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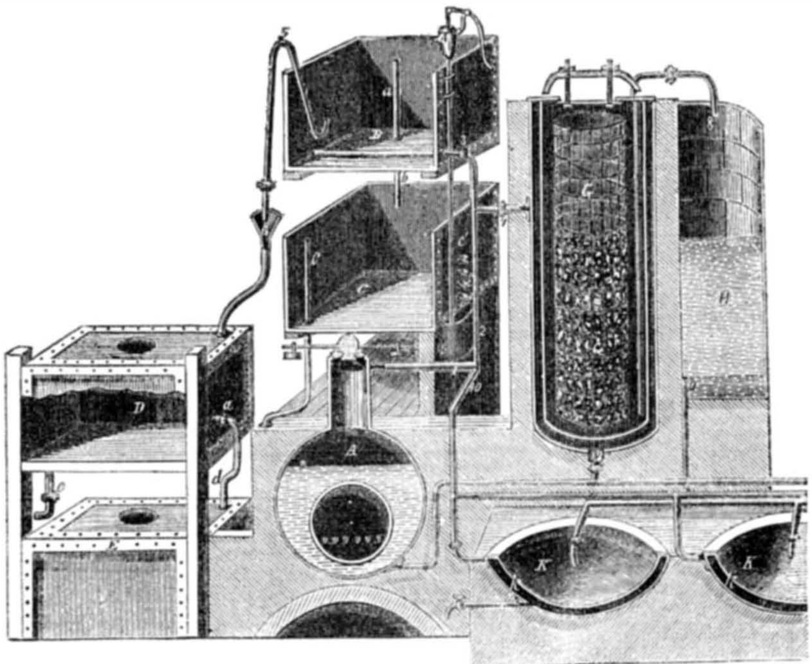
QUARTZ AND ARTIFICIAL LIQUID STONE.



Artificial Stone.

In 1844, F. Ransome, of Ipswich, Eng., devoted his attention to the construction of artificial stones for grinding grain, by cementing the chips of burrstones with plaster of Paris. In this effort he was unsuccessful, but he continued his experiments to find a superior substitute for the plaster, and after years of toil at last hit upon the idea of dissolving silica, or flint, in an alkaline solution in a steam digester. The following figure illustrates the apparatus which he employs for this purpose.

A is a steam boiler, capable of generating a sufficiency of steam for heating the dissolving and evaporative vessels, and usually worked at a pressure of about 70 lbs. to the square inch. B is the upper lye tank, for dissolving the carbonate of soda. It is supplied with steam by the pipes, 1 2 3, communicating with the boiler.

The first operation is to reduce the ordinary soda ash of commerce to the condition of caustic soda. For this purpose the ash is first dissolved in the tank, B, the water in which is heated by means of the perforated steam pipe, *b*. A quantity of quick lime is then added, and the mixture well stirred. The soda is by this means deprived of the carbonic acid which it contains, by the quick lime forming with it a carbonate of lime. To ascertain when the lye is quite caustic, a small portion is taken out in a test tube, and a few drops of hydrochloric acid added. If there is no effervescence, it may be assumed that the soda is entirely deprived of its carbonic acid, and is, consequently, caustic.

When the lime, now converted into chalk, has subsided to the bottom of the tank, the clear supernatant lye is drawn off by the syphon, 5, into the funnel, 6, leading into a closed vessel, D, to prevent the carbonic acid of the atmosphere combining with it, and destroying its causticity. When the lye has been drawn off from B, the sediment remaining at the bottom of the tank is allowed to fall into the lower tank, C, by withdrawing a plug, *a*, from the pipe, *b*. Any undissolved crystals of the carbonate of soda which have been entangled among the particles of the lime are now washed out and pumped back to the upper tank, B, where it forms a portion of the next charge.

The clear caustic being contained in the closed tank, D, has a further process of depuration to undergo before it is ready to be used as a solvent for the flints. The ordinary soda ash of commerce is always more or less adulterated with a sulphate of soda, which, although an inert substance in itself, if allowed to remain in the cement, subsequently makes its appearance in an ugly efflorescence on the surface of the finished stone. To get rid of the sulphate, the caustic solution of soda has added to it in the tank, D, a quantity of caustic baryta, obtained by burning the commercial carbonate of baryta with wood charcoal. The caustic baryta seizes upon the sulphuric acid contained in the sulphate of soda, and forms with it an insoluble sulphate of baryta, which is precipitated on the bottom of the tank. The depurated lye is then drawn off by the pipe, *d*, into the lower closed tank, E, and the sulphate of baryta sediment passes off by the cock at the bottom. From E, the prepared solution of caustic soda is pumped into the vertical boiler or digester, G. This digester, in which the process of dissolving the flints is effected, is a cylindrical vessel, having a steam jacket, into which steam from the boiler, A, is supplied by the pipes, 1 2 7. The inner cylinder, is provided with a wire basket, reaching the whole length of the vessel, and serving to hold a collection of nodules of common flint. When it has been filled with the caustic lye, and the basket with flints, the man-hole at the top is closed and well screwed down, so as to be able to resist a pressure of at least 60 lbs. on the square inch. The cock at 7 is then opened, and the full pressure of steam from the boiler passes into the jacket, and causes the lye in G to rise to the same temperature. The condensed steam in the jacket returns to the boiler by the pipe, 12, which it enters below the water line. The pressure maintained in the digester is generally about 60 lbs., and this is continued about thirty-six hours, at the end of which time the solution is tested. The workmen employed to superintend this part of the process generally use the tongue as the most delicate test. If the solution has a decidedly caustic alkaline taste, they conclude that there is still too much free soda in the cement, and the boiling is allowed to continue until the cement has a slightly sweetish taste, which occurs when the alkali has been nearly neutralized by combination with the silicic acid of the flints.

A more scientific mode of testing the strength of the solution is to take a wine glassful, and drop a little hydrochloric acid into it. By this means, the whole of the silica in the solution is thrown down by the acid combining with the soda, so as to form chloride of sodium. The precipitated silica presents an appearance resembling half dissolved snow, and its comparative volume gives a good idea of the strength of the solution of the alkaline silicate.

When it is judged that the alkali has taken up as much of the silica as it is capable of doing, at the temperature to which it is subjected in the digester, the stop cock, 7, in the steam pipe communicating with the jacket, is shut, and a cock in the pipe, 8, is opened.—The pressure of the steam in F then force the fluid silicate through the pipe, 8, into the vessel, H, where it is allowed to stand for a short time, to deposit any sediment which it may contain. From H it is then conveyed by the pipe, 9, to the evaporating pan, K, which has a steam jacket, *k*, supplied with steam by the pipe, 10. The cement is then boiled in the evaporating pan until it becomes of the consistency of thick molasses, when it is taken out. The specific gravity of the cement when ready for use is about 1·6.

The general proportions of the materials used in making up the artificial stone is about the following:—10 pints of sand, 1 pint of powdered flint, 1 pint of clay, and 1 pint of the alkaline solution of flint.

These ingredients are first well mixed in a pug-mill, and kneaded until the various ingredients are thoroughly incorporated, and the whole mass becomes of a perfectly uniform consistency. When worked up with clean raw materials, the compound possesses a putty-like consistence, which can be molded into any required form, and is capable of receiving very sharp and delicate impressions.

The peculiarity which distinguishes this from other artificial stones, consists in the employment of silica both as the base and the combining material. Most of the varieties of artificial stone hitherto produced are compounds, of which lime, or its carbonate or sulphate, forms the base; and in some instances they consist, in part, of organic matters as the cement, and having inorganic matters as the base.

To produce different kinds of artificial stone, adapted to the various purposes for which natural stones are usually applied, both the proportions and the character of the ingredients are varied as circumstances require. By using the coarser description of grits, grinding stones of all kinds can be formed, and that with an uniformity of texture never met with in the best natural stones. Any degree of hardness or porosity may also be given, by varying the quantity of silicate employed, and subjecting it to a greater or less degree of heat.

For some description of goods a portion of clay is mixed with the sand and other ingredients, for the double purpose of enabling the material to stand during the process of firing in the kiln, and to prevent its getting too much glazed on the surface.

As this subject is exciting no small degree of attention at present, and as various enquiries have been made of us respecting the apparatus employed for rendering quartz and glass soluble, we present the foregoing as embracing the most recently improved process, and which the London *Engineer* states is in practical operation.

Alum in China.

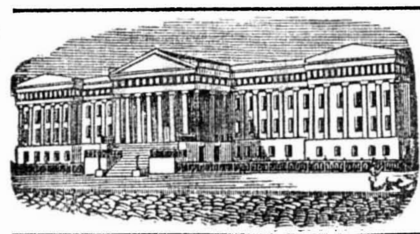
This mineral is largely employed by the Chinese in dyeing, and to some extent in papermaking, as with us. Surgeons apply it variously, after depriving it of its water of crystallization, and in domestic life it is used for precipitating vegetable substances suspended in potable water. It is used also by the Chinese in a manner peculiar to themselves. Fishermen are usually provided with it, and when they take one of those huge Rhizostoma which abound on the coast, they rub the animal with the pulverized styptic, to give a degree of coherence to the gelatious mass. Architects employ it as a cement in those airy bridges which span the water courses. It is poured in a molten state into the interstices of the stones; and in structures not exposed to constant moisture, the cohesion is good; but in damp situations it becomes a hydrate, and crumbles. Alum was first introduced into China from the west; and until a comparatively recent period the best kind, called sometimes Persian, was brought from Western Asia.

New Sugar Cane Cuttings.

The bark *Release*, dispatched to South America under the directions of the Patent Office, to procure sugar cane cuttings for the relief of the planters of Louisiana, is expected to return next month. The sugar crop of Louisiana, for several years past, has fallen off from 460,000 hogsheads of product to not more than 120,000. One cause which gives rise to very great apprehension on the part of the planters of Louisiana is the supposed deterioration of the cane. The cane cannot be planted from seed, but the cane itself must be planted, and the plant germinates from the eyes of the cane.

A Cheap Mouse Trap.

This figure represents a simple mouse trap which a correspondent, Charles Currie, Jr., of Providence, R.I., who has sent it to us, thinks is better and as cheap as the one described by another correspondent in the SCIENTIFIC AMERICAN of Dec. 20. A represents a piece of whalebone, a split cane or any such material that will bend so that both ends will meet. The ends are tied together with a piece of cheese at C. Place the edge of a tumbler B on the large end, and the trap is completed. The unfortunate mouse, following his nose, has crawled under the tumbler, and is nibbling at the bait which will soon be the means of confining him in close quarters. When the equilibrium of the whalebone A is disturbed, down it drops, and the mouse is trapped. This trap is placed on a small board, so that when the mouse is caught it can be lifted and carried off to any part of the house, to give him a bath in the slop pail, for instance.



[Reported officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office FOR THE WEEK ENDING JANUARY 13, 1857.

FIRE-ARMS—Ethan Allen, of Worcester, Mass.: I claim placing the valve, H, in the chamber at the base of the nipple, when constructed and operated substantially as described.

I claim supporting and retaining the chamber, A, by the parts, B D and C, when constructed and operating substantially as set forth.

Third, I claim operating the rammer by means of the lever, N, said lever forming a guard for the trigger, as described

COTTON SEED PLANTERS—Wm. Badger, of Memphis, Tenn.: I claim in combination with one or more sets of feeding arms, centrally located in the hopper, the false sides in the hopper, for drawing or forcing the cotton seeds up to said feeding arms, substantially as set forth.

FIELD FENCE—Seneca H. Bennett, of Belleville, Pa.: I claim the combination posts, secured firmly in their places by the top rails of the fence being let into the mortises in the top of the posts, substantially as set forth.

LOOMS—Erastus B. Bigelow, of Boston, Mass.: I claim, first, the employment, in power looms for weaving two fabrics at one operation, such as described, of transverse intersecting pile wires, when said transverse intersecting pile wires are woven in between the two fabrics, substantially in the manner and for the purpose specified.

I also claim the application or employment in power looms for weaving two fabrics at one operation, of a double positive shuttle motion, in combination with transverse intersecting pile wires, for keeping the two fabrics apart, substantially as described.

I also claim the mode of arranging the parts which connect the shuttle or shuttles with the loom shipper, whereby the loom is thrown out of gear when the filling fails in either shuttle, substantially as specified.

I also claim elevating and depressing the reed, substantially in the manner and for the purpose set forth.

I also claim the mode of arranging the cams, whereby the combined action of the lathe, shuttles intersecting pile wires, and ground warps is effected, that is to say, placing the cams, f4 f4, for operating the lathe on the shaft, m, and the cams, r r, for operating the shuttles on their respective counter shafts, u and s, all said cams moving at the same relative velocity, whilst the crank, q3, and cam, v3, for operating the pile wires, and the cams or tappets, p4 p4, for operating the ground warps are placed on the said counter shaft, u, but move at different relative velocities, the said crank, q3, and the said cam, v3, being affixed to the said counter shaft, u, whilst the said shuttle cam, r, and the said ground warp cams or tappets, p4 p4, turn loosely thereon, the whole being geared together, and operating substantially as described.

And finally, I claim the mode of arranging the double let-off motion, in connection with one positive take-up motion, whereby the delivery of the ground warp of each fabric is regulated by its respective tension, and held at the beat of the lathe substantially as specified.

HOES—Samuel Boyd, of New York City: I disclaim the making of hoes with sheet steel blades, as such articles have long been known.

I also disclaim the use of rolled steel for hoe blades, as the same has been before used.

I claim as a new article of manufacture a hoe having a sheet steel blade and a malleable cast-iron eye welded together.

[The eye of this hoe is of malleable cast-iron welded in the most perfect manner to the steel blade, forming the handsomest hoe we ever saw, equally as strong and durable as if made with a forged steel or wrought-iron eye. The improvement is a valuable one.]

DIES—Robert Brayton, of Buffalo, N. Y.: I claim the use of chilled cast-iron die or dies, constructed and operating substantially as set forth, for the purposes specified.

