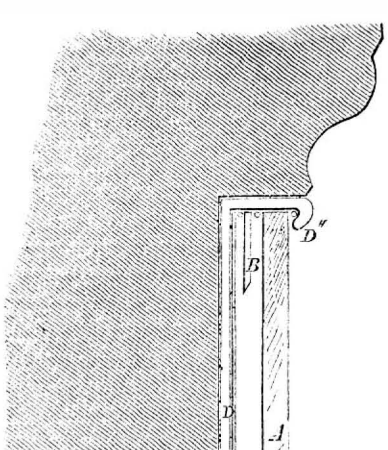
Fig. 1 is a perspective view of the pen and holder. Fig. 2 is a view of the holder without the pen. Fig. 3 represents the different parts of the holder separated, and fig. 4 is a perspective view of the holder with the cover over the pen. A represents the barrel of the holder which contains the ink. B is a small round tube about one-third the size of the barrel to which it is joined. At the point of junction on tube B there is a small projection, C, which answers for a stop. Near the end of the small tube, B, there is an orifice or small hole, D, in its side. E is a tube which, fitting over the small one, B, which is closed at its lower end, but has a small hole, D, in its side—near its end—corresponds to the one in the small tube, B. The open end of this tube, E, is a stop, C, corresponding with the stop, C, on tube B. These stops are for the purpose of stopping the tube, E, while revolving around on tube B at the proper place, so that the holes, D D, may be together, and allow the ink to pass out into the pen, and also when turned back to stop the tube, E, at the place where the holes, D D, will be away from each other, and thus close the holder so that no ink can escape. A piece of tube is soldered over these stops on tube E, to give it a finished appearance. The holder for the pen is attached on the tube, E, in a manner that the pen can be slipped in on the side of the tube in which the hole, D, is made, so that the ink may be made to flow out into the hollow of the pen, and run down to the nibs. I is a tube made to cover the pen with when carrying the holder in the pocket, and also to put on the reverse end to extend the holder when writing, as shown in fig. 1. J, fig. 3, is a neat small screw plug to fit in the hole of the ink holder. F is a small section tube, which can be used in place of the one G.

The mode of filling the holder is as follows: Pull off the tube, I, and then unscrew the small plug, J. Then screw the tube, E, to the right and insert its end in the ink bottle, and apply the mouth to the part G, fig. 3, and extract the air from the holder. The ink will then flow up until the holder is full. (A few efforts at filling the holder with ink will enable any person to fill it correctly.) The small screw, J, is then applied to close the hole in the end, G.—The holder is now an ink fountain for supplying ink to the pen while writing, when the two small holes, D D, are together. When the pen is not used for writing, the tube, E, is turned, to bring the holes, D D, out of line; the tube, E, then acts as a stopper to enclose the ink in the holder, and thus allow the pen to be carried in the pocket to afford a good supply of ink at any time and at any place required. A good fountain pen like this one is very useful, both as regards its portable ink bottle quality, and also the saving of time to the penman, in dispensing with continually dip, dip, dipping into the ink while writing.

More information may be obtained of the patentee respecting the manufacture, &c., of this fountain pen by letter addressed to him at No. 105 Nassau st., N. Y.

Securing Daguerreotypes in Monuments.

The accompanying sketch represents the plan adopted by me for securing daguerreotypes in monumental stones, and which has been tested for two years in a very exposed situation, the picture still remaining as perfect as when set.



In a carefully prepared cavity of proper size and depth is inserted a box of sheet lead, D D' D'', having its corners nicely soldered. This box should project above the face of the glass, A, as shown at D', upon all sides of the cavity. The plate, C, containing the daguerreotype, the matting, B B, and the glass, A, are carefully laid in their proper positions, and having between, and close around the margin of each, a small silken cord saturated with white wax. Another cord is laid upon the face of the glass, A, over which the lead is turned down, as shown at D'', when, with a "set" of ivory or hard wood, and a light hammer, the lead may be firmly clenched or riveted down upon the glass and cord, and compressing the other two cords, renders the setting perfectly impervious.

G. H. Hubbard.

Shelburne Falls, Mass.

[It is our opinion that beautiful monuments of cast-iron will yet come into extensive use, as they can be produced elaborately ornamented, at a mere tithe of the cost of marble monuments. The above plan to secure the pictures of departed friends in monuments of marble and cast-iron is well worthy of general adoption, although we should recommend photographs or ambrotypes instead of daguerreotypes, as the different temperatures to which they are exposed would be less likely to affect the picture.—[Ed.

The Conducting Powers of Metals.

Electricians agree in considering that silver, copper, and gold, are the best, platinum, palladium, and iron, the worst conductors. The resistance in the latter offer such great resistance to the passage of the current, that on completing the circuit they became intensely red or white hot, while silver or copperremain cold. Sir H. Davy, after numerous experiments on the conducting powers of metals, taking copper at 100, makes that of silver 109·1, gold 72·7, lead 69·1, platinum 18·2, palladium 16·4, iron 14·6. The better the conductor the less the resistance, and consequently greater the power. A chain formed of long links of silver and platinum, placed alternately, when connected with the battery, the platinum glows with a white heat, the silver links remaining cold.