PUMPS—James S. Burnham, of Yorkville, N. Y.: I disclaim the pumping of liquids or other substances by means of a flexible diaphragm, as pumps of this description are old. I disclaim the placing of pump valves under water, or arranging them in any particular manner. I disclaim everything heretofore known in connection with diaphragm pumps. I also disclaim the use of an air vessel in diaphragm pumps.

I confine myself exclusively to the combination of the air chamber directly with the diaphragm, so that the air chamber rides upon the diaphragm, as shown.

In the patent of McPherson & Joyce, 1856, a corrugated diaphragm is used, vibrated by a plunger. I claim no such device, neither is my invention, viz. an air chamber riding upon the diaphragm, anywhere shown in that patent.

In the application for a patent of Hyzer & Parks, 1856, rejected, an ordinary pump is employed, the valves being placed under water. As before stated, I disclaim all such devices.

I am aware that in Chapman Warner's patent, July 7, 1856, the air chamber is attached to and moves with the piston, and I therefore disclaim a movable air chamber.

I claim combining the air chamber, G, directly with the diaphragm, B', so that the air chamber rides upon the diaphragm, in the manner and for the purposes set forth.

[By combining the air chamber with the elastic diaphragm in this pump, as specified in this claim, a number of parts required in other diaphragm pumps are dispensed with, the machine is simplified, and a more compact, cheap, and an equally efficient pump obtained.

Messrs. Burnham was awarded a silver medal at the last Fair of the American Institute for the best force pump, which is eminently adapted for railroads on account of its strength and simplicity.]

HOLDING BLACKING BOXES—Wm. and Jasper Cairns, of Jersey City, N. J.: It is very common in lathes and other machines, to hold articles, both round, and of other shapes, by means of adjustable clamps, and therefore we expressly disclaim the use of adjustable clamps for the holding of objects.

But we claim in blacking box holders the combination with a slotted handle of the stops, a', and the adjustable jaw, C, in the manner and for the purposes specified.

[This blacking box holder is a very cleanly instrument to use in blacking boots and shoes. It holds the blacking box in a clamp, while it is held by the handle when the brush is used to take up the blacking from the box. It is a useful article of a domestic character.]

KNITTING MACHINES—Enoch Colvin, of Poultney, Vt.: Machines are already in use in which a single circle of needles are employed for knitting plain work with machinery similar, in some respects, to that described; and I make no claim to any part of such machinery.

But I claim, first, the use of two circles of needles, as described, for knitting a ribbed fabric.

Second, the method of moving the feeders, as described, by means of grooved eccentrics, with curves in the grooves.

RIFLING ORDNANCE—Horace E. Dimick, of St. Louis, Mo.: I make no claim to what is termed a freed bore separately considered or to the obtuse angular grooves.

I claim a system of straight grooves, extending from the base of the bore, to about the position of the trunnions, and twisting from thence to the muzzle, in combination with a freed bore, substantially as described, as an improved mode of applying the rifle principle to ordnance.

FIXED RAILS—Joseph T. Davenport, of Augusta, Ga.: I claim the arrangement and form of the rails and guards to produce the described connection between the sidelings and the main track on railroads, and for the purpose described.

BURNING-FLUID LAMPS—M. B. Dyott, of Philadelphia Pa.: I do not claim the thermo-insulation of the burner, as this has heretofore been done.

But I claim removing the metallic connection between the main and the auxiliary burner of a fluid lamp, so far from the flame or heat, and interposing a non or bad conducting material between the burner and lighter, as that the heat of the main burner shall not be transmitted to the auxiliary, whilst the efficiency of the latter is in no wise impaired, substantially as and for the purpose described.

STAIRCASES—Augustus Eliaers, of Boston, Mass.: I claim the described improvement in the construction of staircases, the same consisting in forming separate and independent string pieces, between which the treads are held and griped, the whole being secured by a screw bolt that forms a part of, or is attached to the baluster, as set forth.

PLATFORM SCALES—Thaddeus Fairbanks, of St. Johnsbury, Vt.: I do not claim a combination of levers wherein four platform bearing levers are multiplying levers, and radiate from one common center, and are there suspended to the multiplying lever connected with an equalizing lever, as I am aware that such is a common method of making a platform scale.

Nor do I claim the combination of a multiplying lever, an equalizing lever, and an equalizing and multiplying lever, as I am aware that such have been employed, and the platform thereof upheld, by being made to rest directly on the first and last of said levers. This differs essentially from my combination and arrangement, as by such I am enabled to employ an additional series of levers, viz., the transverse levers, C C C, whereby I gain an extra or manifold increase of leverage, and thus render the weighing apparatus useful for determining the weights of railway carriages.

Nor do I claim the employment of a series of transverse and multiplying levers, with a lever composed of a long longitudinal shaft, and an arm arranged transversely and projecting from such shaft, the transverse bearing levers of the platform being applied to the long shaft, with reference to its axis, as described.

But I claim my improved arrangement and combination of four bearing multiplying levers, C C C C, a multiplying lever, E, and a lever, F, made as described, so as to act at the same time as an equalizing and multiplying lever, the whole being applied to a steelyard weighing lever, by means substantially as set forth.

I also claim arranging the suspension bridge so that its arched standards shall extend upward by the sides of the platform, and between it and the sides of the pit, in manner as stated, in combination with arranging the transverse levers, C C, and their bearings below the platform, the same affording the necessary room for the vertical play of the longitudinal levers, while it secures an advantage, as regards the depth of the pit, as stated.

SEWING MACHINES—Milton Finkle, of New York City: I claim the construction and use of the loop former, for the purpose of parting the thread from the needle, so that the shuttle will be certain to enter, in the manner described.

HAY FORKS—Wm. Jones, of Speedsville, N. Y.: I claim the slotted socket, B, for the reception of the tangs of the tines, when used in connection with the wedges, E, screw, D, and ferrule, F, or their equivalents, in the manner substantially as and for the purposes described.

FLOUR BOLT—Sanford E. Fitch and Theodore Sharp, of Greenbush, N. Y.: Disclaiming any arrangement of the oblique ribs, for the purpose of returning the material being ground, or part of the same, to the mill, for regrinding other than that specially set forth.

We claim the employment of the shelf, M, and bolter, N, constructed and arranged in reference to each other, so as to take the meal from the mill, and bolt it in successive and graduated portions, so as to prevent the finer portions of the meal from continuing unnecessarily in the mill, whilst the coarse particles return to the cylinder, to be re-ground, or in certain cases, the substitution of a shelf in place of the bolter, for the purposes and in manner and form as set forth.

LOCOMOTIVE LAMPS—Lewis A. Hamblen, of Chicago, Ill.: I am aware that the reservoir or chamber of a locomotive lamp has been divided into a series of compartments by means of partitions, which extended from the top to near the center of its depth, but this arrangement has been found not to accomplish the object desired, as a direct communication is necessarily left from end to end of the lamp below said partitions, and owing to this, as the oil is shot suddenly back and forth that portion which is below the partitions rushes to one end of the lamp, and that above the bottom of the partitions falls into its place, and causes a too great and sudden pressure at the said end, and slopping or overflowing, and unsteady feeding to the burner are the results. Such an arrangement, therefore, I do not claim, as the same was patented to Irwin A. Williams, on the 10th Oct., 1854.

But I claim as an improvement on the said Williams' lamp, making a locomotive lamp with three or more distinct chambers, A A' A", said chambers all being arranged on the same level, and connected by two tubes, B B', which run parallel, but not in line with one another, and provided with two elevated vent passages, E E, which communicate with the ordinary vent passages, D D, substantially as and for the purposes set forth.

[By constructing this lamp with several oil cells connected with tubes, the feed of the oil to the burners is more steady, by being less affected with the oscillations and concussions of the locomotive. The improvement produces a more uniform, steady, and bright light, because the combustion of the oil is rendered more perfect.]

BRICK MACHINES—Jacob Hockman, of Mexico, Ind.: I claim the under frame or carriage, H G' G', and trucks or rollers, P P', in combination with the main supporting wheels, A A', and rotating cylinder of molds, W, when arranged to operate in the manner and for the purposes specified.

OPENING GATES—Royal E. House, of Binghamton, N. Y.: I claim the process, as described, for opening and closing road gates while riding on horseback, or in a vehicle, through the gate passage, and also the apparatus, arranged as described, for the purposes set forth.

SEWING MACHINES—A. F. Johnson, of Boston, Mass.: I do not claim the peculiar construction and arrangement of the mechanism described, for driving and operating the machine, as I intend to make it subject matter of another application for patent.

I claim neither the set screw, nor a circular plate, or cylindrical body, rotating upon eccentric pivots as new means for adjustment.

But I claim combining the hook, when furnished with a lever or arm, as described, with the eccentric-headed screw, q, and the adjustable projection or screw, r, for the double purpose of taking first, the loop, properly, from the needle, and secondly, for actuating the hook at the proper time for the needle to take the loop from the hook.

NIPPLE SHIELDS—James Parker, of Boston, Mass.: I do not claim a nipple shield so constructed that when worn on the breast of a person it will entirely cover the nipple thereof.

Nor do I claim one made with a small air hole in its front end, or that part covering the end of the nipple.

But I claim my improved nipple shield, constructed with a tubular cap, as described, viz., one which shall only encompass the nipple on its sides, and not cover the front or end thereof, the whole front of the nipple guard being open, as specified.

BALANCE FOR DETECTING COUNTERFEIT COIN—H. Maranville, of Clinton, O.: I claim the graduated disk, A, and slide, C, connected as shown, and hung in the ears or lugs, b, the disk having ledges or guides, c c, attached to its face, and the whole arranged as shown and described, for the purpose set forth.

[This instrument is neat and portable, and can be carried in the pocket. It is constructed to weigh the coin and measure it, both in thickness and diameter; therefore, knowing the true standard of coin, it is capable of detecting a counterfeit. All counterfeit differ from genuine coins, either in weight or dimensions, owing to the different specific gravities of the metals.]

OIL PRESS—Wm. W. Marsh, of Jacksonville, Ill.: I am aware that boxes having hinged sides or ends have long been used, in connection with various kinds of presses, and I therefore disclaim them. But I am not aware that the pistons of oil presses have been provided with flanges or side pieces extending below the line of the bottom of the piston surfaces, for the purposes set forth.

I claim providing the lower or piston surfaces, b, of the trusses, E, with vertical flanges or side pieces, e e, when a space is left between said side pieces, and the bottom piston surfaces, b, in the manner and for the purposes specified.

[The hinged boxes of oil presses are very convenient for placing the meal of the oil seed in, and taking out the pressed cake; but the pressure of the pistons within them is exerted outwardly, thus tending to strain and injure the hinges. This improvement removes the strain from the hinged sides, thus rendering the press more durable, while, at the same time, it is very convenient]

HAND LOOMS—Stephen C. Mendenhall, of Richmond, Ind.: I claim, first, the universal treadle cam, J, cam, O, shaft, h, spring, S, and hinge, u, in combination with the revolving cam wheel, S, connecting rod, 2, brace, r, hook, k, pin, i, and spring, v, or their mechanical equivalents, substantially for the purpose set forth.

Second, I do not claim the arms, g g, or the triggers, w w.

But I claim the cords, x x, and pulleys, c c, in combination with the spring, h, arms, g1 g2, triggers, w1 w2, and cords, f f, for the purpose of throwing the shuttle back and forth through the loom, as described and set forth.

CUTTING APPARATUS OF HARVESTING MACHINES—Robest J. Morrison, of Richmond, Va.: I claim as an improvement on my patent of Aug. 14th, 1855, the peculiar form of the lid which overlies the cutters, viz., a lozenge, or spear-shaped point, and rhomboidal base, for the purpose of giving an oblique direction to the joints between said lids, to prevent the grass, gum, or other material from clogging said joint and checking efficiency of the lids, substantially as described.

COTTON GINS—James F. Orr, of Orrville, Ala.: I claim the combination of the two short ribs, R and R', the latter arranged in relation to the saw cylinder, substantially as, and for the purposes described.

ROLLING TAPERING TUBES—Wm. Ostrander, of New York City: I claim the combination with a tapering mandrel of cylindrical rollers, formed of disks or sections as described, for the purpose of rolling a tapering tube, substantially as set forth.

PRESSES—Rodolphus Kinsley, of Springfield, Mass.: I claim the compound action of the cam and eccentric, or their equivalents, arranged and combined, substantially in the manner and for the purposes set forth.

AUTOMATIC REGULATOR FOR WINDMILLS.—Joseph Dunkley, of Carrollton, Mo.: I claim the employment of the slide wing, g, arranged and operating substantially as described for the purposes specified.

EXCAVATORS—Wm. Provines, of Columbia, Mo.: I claim in combination with the scoops that cast their contents from them, the trigger, Q, and spring, d, for the purpose of regulating the point at which the scoops shall divest themselves of their load so as to raise it higher, or cast it further from the trench that is being cut, as described.

BURNING-FLUID LAMPS—David F. Randall, of Chicopee, Mass.: I do not claim combining with a burner, a piece of metal to extend down into the body of a lamp, for the purpose of fluidizing the combustible matter therein.

Nor do I claim combining with the wick of a burner, a metallic tube to extend around said wick, and down into the burner tube, and to be capped with a button, for spreading the flame, the heat of said button and the tube extending immediately around the wick, serving to vaporize the fluid within the wick.

But I claim so applying to the gas burner, a tapering spur that it may extend down into the body of the wick, and serve to conduct heat into the interior of the wick while the external sides of the wick are heated, by the burner and wick tube, as specified, and when such spur is used I claim making it with one or more branches at top, as shown and described.

FASTENING RAILS IN IRON FENCE POSTS—John B. Wickersham, of New York City: I claim as an improvement on Letters Patent granted to me Sept. 16th, 1856, connecting the bars, strips, or rails that pass through mortises in corrugated metallic posts or bars, by the means described, or by any other means substantially the same, to secure said parts at the points of intersection, substantially as specified.

ARTIFICIAL LEGS—O. D. Wilcox, of Easton, Pa.: I claim the artificial elastic muscles, with their conjoined tendons running from the thigh to the foot, as described, to effect and control the motions of the leg and foot in cases of amputation at the knee, and below it.

MULEY SAWS—A. Winter, of Pickens, S. C.: I claim, first, the arrangement of the clamp guide posts, B, in combination with the sliding head, c, for securing it in any desired position, substantially as set forth.

Second, the method of constructing the sliding guide head, C, with the race guards keyed on to starts framed into the sliding head, for the purpose of adjusting or renewing them, in case of wear.

Third, the arrangement of the boxes, K, in connection with the cross-head, J, for the purpose of adjusting the saw, to give it the desired advance motion, during its downward stroke.

Fourth, the arrangement of the guide posts, B, and upright, G, in combination with the beam, A, and sill, F, whereby the usual fender posts, &c., are dispensed with, all substantially as described.

OIL PRESSING—Wm. Wilber, of New Orleans, La.: Patented in England June 12, 1856: I claim extracting or expressing the oil from tempered oleaginous seeds or other vegetable matter, by pinching and carrying said tempered material between two belts or aprons made of hair cloth or similar heavy porous materials, and thus forcing it through, between compressing rollers, substantially as described; and this I claim, whether the oil be cold pressed or hot pressed, or both, as set forth or whether used in connection with a reducing apparatus or separate therefrom.

STOVE THIMBLES OR DECK IRONS—Loftis Wood, of New York City: I do not claim the mode or process of casting described, though I believe it to be, in some respects, new.

I claim the deck iron, described, constructed substantially as set forth, irrespective of the mode or process of casting.

MOUNTING AND GUIDING CIRCULAR SAWS—G. F. S. Wright, of Black Oak, S. C.: I claim, first, the employployment or use of the spring, E, applied to the machine, as shown, in connection with the shoulder, C, on the saw arbor, B, for the purpose set forth.

I further claim the guide, I, arranged or connected with the saw, D, and rotating wedge, G, as described, when used in connection with the spring, E, for the purpose specified.

[By combining a spring and an adjustable guide for regulating the position of a rotating wedge and keeping it in line with the circular saw, as embraced in this claim, the proper lateral required play of the saw is provided for, while the log and saw are always maintained in line. The use of a spring, and the giving the saw arbor a slight lateral play, is not new, but the mode of doing this, in this invention, is new, and is a good improvement.]

HANGING FARM GATES—I. S. Roland, of West Earl, Pa.: I claim constructing the upper hinge of said gate, of the peculiarly shaped hinge arm, a, the pawl, b, and the cam, c, when the said parts are combined and operated with each other, in connection with the loose play of the bracket pivots in the eyes of the upper and lower hinge arms, substantially in the manner and for the purpose set forth.

MAIL AXLES AND HUBS—A. E. Smith, of Bronxville, N. Y.: I claim the described method of constructing a mail axle, that is to say, making the end of the box abut against the inner side of the collar, instead of against the holding plate, whereby the wear of the washer between the collar and the holding plate may be compensated for, by setting up the bolts, substantially in the manner as set forth.

LATHING AND PLASTERING—John G. Vaughan, of Middleborough, Mass., assignor (by mediate transfer) to Isaac M. Singer, of New York City: I do not claim the sawing of laths; nor as limiting my claim of invention to making laths of the form specified, by sawing, as they may be made otherwise than by sawing, nor to the making of such laths of wood, as other materials may be substituted, although I prefer wood.

Nor do I claim, broadly, the securing of plastering by dovetailed interstices between laths or analogous devices.

But I claim plastering ceilings, or other surfaces, on lathing formed and secured so as to leave interstices between them, with parallel sides oblique to the surface of the plastering, when put on, substantially as and for the purpose specified.

HAT BODIES—Ira Gill, of Walpole, Mass., assignor to himself and Elbridge Brown, of Malden, Mass.: I claim the forming of a hat body, within an inclosed chamber, in which a vortex is produced by means substantially such as described, said chamber diminishing in area, from its open to its closed end, to regulate the draft through it, and to avoid counter currents, eddies, or dead space, as set forth.

I also claim, in combination with the cone on which the hat body is formed, a register, or draft regulator within it, so as to regulate the quantity of fur, or other material, that is to be gathered upon its upper and lower portions, as set forth.

PLANING SASHES—Daniel Berlew, of Delaware, Ohio. I am aware that tenoning and coping heads have been used before; those I do not claim.

I claim the combination with the reciprocating carriage, B, and frame, H, the hooked and slotted springs, V U, or their equivalents, all arranged and operated as set forth.

TUBULAR AUGER—J. A. Reynolds, of Elmira, N. Y. I am aware that the employment of a tubular auger is not new, as one has been employed with the cutters attached to said tube. I am also aware that a tubular auger and screw therein, for the delivery of the chips cut by the tube, has been employed.

I claim the employment of an auger whose shank or stem shall form a screw, and whose head shall be constructed in the manner described, when combined with a guiding tube, E, surrounding the screw shank of the auger, but not covering the head thereof, substantially in the manner and for the purpose set forth.

I claim the use of the guide tube, E, when combined with the sliding carriage, D D, said carriage constructed with the slide, h, as set forth.

COTTON CULTIVATORS—Joseph Shaw, of Richland, Ga.: I claim, in combination with the hoes, E E, having both a vertical and lateral adjustment, the shoes H H, above them, and so adjustable on or with said hoes, as to serve to throw the earth towards or from the plants, as may be required, the whole being for the purposes set forth.

HUB BORER—John Shaerer, of Reading, Pa.: I claim the vertically movable nut, a, in combination with the cutter shaft, D, constructed, arranged, and operating substantially as and for the purposes set forth.

PLANING SHINGLES, OR TAPERING PIECES—R. W. Sharp, of Montgomery, Ala.: I claim the combination of the reciprocating slide, E, and vibrating and rotating cutter head, c, with or without the stationary cutter heads, a, arranged and operated as shown, for the purpose set forth.

[In this machine, the shingles are planed on the under side by a reciprocating planer, while on their upper surfaces they are, at the same time, planed and beveled by a rotary cutter in a carriage, which has an inclined descending motion. The improvement is simple and good.]

LOOMS—D. W. Snell and S. S. Bartlett, of Woosocket, R.I.: We do not claim priority in using a "strain," as a means of regulation, for under various modifications it is found in use; for instance, Hendrick employs strain acting upon or with the movable reed, as his regulating feature; also Stone, Potter, and others, their motions acting in combination with an intermittent take-up motion; Knowles, Boyd, Bigelow, Mason, and others, use one or more stationary or re-acting vibratory whip rolls, as their point of regulation, while Taylor and Wilcox, and others, employ the beam as a means of regulation.

We claim, first, employing the positive take-up mechanism, or cloth roll, as the point through which the variable strain and wind of warps, is made to act more sensitively than from or by the variable or vibratory, re-acting motion of the whip rolls, or sudden jerking of the beam, or movable reeds.

Second, effecting and producing a regular delivery, an uniform strain of the warps, by the equalizing strain lever, P, said strain lever being acted upon by the variable strain of the warps through the positive take-up mechanism, or cloth roll, as represented.

Third, The equalizing strain lever, P, acting in combination with the positive take-up mechanism and cloth roll, as represented

Fourth, the equalizing strain lever, P, when operating in connection with the positive take up mechanism, in combination with any mechanism, for producing rotary motion to the beam, and with any device or means for regulating the delivery and strain of the warps, as the beam decreases in diameter, and as the desired strain requires.

Fifth, employing the rod T, with the pin, X, or equivalent, to act upon the strain lever, P, as a means of moving the weight, K, when the balance-spring, S, or equivalent device is not sufficient to move it.

Sixth, in combination with the pulley, F, and pinion, C, we claim the movable weight, K, the fixed or yielding sectional friction piece, G, and friction lever, J, as and for the purpose represented.

Seventh, in combination with the weight, K, and friction lever, J, we claim the rack, N, or its equivalent, to so act upon weight K, through catches, L, or analogous devices as to gradually move the weight, K, towards the fulcrums of lever J, as the beam decreases in diameter, and as the desired strain of warp requires.

Eighth, in combination with the weight, K, and friction lever J, we claim the jointed or stationary sectional friction piece, G, and set screw, H, as and for the purpose represented.

SUPPORT FOR POSTS OF FIELD FENCES—Obed Spencer, of Jacksonburg, Ohio: I claim the chair or base, formed of the pieces, a a', and ties or battens, b b' B B', in the described combination with the posts, for the purposes explained.

SAWING HOOPS—E. C. Strange, of Taunton, Mass.: I do not claim the use of pressure rolls upon hoop-sawing machines, for these have been used before; neither do I claim the levers, F and N, or the side lever, O, or the cam, H, by themselves alone.

But I claim first, making the saw, B, of the peculiar form, as shown, a plain circular saw with a beveling or angular edge or rim; not confining myself to any particular angle which this rim makes with the saw plate, but using that which is best adapted to the work.

Second, the cam, H, the sliding journal box, E, the lever, F, and its connection; the shield, S, and the lever, M, and its attachment, as specified, so as to operate together, for the purpose and in the arrangement, substantially as set forth.

TIGHTENING FELLIES IN WHEELS—Augustus Stoner, of Mount Joy, Pa.: I claim the construction and operation of the metallic cheeks, A, when constructed as described.

I also claim the manner of securing them in their place, when applied to the fellies of wheels, by the use of melted metal of any kind, filling the grooves, b b, to keep them secure in their place, substantially in the manner, and for the purpose set forth.

SEED PLANTERS—Joseph Thompson, of Durhamville, N. Y.: I claim the spring plate, Y, or its equivalent, so constructed and arranged as to hold the earth down firmly while the punches, V, and the tubes, S, are drawn out of the earth, substantially as described.

LOCKS OF FIRE ARMS—Alfred Tonks, of Boston, Mass.: I do not claim raising the striker by a spring latch hinged to the trigger, such latch being disengaged from the striker, by means of a cam on one or the other.

I claim the described arrangement or application of the spring rocker catch, the tooth, a, of the trigger and the shoulder, f, with respect to the striker, its arbor, and the trigger, and so as to enable the striker to be operated substantially as specified.

SCREW-FEEDING GEAR—C. C. Walworth, of Boston Mass.: I claim the combination of a feeding screw or nut arranged so as to have an endwise movement, with springs, for the purpose of insuring the engagement of the screw and nut, and returning either of them to a mean position, when released from strain.

CORN PLANTERS—J. S. Toan, of Venice, N. Y.; I do not claim the general construction and operation of the machine, and am aware that many of the devices employed have before been used, as specified.

I claim the combination and arrangement for operation together, substantially as shown and described, of the lower striking tube, F, having a plow bit in front, and covering roller rigidly attached to it in the rear, with the secondary cross sliding valve, I, and its operative lever, J, arranged to form part of said sliding tube, F', the whole being supported by the covering roller and plow bit, for the more perfect and easy operation of the secondary valve and sliding tube, as specified.

PLANES—Thos. J. Tolman, of South Scituate, Mass.: I claim the application to the common plane of the screw attachment and key through the same, thereby regulating the mouth and greatly increasing its value.

REAPING AND MOWING MACHINES—David Watson, of Newark, N. J.: I claim the use and application of the adjustable curved flat spring, c, to the upper surface of the finger bar, B, when both are attached to the stirrup, A, for joint action, in the manner and for the purpose described.

[The cutters in this reaper are triangular in form and rotary in action; they are placed underneath the finger bar, and no obstruction is offered to the cut grass or grain as it passes over them and the finger bar: owing to the form of the cutters they are not liable to choke; and the finger bar is so hung that it accommodates itself to uneven ground, and the grain or grass is thus cut evenly.

POWER LOOM—Wm. Wild, of Manchester, England, Patented in England, March 7, 1855: I claim, when applied to looms, or machinery for weaving pile fabrics, &c. the arrangement of the wires in grooves or flutes, formed in a roller or cylinder, the wires on being pushed into the "shed" never wholly leaving the grooves in the roller or cylinder

I also claim as a peculiarity and novelty, the arrangement of the wires, so that the one to be inserted in the shed is opposite, or nearly opposite, and in a line with the fell of the fabric, or that point where the reed will leave the wire on beating up such wires when so arranged, having to be bent out of the straight line to present the points towards the widest part of the shed, the whole combined and arranged substantially as described.

[This improvement in looms for weaving cut pile and Brussels carpet, will weave from 45 to 50 yards of Brussels carpet per day, and is in general use in Kidminster and other places in England, and does weave 38 yards per day to the other next best loom 18 yards, both driven by the same shaft and having the same speed.]

RECIPROCATING SAWS—Carlyle Whipple of Lewiston, Me.: I do not claim the two levers, C C', to which the saw, D, is attached, separately, for they have been previously used.

I claim the lever, C C', two or more, when the upper lever or levers are attached to an adjustable shaft, B', and the levers driven by a crank pin, f, having the roller, i j, fitted upon it, and working within a slot, e, in the lower lever, C, the saw, D, being attached to the end of the levers, the whole arranged as shown and described, for the purpose specified,

[There are two transverse shafts—an upper and lower one—in the saw frame; the upper one is secured in bearings, and can be raised and lowered by screws. The saw is connected to two levers, one on each shaft; therefore, by turning the screws to raise the upper shaft the saw is strained in a very simple and efficient manner.]

PARING AND SLICING APPLES—D. H. Whittemore, of Chicopee Falls, Mass.: I do not claim the peculiar form or arrangement of the parts.

I claim, first, so arranging the slicing knife that it shall cut the apple into a continuous spiral slice, as set forth.

Second, so combining the parer and slicer with each other that the operation of the two shall be simultaneous, as set forth.

CALENDAR CLOCKS—M. J. Whitmore, of Potsdam, N. Y. (assignor to F. G. Johnson, of Brooklyn, N. Y., and M. J. Whitmore): I claim placing the intermittent cogs, D, upon the upper and lower faces of the calendar wheel C, and giving said cogs the necessary movements for accomplishing the intended purpose by means of the sliding and stationary and intermitting pinions, E E E, on the shaft, B, all being combined together and operated in the manner and for the purposes set forth.

RE-ISSUES.

AXLE BOX ROLLERS—G. W. Geisendorff, of Indianapolis, Ind., and J. C. Geisendorff, of Cincinnati, O. Patented Feb. 6, 1855: We are aware that it is new to give motion to the lubricating roller, by mere contact of said roller, with the journal of the axle.

We claim giving a positive motion or rotation to the lubricating roller, by the axle of the car wheel, in the manner set forth.

PRESSING BONNET FRONTS—W. E. Kidd, of New York City Patented November 28, 1854, I do not claim broadly, the combination of a mold or matrix, for pressing bonnets or bonnet fronts.

But I claim the hollow metallic mold, substantially such as described, of the form required to give the complete form required for bonnet fronts, and provided with a mode of imparting to it the required temperature, and the matrix of corresponding form to make pressure, by a motion in or nearly in the line of the axis, when the said mold and matrix are used in connection and in combination with the means described for controlling the position of the strip to be pressed, or any equivalent therefor, as set forth.

CLEANING THE TOP FLATS OF CARDING ENGINES—Wm. H. Walton, of New York City: Patented Dec. 9, 1856: I do not claim two sets of feed rollers combined with a carding machine, as they have before been made and used; nor do I claim the "lickers in," working directly out to the main cylinder, as they are to be found on machines previously devised.

I claim suspending the top flats or lays, upon pivots in the center of the ends, by which they can be raised out of the way of the adjoining flats or lays, to be turned by means of a rack working on pinions upon their pivots, or the equivalent thereof, the whole being constructed and arranged substantially as described for the purpose set forth.

I also claim stripping the flats or workers by a rotating brush, so arranged that a card may, in turn, strip the brush and return the strippings to the main cylinder, substantially in the manner and for the purposes described.

I also claim the combination and employment of the "lickers in," c c d d, and worker, e, arranged substantially as described, and acting as workers and strippers in the manner and for the purpose described.

DESIGNS.

PARLOR STOVE—S F. Pratt, of Boston, Mass., assignor to W. and J. Treadwell, Perry, and Norton, of Albany, N. Y.

COOKING STOVE—N. S. Vedder, of Troy, N. Y., assignor to Newberry, Filley & Co.

More California Big Trees.

We are informed, says the *Mariposa Gazette*, that a grove of big trees has been discovered upon a branch of King's river, near the saw mill of O. K. Smith. The grove contains over 1,000 trees, by actual count, varying in size from eight to thirty-two feet in diameter. Many of them are from 325 to 375 feet high. The species of tree is the same as those in Calaveras county which attracted so much attention, and which was described in a paper read before the meeting of the Scientific Association held at Albany, N. Y., in August last.

[For the Scientific American.]

Muley and Circular Saws.

In No. 13 of the SCIENTIFIC AMERICAN, lately received, I see an article over the signature of "M. English," wherein the writer gives the preference to the muley over the circular saw. He also deals in a very harsh way with the statements of those who have cut more with the circular saw than the muley.

Although I agree with him that the muley possesses great advantages over every other straight saw; and I am willing to admit that it is, in some respects, superior to the circular saw, as generally constructed, yet I cannot go so far as he does, and claim for it a superiority over every other saw.

Mr. English assures us that his opinion is based on practical experience, yet it seems, from the succeeding sentence, that he has only seen the circular saw cut, in certain mills. They certainly were not the best mills in the United States, or Mr. E. would no longer have questioned the veracity of those who have sawed 12,000 or 15,000 feet in twelve hours.

I believe the circular saw is superior to all others, and base my opinion on the fact that every cause must be followed by its effect. The best mill is that which will cut the greatest amount of lumber in the best manner, and at the least expense, in a given time. Let us see what mill is best qualified to do this.

The circular saw will cut more than any other, because, first, it is constantly cutting, and second, the only limit to its speed is the rapidity with which the log can be fed to it.

The quality of the work done by the circular saw will compare favorably with that of any other saw, when an equal amount of work is done with the same power. On the score of economy, there is no reason why the straight saw should be preferred to the circular. In this region, those who have straight saws are rapidly exchanging them for the circular; but I do not know of any one exchanging a circular for a straight saw. This I consider good evidence that those who have tried both, regard the circular saw as the most economical. J. W. GAREY.

Grenada, Miss., January, 1857.

The same Subject.

MESSRS. EDITORS—A communication headed "Which is the Best Saw?—The Muley," on page 99, present volume of the SCIENTIFIC AMERICAN, deserves notice. The fling of Mr. English at the circular, evinces a want of knowledge of the machine, and of the principles of sawing. He remarks, "I have no faith in the statement of a circular saw cutting from 12 to 15,000 feet in twelve hours—oak logs eight feet long at that. . . . . . . It would take about 75 logs, or between 600 and 700 cuts with the same number of runs back, and sets, with 75 stoppages, to put on and take off logs in 12 hours. There are but 720 minutes in 12 hours," &c.

Certainly, he could never have witnessed a well-constructed saw cut. But let us review his figures. If we take from the 720 minutes one hour for breakfast and another for dinner, we will have 600 minutes left. 75 logs are to be put on—not taken off, each plank is taken away as sawed—and one minute is more than sufficient time to put on a small log, but say 75 minutes, and we have 525 minutes left to cut 700 lines. Now a good circular saw will cut a line 24 inches deep and 12 feet long, back and start again in 20 seconds—or cut three lines per minute. But say it takes 30 seconds to cut a line in an 8 feet log, and we will have 175 minutes—near three hours—of the twelve left, after finishing the work.

Most circular saws are driven by engines inadequate to force them forward with sufficient speed, and few sawyers are capable of putting them in order to bear feed if they had the power. Of all machines, the circular saw requires less practical and more theoretical knowledge to put them in order than any other. Hence so few good sawyers, and so many who, not having seen one conducted by one who understood his business, condemn them.

A little reflection will convince any intelligent scientific person, that the circular saw surpasses all others, so far as fast cutting is concerned. A tooth of a saw can be made to cut only a certain distance forward each time it passes through the wood, no matter whether it be on a reciprocating or on a circular saw. And if it be driven with sufficient force, it will cut that quantity, and no more; which quantity depends on the order the saw is in. Now, a five feet circular saw is near 16 feet in circumference, and if it make 600 rotations per minute, over nine thousand feet of its edge will pass through the wood in that time. A muley saw is not cutting more than one foot each stroke, and, at 300 strokes per minute, 300 feet of the edge will pass through the wood per minute—only one-thirtieth of that of a circular saw. But, although there is no good reason for it, the circular saw has only one tooth in the space that a muley saw has three; therefore only ten teeth of the circular saw pass through the wood to one of the muley. Hence, when the power is not limited, if a tooth of a circular saw can cut as deep as a muley, and there can be no reason assigned why it should not, a circular saw can be made to cut forward ten times as fast as a muley. J. B. CONGER.

Jackson, Tenn., January, 1857.

Mammoth Cave Pit.

MESSRS. EDITORS.—In No. 16, SCIENTIFIC AMERICAN, there is an article on the Bottomless Pit of the Mammoth Cave of Kentucky. Persons are liable to be deceived regarding deep pits by mere sound. I have a well, only 82 feet deep, of large diameter, and walled with thin shelly limestones. Now, while a tube of smooth interior is a good conductor of sound to a vast distance; it is very difficult to understand what a man says who stands at the bottom of my well. Apply this to the shelving surroundings of the Bottomless Pit, and it may be, that it is not *quite* bottomless.

A large salt spring in this County (Saline) was said to be bottomless, by the early surveyors, who could not fathom it with the length of four of their chains—264 feet—but a friend of mine, with a lead and line, found only 15 feet. The surveyors only dropped their chains, link by link, into the bubbling sand, and might have so disposed of half the chains in the United States. The spring is 30 feet across, and affords water to turn a mill (salt) 80 to 1, or more properly 1 bushel of salt to 80 of water. J. L. H.

Arrow Rock, Mo., 1857.

Dr. Livingstone Discoveries in Africa.

The celebrated traveler, Dr. Livingstone, has been lecturing since his return to England, as we learn by recent news. His adventures have been of the most dangerous and thrilling character. He traced by himself the course of the great river Zambesi, in Eastern Africa, extending two thousand miles.

This immense stream, whose discovery is the great fruit of the journey, is in itself an enigma without parallel. But a small portion of its waters reach the sea coast. Like the Abyssinian Nile, it falls through a basaltic cleft, near the middle of its course, which reduces its breadth from 1000 to 20 yards. Above these falls it spreads out periodically into a great sea, filling hundreds of lateral channels; below it is a stream of a totally different character. Its mouths seem to be closing. The southernmost was navigable when the Portuguese first arrived in the country, 300 years ago, but it has long since ceased to be practicable.

During his unprecedented march, alone among savages, to whom a white face was a miracle, Dr. Livingstone was compelled to struggle through indescribable hardships.—The hostility of the natives he conquered by his intimate knowledge of their character and the Bechuana tongue, to which their is related. He waded rivers and slept in the sponge and ooze of marches, being often so drenched as to be compelled to turn his arm-pit into a watch-pocket. Lions were numerous, being worshiped by many of the tribes as the receptacles of the departed souls of their chiefs; however, he thinks the fear of African wild beasts greater in England than in Africa. He has memoranda of the latitudes and longitudes of a multitude of cities, towns, rivers, and mountains, which will go far to fill up the "unknown regions" in our atlases.

Toward the interior he found the country more fertile and more populous. The natives worshiped idols, believed in transmigrated existence after death, and performed religious ceremonies in groves and woods. They were less ferocious and suspicious than the sea-board tribes, had a tradition of the Deluge, and more settled governments. Some of them practiced inoculation and used quinine, and all were eager for trade. Their language was sweet and expressive. On the arid; lateau of the interior, water melons supplied the place of water for some months of the year, as they do on the plains of Hungary in summer. A Quaker tribe, on the river Zanga, never fight, never have consumption, scrofula, hydrophobia, cholera, smallpox, or measles.

Dr. Livingstone is nearly forty years old. His face is furrowed by hardships and thirsty fevers, and black with exposure to a burning sun. His left arm is crushed and rendered nearly helpless from the embrace of a lion.

Dr. Livingstone's discoveries, in their character and commercial value, have been declared by Sir Roderic Murchison to be superior to any since the discovery of the Cape of Good Hope by Vasco de Gama. But greater than any commercial value is the lesson which they teach—that all obstacles yield to a resolute man.

Louisville Mechanics' Institute.

This Institution is in a very flourishing condition, as we learn from the report of its able actuary, D. McPherson, Esq. The library is in a promising condition, the rooms are better attended, and more volumes have been circulated than during any previous year.

Since the 1st of May, 1,065 persons have drawn books from the library. Of this number 523 were members, 807 ladies, and 235 minors. Many ladies and minors get books on members' account.

In the same time, 10 523 volumes have been circulated, averaging 1,403 per month—an increase of nearly 300 volumes per month over last year.

The Annual Exhibition was very successful. The building was well filled, principally with the manufactures of Louisville, and the receipts were larger than they were last year, under more disadvantageous circumstances. The expenses were greater, on account of the removal of the building; but, exclusive of the expenditures attendant upon the removal, they were not so great, while there was an increase in the receipts. The community looks upon these expositions now with a more favorable eye than ever before, and seems to appreciate more correctly their importance.

A fine class in mechanical drawing has recently been established, and is now in successful operation, under a competent and successful teacher. It promises to be one of the most interesting and beneficial features of the Institution.

The total amount of receipts were $7,309·42. Expenditures, $5,706·92, leaving a balance of over $1,600 in the treasury. This Institute is, no doubt, under able management, and does great credit to the mechanics of Louisville.

Spinning on Cotton Plantations.

We have seen in several of our cotemporaries long and favorable notices relating to the improvement that would be secured by spinning the cotton into rovings direct from, and in connection with the ginning of it. Upon the same principle of reasoning it would also be an improvement to manufacture the cotton into cloth on the plantation. The question is, what end will be secured thereby? Will it be profitable for each planter to get up carding and spinning machinery in order to spin his cotton into yarns before leaving his plantation? in other words, to have a cotton manufactory attached to it? We are of opinion that on a very large plantation it *might* be profitable to erect a cotton mill, just as it might be profitable to erect a grist mill to grind the wheat of a large farm, but not otherwise.

A Steam Whaler.

A screw steamship, according to the *New Bedford Mercury*, is being fitted out at Providence for the northern whale fishery. This shows the right kind of enterprise among our whalers; the present high price of oil will enable them to employ steam with profit.

New Inventions.

Cornish Pumping Engines.

"A contract for the heaviest pumping machines ever made or used in America will soon be awarded by the parties engaged in pushing forward the Brooklyn Water Works. Twenty millions of gallons per day are to be hoisted 170 feet by steam. There are many plans before the Committee of Engineers employed to decide on the subject.

The fact is, American engineers, with all their smartness in some lines of business, do not seem to understand pumping water on a large scale. The very large, slow, single-acting engines and pumps in the mines at Cornwall, in Great Britain, are believed to be the most economical in the world; and although there exists in theory room for considerable improvement in these, with shame be it said, we cannot even imitate them. The proportion of water raised to the coal burned varies, of course, with the hight to which it is to be raised; but reducing the effect in all cases to that of lifting water only one foot, the Cornish engines in Cornwall, lift from 75 to 100 millions, and in some cases as high as 125 million pounds of water per pound of coal burned, while the latest, and, we think, the best of our American imitations is that of Belleville, which raises the water for Jersey City, and attains a duty of 52 millions.—American designers of steam engines and pumps must rub up their ideas."

[The above is from the *Tribune* of the 8th inst., and is very unfair, not only to our engineers, but to those Cornish engineers in our country who can, and have built pumping engines equal to any in Cornwall. Some of our American engineers have also built Cornish pumping engines of the first class, such as those built at the Allaire Works, this city, two years ago, for the Cleveland (Ohio) Water Works. The duty performed by the Cornish engines in England averages 65,000,000 lbs., per bushel, not a pound of coal, and there are numbers of them that fall short of the duty performed by the one at the Jersey City Water Works.

The above involves a very common but mistaken notion entertained by those who are not minutely acquainted with engineering. It holds forth the idea that an engine, either owing to its design or construction, is the great and only source of economy, or waste of fuel; and upon this idea a hypothesis is set up that an engine in Cornwall doing more duty than one in America must be of superior construction. This is all wrong. Two steam engines of the same dimensions, constructed alike in every particular, and with boilers exactly similar, will give different results, according to the attention and care of the engineer and fireman. One may do twice the duty of the other by careful firing and attention to lubrication, cleanliness, and the packing of the pistons. We have actually known cases of this kind; and when this is done by carefulness, what may we not expect in superior economy from a superior boiler?

Cornish boilers are as much distinguished for economy of fuel as the engines; and so it is with other kinds of boilers—the boiler is as much the secret of economy in fuel as the engine.

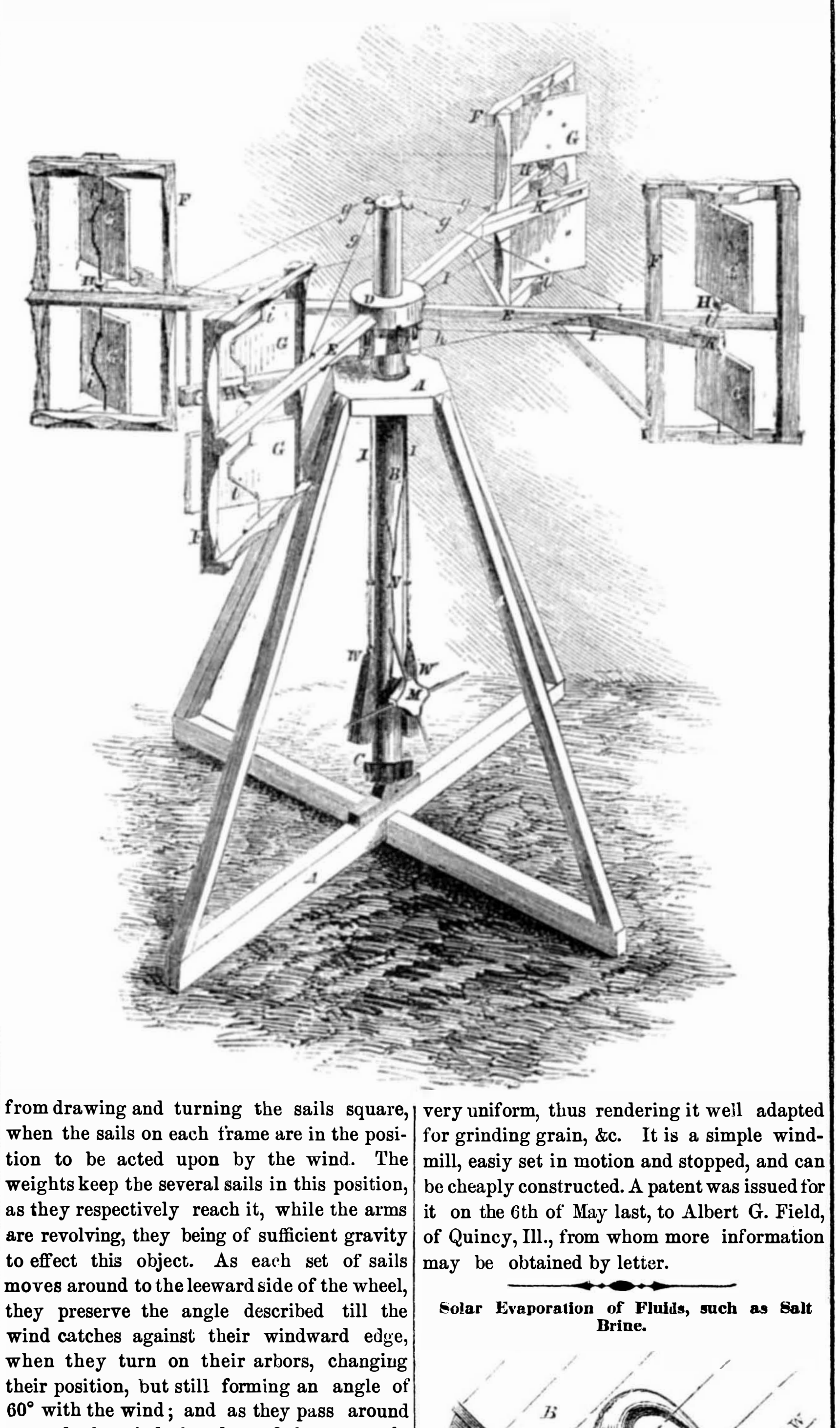
Improvement in Windmills.

This figure is a perspective view of a self-adjusting Windmill.

A represents the frame supporting a central shaft, B, which runs in a step at the foot, and in a collar bearing in the platform of the frame. This is the driving shaft of the mill, and is revolved by the wings or sails, and it has a large cog wheel, C, near its foot, for gearing into another shaft to transmit the power to, and drive mill stones, saws, pumps, or other machinery. D is a hub, near the top of shaft B, in which the inner ends of the sail frame spokes are inserted. F F F F are the sail frames, each divided in the middle by a bar, G. The spokes are supported by brace rods, *g g*, extending from the top of the shaft, B; there is also a brace rod, *h*, between each pair of spokes; G G are the sails or wings; they are represented as being made of wood, but they may be formed of canvas secured on slats. The spokes and sail frame constitute the wind wheel. These sails or wings are of peculiar construction and arrangement. They are hung in the frames on arbors—each pair on a cranked arbor, *i*. There is a small block, H, on each sail arbor, *i*, to which is secured a cord, I, that passes through a guide pulley, K, in the end of an arm, thence along and over a pulley, J, under hub, D, and down through eyes in a ring around shaft B, where it has a weight, W, secured to its end. The weights, W, are governors of the sails. When the pressure of the wind is too strong upon a sail, the weight is raised, and the sail revolves on its cranked arbor in a direction contrary to that of the main shaft, and thus they accommodated themselves to the pressure of the wind—are self-adjusting. Each cord, I I, has a button on it, on the inner side of the guide pulley, K; this button prevents the weight, W, drawing upon the sails, G G, beyond a limited degree. M is a small windlass on the main shaft; it has cords, N, secured to it, these pass through eyes on the shaft, and then are secured to the weights—one to each weight, for regulating the power of the mill or stopping it altogether.

When the mill is in operation the weight, W, will keep the sails, G, of one frame at an angle of 45° with the wind, as the button mentioned, on the cord, I, prevents the weigh

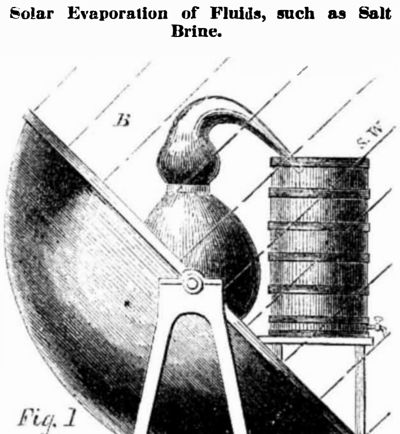
SELF-ADJUSTING WINDMILL.

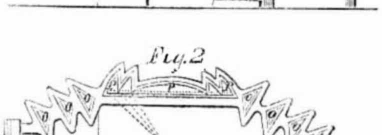


from drawing and turning the sails square, when the sails on each frame are in the position to be acted upon by the wind. The weights keep the several sails in this position, as they respectively reach it, while the arms are revolving, they being of sufficient gravity to effect this object. As each set of sails moves around to the leeward side of the wheel, they preserve the angle described till the wind catches against their windward edge, when they turn on their arbors, changing their position, but still forming an angle of 60° with the wind; and as they pass around towards the wind, the edges of them are only presented to it, as they are not acted upon by the weights at this point—because the buttons on the cords bear against the eyes at K; when the sails reach the windward side of the wheel they are again acted upon by it at an angle of 45°, and so on continually; and thus they will operate under a favorable working wind. When an undue pressure of wind is exerted, the sails adjust themselves to the pressure, as has been already described. By turning the windlass, M, so as to wind up cords, N, on it, and raise the weights, W, the sails are relieved from tension on their cranked spindles, *i*, the sails are then free to revolve on their spindles, and the mill is thus stopped. The degree of tension exercised by the weights, W, on the sails, can also be regulated by the windlass, by raising or lowering the weights.

Instead of requiring a high tower of from 45 to 50 feet high, like common windmills, a low, wide building of 25 feet high, will answer for this one, and this is a matter of no small consequence, in saving expense. Being self-regulating in its motions, its velocity is very uniform, thus rendering it well adapted for grinding grain, &c. It is a simple windmill, easily set in motion and stopped, and can be cheaply constructed. A patent was issued for it on the 6th of May last, to Albert G. Field, of Quincy, Ill., from whom more information may be obtained by letter.

Solar Evaporation of Fluids, such as Salt Brine.





The accompanying figures represent a method of evaporating fluids by the concentrated rays of the sun, directed into the evaporating pan. The inventor is Mr. Gordon, of London, a distinguished engineer, who has obtained a patent in England, as described in the *Engineer*. It is specially adapted to the solar evaporation of salt, and may be of great importance to our salt manufacturers in Florida, Central New York, Virginia and other States.

The invention consists in employing reflecting apparatus, or concentrating or refracting lenses, or both combined, in such a manner that the heat of the sun's rays is for hours continuously rendered applicable for purposes of evaporating and even distilling fluids. The apparatus the patentee calls a thermoheliostat, because it collects the sun's rays and continuously directs them upon the vessel, a body placed in or near the focus to which the rays are required to converge, and so produce the great heat, the thermheliostat being made to keep pace or correspond with the sun's diurnal motion. The patentee proposes to use the thermoheliostat for the purpose of distilling sea water, and obtaining therefrom fresh water; also for boiling and evaporating and generating steam; and for purposes of cooking, especially in tropical climates, and in positions where the sun's heat is great, and where it may be difficult or expensive to procure coal, wood, or other fuel for making a fire, such as at certain lighthouses, in positions little frequented. The patentee states that he prefers reflecting the rays of the sun to refracting them through glass, but describes both. In the use of reflecting apparatus he takes any bright hollow surface in the shape or a section of a hollow globe, and prefers to have it six or seven feet in diameter at the mouth. In or near the focus of this is suspended from a crane or davit, or other suitable apparatus, a still, in connection with a worm and tub, the mouth of the reflector being kept directly open to the sun's rays; the heat is concentrated on the still; fresh water is distilled off from the salt, and when filtered through charcoal it becomes fit for drinking. Sometimes the still is supported upon a frame. This reflector is supported by two bearings, one of which the patentee calls the north pole and the other the south pole; by a clock motion, or a regulated motion from a falling weight, such as is commonly used in lighthouses for revolving lights, or by any other suitable motive power, so regulated as to keep for one or more hours of the day the mouth of the reflector fully open to receive the rays of the sun as he changes his place in the heavens. This movement of the reflector from east to west can also be effected by a man in attendance watching a shadow. Bright and polished brass for reflecting heat is prepared. The illustration fig. 1, shows a still and the section of a reflector in position, with the sun westward (S.W.), B being the rays. As the sun advances in the afternoon, the reflector must dip to the westward at a corresponding rate. When such an apparatus is to be employed, the latitude of the place must be attended to, and the equinoctial changes must be provided for, so that once a day, or once a week, or once a month, the whole apparatus may be set to suit the sun's declination.

In using refracting glasses for purposes of distilling by the sun's heat, the lighthouse apparatus known as Fresnel's is employed, and the arrangement of polyzonal lenses which he uses for directing rays of artificial light is preferred. This apparatus is shown in fig. 2. There, O, O, O, are zones of glass, called catadioptric, because they both reflect and refract the rays; and P P are called dioptric, because the light passes through them. When the sun is passing over this glass apparatus, the rays which fall upon the other side of the polyzonal glasses pass through and fall upon F, F, the focus, where is placed the still or other body to be acted on by the sun's heat. This apparatus requires no diurnal motion, and it is arranged for suiting the sun's declination by mounting the whole on a frame.

The cold moderates immediately preceding a fall of snow, because the vapor in the atmosphere, in the act of congealing into snow, parts with many degrees of heat, which before were latent.

Scientific American.

NEW YORK, JANUARY 24, 1857.

The Eye, and How to See.

This is a continuation of the subject in our last number, under the heading of "The Mechanism of the Eye." Vision is performed by the eye in a peculiar manner, with which few have acquainted themselves. By experiments it has been ascertained that rays of light proceed in straight lines, and in all directions, from every point of visible objects, and they illuminate with their own color any colorless body or surface on which they fall. If a small hole is made in the window shutter of a dark room, and a sheet of white paper held about two feet behind the hole, the picture of a person standing opposite to it in the street will be seen on the paper, with all the colors of his clothes visible, but in an inverted position—head downwards—like the picture seen in looking into the camera obscura of the photographic artist.

Images are also painted in reverse position on the retina of the eye, and these can be seen by removal of the schlerotic coat. It is difficult to understand how we see objects erect when they are inverted on the retina, but experiment has established the fact that any part of an object is seen in a direction perpendicular to the portion of the retina of the eye on which it falls, according to what is called the "law of *visible direction*;" while the picture is, therefore, painted in a reverse position on the retina, the mind contemplates it erect from such a position.

The difference between the use of one and two eyes is not generally known. One eye has been found sufficient for the general purposes of life. There are instances on record of persons having the sight of but one eye, and yet were ignorant for years of having a blind one. There are also a great number of persons who have lost an eye by accident, and with the remaining one have performed all the duties required of the two. Two eyes, however, are better than one, for the field of vision with one is only about 150°, while with two it is about 200°. It was long supposed, by many, that we saw objects twice as luminous with two as with one eye; but this is a mistake, for objects are seen as brightly with one as with two eyes.

The pupil of the eye increases in size to admit as much light, when one eye is shut, as when both of them are open; therefore, so far as mere brightness is concerned, the loss of one eye is no disadvantage. Sir David Brewster has determined this by experiment.

Two eyes enable us to see solid objects in a higher relief, and all distances in nature more perfectly than one eye. With one eye, however, we see the direction in which an object or point is situated more distinctly than with two eyes. By monocular vision (one eye) we see the exact point where a near object strikes a more distant one in line; this we cannot do with both eyes directed to it, for while they see a near object distinctly, they do not perceive *two* objects in line accurately; hence one eye only is used in shooting with a rifle at a mark, because it takes cognizance correctly of the *sight* on the rifle, and the mark in a line beyond the needle—further off.—Some have supposed that practice alone gives us an appreciation of distances with the eyes—one or two—and this idea of acquiring all knowledge experimentally is taught in some works on philosophy, but it is a mistake. An artist in this city (New York), distinguished for his skill and fine taste, who has been deprived of the use of one eye for a number of years, has told us that in a dim light, such as in the dusk of evening, he has never learned to judge well of distances; in other respects, however, monocular vision is more advantageous to him than otherwise in pursuing his profession.

To prove that we can appreciate distances more correctly with two eyes than with one, let any person endeavor to thread a tolerably large needle held out at arm's length, and he will discover how deceptive monocular vision is, regarding distance. The needle's eye will appear further from him than it really is, and he will continually thrust the thread in a line beyond it.

The Coolest Dodge Yet.

The extracts from the *Tribune* which we copied last week, on the Woodworth Planing Machine, we thought showed middling coolness, but another item has since appeared in the daily papers here which caps the climax, and sends the thermometer clear down below zero.

The following appeared under the telegraphic news in the *Daily Times* of Thursday last:—

"The House Committee on Patents to-day agreed upon a unanimous report against the extension of the Woodworth Planing Machine patent. This buries the case, which its proprietors abandoned some time ago."

Faithful Committee! They each deserve a leather medal. More than a year ago this Committee had the Woodworth extension matter under their charge, and the names of the thousands of petitioners who remonstrated against the extension of this monopoly, from all parts of the country, were deposited with this committee. We were shown in the committee room, last winter, many bushels of remonstrances, exhibiting a weight of evidence against its extension, sufficient to have satisfied any unprejudiced person at a glance that the measure solicited by the Woodworth schemers would, if adopted, be against the interests and wishes of the public; but the Patent Committee were blind to all this, and not till after the patent had expired for weeks did we get even a glimmering of the Committee's intentions in regard to it; but now that the patent is dead, and the very schemers themselves heve abandoned their case, this Committee are announced to be ready with an adverse report. Well done!

The reader will say "Well, it was adverse when it did appear." Just so; but after the thing had died a natural death, what could be the use in holding a *post mortem* examination—of reporting on it at all? It was, reader, that the committee might make an exhibition of their *virtue* to the public, for so long as a ray of hope lasted for getting the Woodworth petition before Congress, this virtuous committee remained perfectly mum; but the moment the field is abandoned by the schemers themselves, and the last ray of hope has flickered out, then the committee arise in their majesty and inform Congress that, on the Woodworth petition for an extension of a patent, they had agreed to report adverse.

Wonder if the recent appointing of a committee to investigate into the bribery and corruption of members of Congress had any thing to do with the bringing out of this report, even at this late day?

Hugh Miller, the Mechanic Geologist.

Recent news from Europe convey the sad intelligence of the death of this distinguished man. He was found dead in his bedroom in Edinburgh, on the morning of the 24th December, shot through the heart with a pistol kept loaded for defence against burglars. He was recently subject to somnambulism, caused, it is believed, by too severe mental labor, and his death is attributed to an accidental discharge of the weapon. For a number of years his name has appeared prominent among the most able geologists of Europe, and his critical works on this science have a world wide reputation. They have all been republished in this country, and his name has become a household word among us. As a man of science, his death therefore requires from us more than a mere passing notice. He was a native of Cromarty in the north of Scotland, and at the time of his death was nearly fifty-four years of age. His life was an exemplification of the fame and distinction which a man may acquire, without a classic education, by good natural abilities and industry. His parents were comparatively poor, and his mother became a widow when he was only five years of age, by his father being lost at sea. At school he was rather a rambling but never a dull student, and he was the acknowledged leader of his school-mates in their forays, fights, water excursions; and wanderings among the rocky cliffs of that stormy coast. He never attained to more than a common English education, and was bound an apprentice to the trade of a stone mason, (which in that country means a stone cutter and builder,) at the age of seventeen years. He had two uncles, very intelligent mechanics, who acted as his guardians, and who had formed a very high opinion of his talents, believing him to be capable of shining in the pulpit; and they were willing to sacrifice much to give him a collegiate education. They were greatly grieved and displeased at his selection of a mechanical trade, believing that he had thereby sold himself to an entire life of drudgery and obscurity; but they were mistaken. Hugh Miller had been but a very short time at his trade when he became convinced that he had chosen a life of severe toil, and that he might have done better had he followed the advice of his relatives, but with a resolute self-will he determined to make the best of his circumstances. He first diligently applied himself to become a skilful and expert tradesman, and soon succeeded. During his spare hours, unlike most apprentices, who spend such precious moments in foolish jesting and absurd amusements, he read useful books, conversed with intelligent persons, studied deeply, took healthful, athletic exercises, and long journeys among the scenes of nature in which he schooled himself by observation and reflection for future distinction. Working among the old red sandstone with his mallet and chisel, he then little thought he was carving out for himself the monuments of his own fame.

The very nature of his occupation led him to love geology, and he extended his information in this and other subjects according to his means and opportunities. By reading the best standard authors in our language, and practising composition, he became an excellent English scholar, capable of writing and expressing his thoughts eloquently and correctly. When he attained to the manhood, of twenty-eight years of age, he became a contributor to various periodicals—*Chambers's Edinburgh Journal* among the number—and his tales and essays attracted attention by the fine imagination, elegant diction and extensive knowledge displayed in them. He also published a small volume of poems which were respectable productions. These things he accomplished while he was yet laboring at his trade, and acquired for himself the acknowledgement of being the genius of his native town, and his ability as a man of letters was recognized by the *literati* of Edinburgh.

This distinction was not rapidly achieved, but by slow and successive steps, for the hours which he devoted to literature were taken from the spare moments of a laborious life. It was not until he had passed nearly forty years of his life, that the period had arrived for him to make his enduring mark upon the science and literature of the age; this was in 1840. Previous to this time he had left the unprofitable and severe labor of stone-cutting, and had become an able and faithful bank clerk, in which capacity he was engaged for a few years.

In the great controversy relating to the subject of church patronage in the Church of Scotland, which afterwards resulted in five hundred ministers throwing up their livings in connection with the State, Hugh Miller took a deep interest, and he published a tract on the subject in answer to a speech of Lord Brougham. This tract attracted general attention, from the force of the reasoning displayed, and the extensive acquaintance of its author with the history and the law of the case in favor of the Free Church. It was proposed at this time (1840) to establish a weekly paper—*The Witness*—as the organ of the new ecclesiastical movement, and when the question arose respecting the most suitable person for its editor, the choice fell upon him. This certainly was a high compliment to his ability. The case was remarkable; here was a mechanic, who had never received more than a common school education, selected to edit the organ of a body of men all college bred, and some of them, such as Dr. Chalmers, distinguished throughout the wide world for their eloquence and contributions to every branch of literature. He came then from an obscure country town to the Scottish metropolis, celebrated for its learning and literature, and was soon recognized as the *man* eminently adapted for the post and it for him. He continued editor of *The Witness* up to the time of his sudden and sad death. Its circulation was large, its influence was powerful, and it was a great favorite of the most learned men in Great Britain. While editor, he gave to the world those works upon which his fame now principally rests, such as "The Old Red Sandstone," "The Footprints of the Creator," and a number of others, all of which have been republished in America. "The Footprints of the Creator" was a complete reply to an atheistical work called "The Vestiges of Creation," which presumed to found all its arguments on the teachings of geological science.

Hugh Miller was a profound geologist, and the charms of his style of writing invested with deep interest every subject which he treated. But a mason, with only a common education, he raised himself from an humble rank of life to a distinguished place among the best writers and most scientific thinkers of the age; and with the exception of overworking his mind during the past few years of his life, he affords a worthy sample of imitation to every mechanic.

Patent Case.

Wood Splitting.—In the U. S. Circuit Court, this city, Judge Hall presiding, a case was decided on the 15th inst. which had occupied the Court for several days. The parties were, J. A. Conover against Peter Roach and others. Complaint was brought by the plaintiff that the defendant, who has a patent on a machine for splitting match splints, infringed by its use his older patent on a machine to split wood. It conveys the blocks on an endless bed, and cleaves them with cutters, like the machine of Nevins for cutting crackers, illustrated on page 305, Vol. 5, SCIENTIFIC AMERICAN. The Jury in this case were unable to agree on a verdict after being out all night, and were discharged by Judge Hall from further consideration of the matter. C. M. Keller for plaintiff, George Gifford for defendants.

Petition for Extension of a Patent.

Burning Bricks.—Joel W. Andrews, of Bridgeport, Penn., has petitioned for an extension of his patent for an improvement in burning bricks, which expires on the 21st of March next—granted March 21, 1843. The petition will be heard at the Patent Office by the Commissioners on the 9th of March next, at noon. All persons opposed to the extension of this patent are notified to file their objections in writing at least twenty days before the day of hearing.

Ex-Examiner Langdon gone to Europe.

Among the passengers who sailed in the *Baltic* on the 3d was Wm. Chauncy Langdon, Esq., formerly one of the chief examiners in the Patent Office. He makes a tour to Europe on Patent business. We wish him a pleasant trip, and a prosperous mission. His friends can address him, care of the American Legation, London, where his head quarters will be while he remains in England.

Artificial Guano.

We have received a sample of artificial guano from Wm. Slocomb, of Milford, Mass., prepared by himself, and which, he states, can be manufactured for from $14 to $17 per tun. Judging of its quality by mere inspection, it will compare favorably with the natural Peruvian guano.

Steam Fire Plug Thawer.

The Chief Engineer (Samuel Ogden) of the Philadelphia Water Department has constructed and employed a very convenient apparatus for thawing the frozen fire plugs in that city. It consists of a small portable boiler with pump and pipe attachment, causing the steam which can be generated in a few minutes, to bear directly upon the inner pipes of a frozen plug, in such force as to completely thaw it in a space of time of from three to five minutes.

At the yearly meeting of the United States Agricultural Society held at Washington, D. C., on the 15th, it was decided to hold their next Annual Fair at Louisville, Ky.

Descriptive Index to Chemical Patents.

The following is an epitome of the chemical patents issued by the United States in 1855. It was prepared by Dr. Daniel Breed, of the U. S. Patent Office. As chemical processes cannot, like a machine, be illustrated by drawings, we think that Dr. Breed's plan of indexing, not only facilitates reference, but also affords an excellent means of diffusing a knowledge of new processes, and of thus giving an impulse to improvement in the Chemical Arts.—[Ed.

Amalgamation—Pressure applied to ores and mercury (quicksilver) in a cylinder: Leander R. Streeter, May 29.

Benzole—Distilled from coal in atmosphere of hydrogen: Stephen Meredith, July 31.

Bleaching—Diffusion of steam to all parts of (revolving) bleach, by means of perforated pipes, etc., to promote action of chemicals (appar.): Harrison Loring, June 5.

Bleaching—Exhaustion and atmospheric pressure, to hasten chemical action in pores of fabrics (appar.): Chas. T. Appleton, April 17.

Carbon—From gas retorts; used in smelting iron: Saml. Macferran, July 24.

Cotton Seed—Soaked or steamed, and then passed between rollers to break the hulls and to force out the kernel previous to expressing the oil: Danl. W. Messer, July 24.

Cotton Seed—Fibers removed from, by sulphuric acid (oil of vitriol,) etc.: Oscar Reichenbach, Oct. 23.

Digestion—Mixture to promote; made of malt liquor and Liebig's extract of the fourth stomach of the ox: J. J. Sherman, May 8.

Fire—Solution for extinguishing; bicarbonate of soda (pearlash) 16 lbs., to water 100 gals.: Ed. F. Overdeer, March 14.

Glue—Clarifying by treatment with mixture of sulphate of lime (plaster of Paris) and water, and decantation. Wm. Adamson, January 30.

Gold and Silver—Reclaimed from jewellers' scraps, and other metals, by oxydation of the latter by nitrate of potash (niter) under heat, without fluxing, and then dissolving the oxyds in sulphuric acids: L. B. Darling, March 27.

Gold and Silver Ores—Sulphurets oxydized by nitrate of soda instead of nitrate of potash (niter): Homer Holland, May 29.

Hides—Hair loosened by mixture of carbonate and sulphate of soda: Andrew H. Ward, January 2.

Hydro-carbon Vapor—Prevented from condensing by hot air or steam around gas generator and gas pipes (appar.): Samuel J. McDougall, June 5.

India Rubber Cloth—Made pervious to air, but not to water by sudden drying (of fresh cement) at 160° Fah. (evaporation of camphene makes the gum porous): H. G. Tyer, and John Helm, Jan. 2.

India Rubber and Gutta Percha—Vulcanized or not, rendered plastic by treatment with "bisulphurate" of carbon (?) and absolute alcohol: Francis Baschnagel, Aug. 14.

India Rubber Cloth—Made by pressing cloth upon each side of sheet rubber by means of rollers: H. G. Tyer and John Helm, Jan. 30.

India Rubber—Scraps and powder of hard, vulcanized, molded and cemented by heat and pressure: Chas. Morey, Jan. 9.

India Rubber, Vulcanized—Treated with alkalies and oil to remove sulphur: Sigismund Beer, May 29.

Lead, Carbonate (white)—Precipitated from solution of subacetate of lead by jets of carbonic acid (cls. app.): Rich. Barker, April 3.

Lead—Corroded by vapor from vinegar factory, and then converted into carbonate (white lead) by gas from fermenting wort, etc. (cls. app.): Robert Rowland, Oct. 9.

Lubricator—Mixture of oil with oleate of zinc, prepared by mixing a solution of soap with one of acetate of zinc: Jacob Marshall, May 22.

Lubricator—Nitrate of potash (saltpeter) hard soap and fat salt pork (refrigerating): Eleazur Brown, July 10.

Lubricator—Oil soap, hot water, and oil, lard, &c.: Freeman Prentiss, May 29.

Lubricator—Tallow, oil, and pulverized lead Nathan Dresser April 17.

Metals, Precious—Ores amalgamated by exhaustion and pressure in a cylinder: Leander R. Streeter, May 29.

Oil—Extracted from seeds by steam, both within and around the boiler: Wm. Wilber, Sept. 11.

Oil, for Wool—Mucilage from sea moss, flax seed, &c.: Thos. Barrows, Aug. 23.

Oil (fixed)—Mixed with crude turpentine for lubrication or illumination: Henry W. Adams, April 3.

Paper—Made from entire bark of resinous wood, by moderate heat, and then steaming, the resin being retained as size or stiffening: Chas. C. Hall, Feb. 20.

Paper—Introduction of soluble soap or wax into pulp, and then an addition of mineral salt to render the soap insoluble: Henry Glynn, Feb. 6.

Petroleum (Asphaltum)—Bitumen, &c., dry distilled at low temperature, then purified by acid, quicklime, (also peroxyd of manganese,) and re-distillation: Abraham Gesner, March 29.

Roofing—Use of lime in combination with rubber and shellac solutions, in composition for: Jas. West, Oct. 30.

Silica—Dissolved by steam forced into the under stratum of silicates in boiler (cl. app.): Benj. Hardinge, May 8.

Silver—See *Gold*.

Soap—Pressure and high temperature, to produce soap from neutral fatty substance and carbonated alkalies, (the glycerine and carbonic acid being set free): R. A. Tilghman, Jan. 2.

Soda—Borate of, (borax) made from native borate of lime by boiling the latter in water and acid, separating the lime, adding solution of soda, boiling, removing impurities, evap. and cryst.: Thos. Bell and Henry Scholefield, Oct. 9. Eng., July 5, 1854.

Soda Water—Diffusion of gas by perforated disk to charge water: Marcus F. Hyde March 6.

Starch—Sugar added to, during manufacture: Henry Colgate, July 24.

Sugar—Melted in a vacuum for refining: Conrad W. Finzel, April 17. Eng., May 7th, 1853.

Tannin—Extracted from old leather by caustic alkali, and being set free by acid, it is again used for tanning hides. The residual skin is made into glue, Obadiah Rich, Jan. 2.

Tanning—Bleaching and stuffing by three different mixtures, uses alum, borax, table salt, sulphuric acid, acetate (sugar) of lead, chlorhydrate (muriate) of lime, flour, gum tragacanth and alcohol: L. Woodbury Fiske, Feb. 6.

Tanning—Use of close vats in liming hides to prevent the formation of a pellicle on the surface of the vats: L. Woodbury Fiske, Feb. 6.

Turpentine—Crude, freed from chips by melting and passing through sieves: Alex. C. Blount May 8.

Wheat—Cleaned by mixing with freshly slaked (warm) lime before smut-milling: Chas. Campbell, May 1.

Wool—Softened and cleaned by a warm solution of nitrate of potash (niter), Thomas Barrows, July 10.

Zinc-White—Blast (hot or cold) diffused through the mass of the fuel, by means of perforated grate bars, to liberate zinc vapors: J. E. Burrows, Aug. 14.

Zinc-White—Blast (hot or cold) diffused through the mass of the fuel by means of perforated grate bars, to liberate zinc vapors: S. T. Jones, Aug. 14.

Zinc-White—Crushing ore and mixing with fuel, in combination with blast diffused through the mass, by means of perforated grate bars or otherwise: Saml. Wetherell, Nov. 13.

Zinc-White—Jets of air conducted into furnace to consume gases or smoke (cl. apps.): J. G. Trotter, Jan. 30.

Zinc-White—Produced from Franklinite by means of a peculiar furnace, in which air is mixed with vapors (cl. apps.): Thaddeus Selleck, Jan. 30.

Zinc-White—Spelter is vaporized in a close furnace, then the vapor passing into a chamber with heated air, is oxydized (cl. apps.): Smith Gardner, March 27.

Zinc-White—Currents of air in walls of a furnace to partially cool vapor before reaching the cooling chamber (cl. apps.): Saml. Wetherell, Feb. 20.

Crystalization of Wrought-Iron.

The following is from the *Mining Magazine* (American):—

"This peculiar change in wrought-iron is a subject well worthy the most careful examination, at this time when wrought-iron is every day becoming more and more used. That certain causes produce a change in the iron by which its strength is greatly diminished, and its fibrous quality destroyed, without any perceptible external change, the observations both in England and France leave us no room to doubt; and it is of the first importance that these causes should be well defined, and, if possible, the time during which wrought-iron can be subjected to them without incurring risk of fracture, determined by observation and experiment. The fracture of axles of locomotives and cars is not uncommon, and many lives have been destroyed by this accident, which has frequently happened in the ordinary working of the road, without any increase in the average load or speed, and without any previous sign of weakness. The experiments published show that when subjected to shocks and torsions, wrought-iron has a tendency to assume a crystaline state, and becomes brittle; this change may also be produced by magnetism and heat, and by the process of manufacture.

Mr. Hood, at a meeting of the Institution of Civil Engineers in England, stated that a large anchor, which had been in store for more than a century at Woolwich Dock, and was supposed to be made of extremely good iron, had been recently tested as an experiment, and had broken instantly with a comparatively small strain. The fracture presented large crystals. In this case, Mr. Hood believed that this effect was produced by magnetic influences dependent on the length of time the iron had been in the same position.

Mr. Low stated that at the gas works under his direction, wrought-iron fire-bars, though more expensive, were generally preferred. A pan of water was kept beneath them, the steam from which would speedily cause them to become magnetic. He had frequently seen these bars, when thrown down, break into three pieces, with a large crystaline fracture. The same change may be produced in any piece of wrought-iron by heating and rapidly cooling it by dipping it in water for a few times.

This change is also often produced in iron by hammering it when below a welding heat, and in forging intricate pieces of iron-work, the ends have frequently been jarred off while the other were being hammered. The larger the piece of iron is, the more difficult it is to keep it at an uniform heat, and the more likely this change is to take place: and we have lately learned from an English paper that "Mr. Nasmyth's wrought-iron gun has proved a complete failure; and this, not on account of the mechanical difficulties which had to be encountered—formidable as they were—but from an unexpected peculiarity in the material employed, when brought together in so large a mass as was necessary for Mr. Nasmyth's purpose."

The explosion of the large wrought-iron gun on board the U. S. ship *Princeton*, some years since, was doubtless owing to the same cause.

Concussion alone, if long continued, will produce this change. A small bar of good tough iron was suspended, and struck continually with small hand hammers, so as to keep up a constant vibration. This bar, after this experiment had been continued for some considerable time, became so exceedingly brittle that it entirely fell to pieces, under the light blows of the hand hammers, presenting throughout its structure a highly crystaline appearance.

The cold hammering of railway axles sometimes produces crystalization in the same manner as in the experiment just cited. In order to test this, Mr. Nasmyth subjected two pieces of cable bolt iron to one hundred and sixty blows between sways, and afterwards annealed one of the pieces for a few hours. The unannealed piece broke with five or six blows of the hammer, showing a crystaline fracture, while the annealed piece was bent double under a great number of blows, and exhibited a fine fibrous texture.

The shocks which the axles of road vehicles experience in use sometimes occasion this change, though the process must be very slow when compared with that of railway axles. The wheels of cars and locomotives being fixed to the axle, and the axle rotating is much more liable to this change from two causes. Where the wheel is of cast-iron, the different vibrations of the two different materials seem to facilitate this change, and in this country, where cast-iron car wheels are to a great extent used, the fracture generally takes place close to the wheel. Owing to the rapid rotation of the axles they become highly magnetic, and there seems to be a close connection between magnetism and crystalization. The presence of steam seems to have an influence in producing this change, owing, perhaps, to the developement of electricity, and this may have a great effect upon the axles of locomotives.

The severe winters of New England, as well from the action of frost on the iron axle, as from its effect in making the track rough, doubtless has a tendency to hasten the process of crystalization, and to produce fracture in axles affected by this change. We have known of the fracture of the axles of the driving wheels of two locomotives occurring on one road in New England in one week during the month of February, 1856. One of them was broken close to the wheel, and the whole surface, from the center to within an eighth of an inch of the circumference presented a bright granulated appearance; a narrow rim extending round the whole axle looked smooth, and of a duller color, as though it has been fractured for some time.

From the fact that this process of crystalization appears to begin in the center of the axle, and from a belief that the effect of the blows and concussions which an axle receives would be greatly diminished if the axle was made hollow; this plan has been tried upon several English roads, with highly encouraging results. A hollow and a solid axle have been run hot in a lathe for two hours, without oil, at a speed corresponding to twenty miles an hour traveling; the solid journal broke off, with 179 blows, quite short and crystaline; but the hollow journal would not break transversely, and longitudinally in several places, with four hundred blows, without any appearance of change in the texture of the iron.

There seems to be no doubt that under certain circumstances wrought-iron is liable to undergo a change by which its strength and tenacity are destroyed, and that railway axles are in a special manner liable to this change. Some of the causes, or supposed causes of it, we have briefly alluded to; not with sufficient fulness, perhaps, to afford much valuable practical information, but enough so, we trust, to lead others, with better opportunities and greater abilities, to investigate this subject, so important in its bearings both on the safe and the economical working of railroads."

[We omit a part of the extract respecting the difficulties in forging the wrought-iron gun of Nasmyth. A steel gun, of larger caliber than that of Mr. Nasmyth, has, since his failure, been successfully forged at the Mersey Steel Works, Liverpool; and repeated experiments have proven it to be the strongest cannon in England. The idea, then, that huge masses of wrought-iron cannot be forged without becoming crystaline, based upon the failure of Nasmyth's gun, or that of the *Princeton*, is incorrect.

Piesse's Pastils.

Willow charcoal, 1-2 lb., benzoic acid, 6 oz., 1-2 drachm each of otto of thyme, otto of caraway, otto of rose, otto of lavender, otto of cloves, and otto of santal.

Prior to mixing, dissolve 3-4 oz. niter in half a pint of distilled or ordinary rose water; with this solution thoroughly wet the charcoal, and then allow it to dry in a warm place.

When the thus nitrated charcoal is quite dry, pour over it the mixed ottos, and stir in the flowers of benzoin. When well mixed by sifting—the sieve is a better tool for mixing powders than the pestle and mortar—it is finally beaten up in a mortar with enough mucilage to bind the whole together, and the less that is used the better.

J. McG. of Va—Naphtha is an article of but small commercial importance—it cannot, for its own sake, be profitably distilled from bituminous coal. We cannot tell you where to obtain a small portable apparatus for manufacturing coal gas for a private dwelling. It has been proposed to light coal mines with gas, but in no instance, so far as we are aware, has this yet been done. The project is practicable.

J. C. A. of N. Y.—You can melt copper and tin in a covered crucible in a common stove. It forms an alloy of great hardness.

F. C., of Pa.—The pressure of water on the sides of a flume four inches wide, is the same in degree as in one six feet wide, if the depth of water is the same in both. The pressure is according to the depth of water.

E. F. M., of Wis.—A common horse radish grating machine can be made large, and driven by horse, water, or steam power.

S. E. T. of N. Y.—The best velocity for the teeth of circular saws is an open question. A different velocity is required for different kinds of wood. Sawyers are not agreed as to the most economical speed of such saws.

W. W. H. of N. Y.—We are obliged to decline your proposal. We have many of the same character which we cannot accept. A steamship can consume 80 tuns of coal per day, and a locomotive may consume a cord of wood in an hour. This consumption depends upon the speed which it is desired to get.

P. C. Jr., of Va.—It is announced, as you will see in another column, that the Committee on Patents in the House has resolved unanimously to report against the Woodworth Patent Extension, therefore it will not be necessary to use your article against it. We shall put it on file for future use if deemed necessary.

F. D., of Fire Island.—A patent could not be procured for casting skates wholly of malleable iron, in the manner you propose.

T. B. C., of Del.—We do not know of any one who has ever employed a windmill for the purpose of elevating water into a tank for the purpose of driving a water wheel. It would be a very foolish scheme indeed. Instead of using a windmill to raise water to drive a water wheel, why not drive the machinery directly by the windmill? This would save a great deal of unnecessary expense and prevent you from being laughed at for your folly.

L. J. O., of Wis.—We are not acquainted with any cement that will answer your purpose—wedging doors—that can be employed as a substitute for glue.

J. V., of Ohio.—The pamphlet to which you refer is not for sale.

R. Kirkman, of Upland, Delaware Co., Pa., wishes to purchase a machine for making reeds of power looms

M. G. K., of Ala.—We do not think you could secure a patent for your method of cultivating crops. It must be very expensive; besides, it is not new except in the particular application you purpose to make of it—which is not a patentable subject. Garden plants are cultivated in pots in the same manner.

Wm. Stormont, of Chambersburg, Pa., wishes to be informed who manufactures the best bran dusters.

L. G., of Boston—If you will inform us in what number that alloy recipe appeared, we shall be most happy to furnish you with a copy of the paper containing it, if we have one on hand, but we beg to remind you that we have not time to search for it ourselves. This will be your part of the business.

C. D. of Pa—H. G. Bulkley, of Kalamazoo, Mich., obtained the patent for Salt Evaporators to which you refer. Address him as above If you can make your egg-hatching apparatus work, it ought to find rapid sale at the price you state—12 cts. per dozen. We cannot decide as to its patentability without the aid of a sketch and description, or one of the hatchers. We should judge, from your brief statement in regard to it, that the chicken business could be carried on at all times, even in our pockets, while engaging in other affairs.

C. W. W. of Ky.—Unless you can procure copies of the Patent Reports of the past four years, of the Member of Congress from your District, we do not know how you can get them.

J. H. F., M. D. of N. Y.—You can purchase chemical and philosophical apparatus of Messrs. Benj. Pike & Sons, also of Benj. Pike, Jr., of this city.

H. W. D. of Vt.—Your plumb and level indicator is far from being new. See No. 12, Vol. 2 Sci. Am., for the precise thing in principle.

J. H. J. W. of Vt.—What do you mean by stencil plates for marking cloths? The patterns stamped on cloth for embroidering, are cut on wood blocks.

O. F. B. of Me.—The principal objection to the rotary engine is the uneven wear of its parts—pistons and piston chamber.

A. B. of Me.—The Electro-Chemical Bath is a name due to the application of the galvanism in the bath to patients. Any common bath can be arranged to apply the fluid.

W. & W., of N. Y.—The principal claim of E. Howe, Jr., is on the combination of the needle and shuttle. His patent contains no claim to the eye-pointed needle.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Jan. 17, 1857:—

J. F. R. of Iowa, $30; J. P. K. of L. I., $30; E. B. L. of N. Y., $55; H. P. of N. Y., $30; C. H. of N. Y., $70; K. & Co. of Vt., $55; P. B. of N. Y., $100; H. T. of Ind., $25; C. T. B. of Mich., $25; J. C. A. of Miss., $15; M. C. B. of N. H., $15; J. M. B. of Me., $25; A. R. H. of Pa., $30; A. M. G. of N. H., $30; T. P. S. D. of Me., $50; R. S. J. of Va., $20; G. W. S. of Conn., $35; G. M. M. of Conn., $27; A. F. P. of N. Y., $30; C. M. of N. Y., $55; J. W. S. of N. J., $25; A. B. of N. Y., $25; D. E. S. of Ohio, $30.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Jan. 17, 1857:—

J. P. of N. Y.; C. H. of N. Y. (2 cases); H. H. of Mass.; E. B. L. of N. Y; J. P. K. of L. I.; J. H. F. of O., H. T. of Ind; J. M. B. of Me.; C. T. B. of Mich.; G. M. M of Conn.; J. W. S. of N. J.; A. B. of N. Y.; S. G. T. of Ohio; T. J. W. of Conn.

Important Items.

Give Intelligible Directions—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

Complete Sets of Volume XII Exhausted.—We regret that we are no longer able to furnish complete sets of the present volume All the back numbers except 1, 2, 6, 9, 10, 11, and 13, we can yet furnish, if new subscribers desire to commence back to the beginning of the volume; but unless they specially request to the contrary when making their remittance we shall commence their subscription from date of receipt of the order.

Inventors Sending Models to our address should always enclose the express receipt, showing that the transit expenses have been prepaid. By observing this rule we are able, in a great majority of cases, to prevent the collection of double charges. Express companies, either through carelessness or design, often neglect to mark their paid packages, and thus, without the receipt to confront them, they mulct their customers at each end of the route. Look out for them.

Terms of Advertising.

Twenty-five cents a line each insertion. We respectfully request that our patrons will make their advertisements as short as possible. Engravings cannot be admitted into the advertising columns.

☞ All advertisements must be paid for before inserting.

Science and Art.

Locomotive Boiler for Burning Coal.

The accompanying figures are views of the steam boiler of Horace Boardman employed in the locomotive experiments which we witnessed on the Jersey City and Newark Railroad, and described on page 394 of our last volume. Since that period, patents have been secured for it in European countries through the Scientific American Patent Agency, and a full description of its construction and operation can now be given to the public.

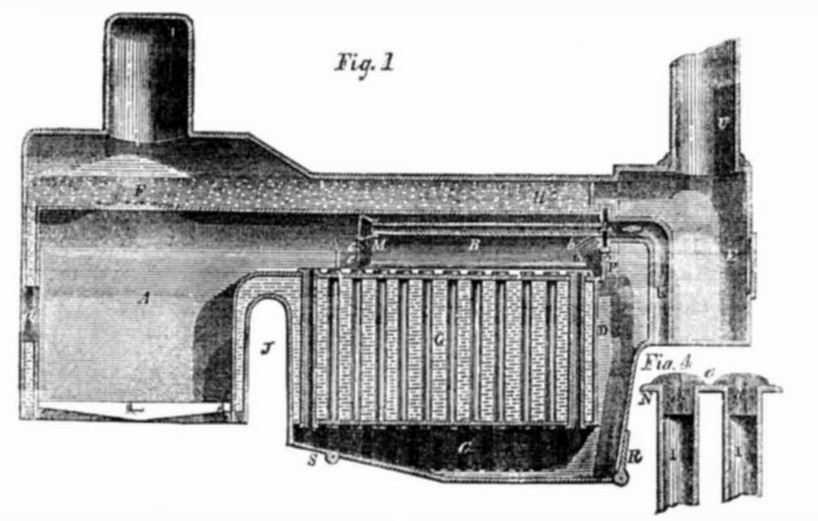
The first part of this invention consists in a certain arrangement of a fire chamber and water casing, the upper horizontal sections of both of which are greater than their lower horizontal sections, in combination with a series of descending flues, by means of which the products of combustion are conveyed downwards, to be thence discharged into the chimney. The object of this part of the invention is to give a more intense heat to the upper part of the interior of the boiler than by previous arrangements, and by that means to prevent the water in the lower and colder portions of the water space from circulating with that contained in the upper and hotter parts of the boiler, but at the same time to keep it moving slowly upwards by the action of the feed alone, which is introduced in the lowest part of the boiler.

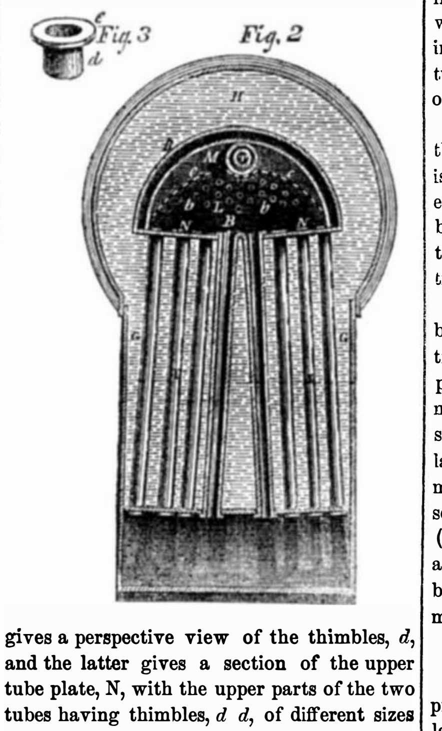
Fig. 1 of the accompanying illustrations is a central longitudinal vertical section of a locomotive boiler; and fig. 2 a transverse vertical section. The fire chamber consists of the fire-box proper, A, and a combustion chamber, B, which consists of an extension of the upper part of the fire-box horizontally through the body of the boiler, the common form of the lower part of the fire-box being retained. The combustion chamber communicates through a number of descending flues or tubes, I I, with a lower chamber, C, which may be called a gas chamber, which is as low down as the bottom of the fire-box, and at the end furthest from the fire-box communicates by an ascending flue, D, with the smoke-box, E. The water casing may be considered as divided into three portions, F G and H. The portion, F, which surrounds the fire-box, corresponds with a similar portion of the common locomotive boiler, the upper part forming the steam chamber; the portion G, occupies a position between the combustion chamber, B, and the gas chamber, C, and has the descending flues or tubes, I I, passing through it, and has vertical sides; and the portion H, which is above G, extends up the sides and over the top of the combustion chamber, occupies a position similar to that of the cylindrical body of the common locomotive boiler, and is of the form of a cylinder of larger diameter than the width of the portion G, below, as shown in fig. 2, thus making the upper horizontal section of the water casing of greater area than the lower horizontal section thereof; all parts of the water casing are in free communication with each other. In order to allow the boiler to be set over the driving axle of the locomotive, an open space, J, is made between the fire-box and the descending flues, I I. The fuel is supplied to the fire-box in the common way at the usual door, *a*, and the flame and gases evolved from the fuel rise in the fire-box and into the combustion chamber, B, into which numerous small streams of atmospheric air are admitted by a pipe, K, passing through the smoke-box, E; and the air thus admitted not only retards the too rapid escape of the heated inflammable gases and products of combustion, but is thoroughly mixed with the inflammable gases in the combustion chamber, and by inflaming them causes all or nearly all the combustible portion thereof to be consumed in the combustion chamber, producing a most intense heat in the upper part of the boiler. The flame and heated products of combustion which descend the flues, I I, into the gas chamber, C C, are gradually cooled in their descent, and therefore impart less heat to the lower part of the boiler than to the upper part; from the gas-chamber or flue, C, they escape to the smoke-box, and from thence pass to the chimney, U. At the end of the combustion chamber, B, nearest to the chimney, there is a damper, P, which serves to close that end of the combustion chamber, and compel the gases and heated products of combustion to descend the flues, I I; but this damper may be opened either for the purpose of employing a direct draft into the smoke-box in starting the fire, or for the purpose of sweeping or blowing the dust or cinders from the tube sheet or plate, N. The gas chamber, C, is provided with doors, R S, to enable the dust and cinders to be swept out of the chamber.

The pipe, K, before mentioned, terminates at its upper end in a box, L, which covers the greater portion of the end of the combustion chamber. From this box, L, numerous small tubes, *b b*, of various lengths, project into the combustion chamber, to introduce the air in small streams at different points over the descending flues; and one long tube, T, of a larger size leads from the said box into a second box, M, of arched form, which stands across the combustion chamber not far from the fire-box, and which has its lower part full of minute perforations, *c c*, for the issue of the air in jets into that part of the combustion chamber. This arrangement retards the escape of the inflammable gases, supplies them with oxygen, they are burned, and the entire smoke is consumed.

Experiment proves that the tendency of the flame and heated products of combustion is to pass over the first flue of the series next the fire-box or furnace, and not to descend into them until checked near the end of the boiler; this disseminates the heated products unequally through the flues, the first of the series not receiving their equitable proportion of heat, whilst the others are receiving too much.—This is obviated by graduating the openings in the tops of the flues or tubes which may be done by gradually diminishing the diameters from those nearest the fire-box or furnace to those most remote from it, (as shown in fig. 1,) so that greater space shall be presented to the flame and heated products at the points where its greatest tendency is to pass over the tubes; and lesser flue space where its tendency to descend is greatest. Or it may be done by dropping thimbles with graduated openings in them into the tops, flues, or tubes, using tubes of uniform diameter throughout. These thimbles are made with flanges, to prevent them from dropping down into the tubes, and to support them in their places, as shown in figs. 3 and 4, the former of which figures gives a perspective view of the thimbles, *d*, and the latter gives a section of the upper tube plate, N, with the upper parts of the two tubes having thimbles, *d d*, of different sizes inserted. The thimbles are made of cast-iron. Their bodies or stems are all of the same size externally, to fit easily into the tubes, and the openings only are graduated; and their flanches, *e e*, are wide enough to cover the ends of the tubes, and serve as shields to protect the riveted joints of the tubes and tube plate from the action of fire. The graduated shingles, *d d*, may be applied to the upright tubes of any boiler already in use. Another method of graduating the entrance to the flues or tubes consists in gradually diminishing the size of the upper ends of the tubes themselves, leaving the bodies of the tubes of uniform size.

LOCOMOTIVE BOILER FOR BURNING COAL.





In fig. 2 it is shown that the flue or tube plates, N N, incline upwards both ways from the center of the boiler, so as to stand at right angles to the tubes, I I, which are inclined outwards at their lower ends; this leaves a space between the tubes at the center of the lower tube plates or sheets for the deposit of sediment, and at the same time provides for the proper riveting of the tubes into the tube or flue sheets, which could not be effected by inclining the tube plates without inclining the tubes, or by inclining the tubes without the tube plates, as it is necessary to insure perfect riveting that the tube plates and tubes should stand at right angles to each other.

In this boiler an intense heat is produced in the upper part, at M, where the greatest heat is required to produce steam of the greatest elasticity. The supply of oxygen to the carbonic oxyd or smoke that may escape from the fire-box provides for the perfect combustion of all the fuel—consuming the smoke.

The locomotive to which this boiler has been applied on the New Jersey Transportation Railroad, has been quite successful as a passenger engine, for which it is positively necessary that all the smoke should be consumed. The coal employed is the Cumberland bituminous, the action of which upon the metal grate bars and fire-box is not so severe as anthracite; it is of the same soft (we use this term for want of a better) nature as the flame of wood fuel. This boiler can be employed for other engines as well as locomotives.

Scarcity of Flour Barrels.

The *Richmond Whig* (Va.) says:—"With the present prices of this article, and the knowledge of the fact that our millers are sometimes retarded in their operations by the scarcity of barrels, it is singular that a larger amount of capital is not invested in this line of manufacture. Fifty to sixty cents are, we believe, the current rates of flour barrels in this market. At this scale of prices, the making of barrels must be quite remunerative; while, with so many mills among us, and consequently such a constant demand, there is no reasonable prospect that prices will ever fall below a paying range."

We suppose that our flour mills will at no distant day have to use bags as substitutes for barrels. Bags are not suitable for holding flour designed for transportation by water but otherwise they answer every purpose very well, though not quite so well as barrels. They have the advantage over barrels of being cheaper, and capable of being used over and over again for a longer period.

Calculating Astronomical Machine.

We have seen it stated in several cotemporaries that the Dudley Observatory at Albany, N. Y., has been presented with one of the celebrated Swedish calculating machines of M. Shultz; the donor is John F. Rathbone, Esq., of Albany. It is said to have cost $10,000. It records the results of its calculations, and will thus facilitate the immense labor attending the atronomical calculations at the Observatory.

A bill is now before the New York Legislature, making it a penal offence to throw any dirt, coal ashes or filth into any dock or slip, in the harbor of this city. The dirty streets of the city, from which the filth is washed into the harbor by rain should also be included as subjects of fine, because they are the greatest offenders. The penalty for each offence is $250.

Literary Notices.

DINSMORE'S THIRTY MILES AROUND NEW YORK—By Railroad, Steamboat, Express and Telegraph—is the title of a conveniently arranged volume, its character being fully indicated by its title, The vicinity of New York has become so completely studded with towns and villages that it is almost out of our power to know how to reach them without a great deal of unnecessary labor: this little volume meets all these wants, and fills a place of real utility to the community. It is published by Dinsmore & Co., No. 9 Spruce street, who also publish "Dinsmore's Railroad and Steam Navigation Guide,"—the best and most reliable work, by far, ever attempted in this country.