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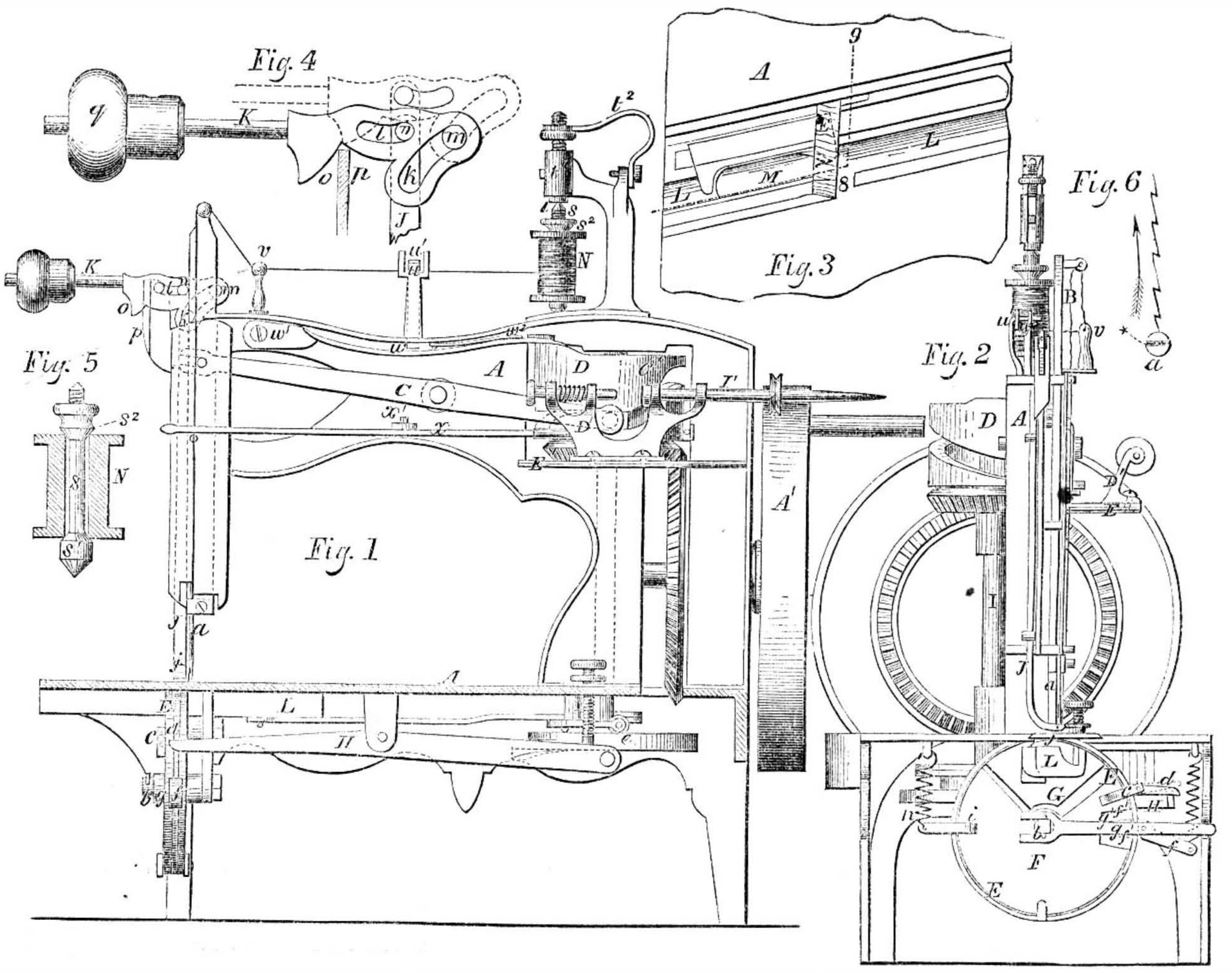
COWPERTHWAITE'S PATENT SEWING MACHINE.



Improvement in Sewing Machines.

On the 9th of last month (October) a patent was granted to C. J. Cowperthwaite, of Philadelphia, Pa., for the improvements on Sewing Machines illustrated in the accompany engravings.

Fig. 1 is a side elevation of the machine; fig. 2 is a front view of the same; fig. 3 is a plan view of the shuttle race and part of the feed motion. Fig. 4 is a side view of the weighted trip lever on a larger scale than the other figures. Fig. 5 is a section of the spool. Fig. 6 is a diagram illustration, which will hereafter be referred to. Similar letters refer to like parts.

The nature of the invention consists of two parts; first, in the employment of a weighted trip lever to apply the necessary pressure to confine the cloth to the surface, by which the feeding movement is imparted to the cloth. Second, in having a certain oblique arrangement of the shuttle race relatively to the line of the feeding movement of the sewing needle, whereby the stitches formed by the needle and shuttle are produced in line with each other.

A is the table of the machine. B is the needle bar, carried along to operate the needle, *a*. C is the lever, and D the cam which operate the needle bar. E is a thin ring of metal, the external face of which imparts the feed motion to the cloth; it is therefore serrated. F is a wheel fitted loosely to the interior of ring, E. It has about a quarter of an inch of its upper part cut away, to make room for a fixed sector, G, the arc of which fits to the interior of the ring. This sector is secured close under the table of the machine, and is so much smaller than the omitted portion of the wheel, F, as to allow the latter to be moved a little way upon axle *b*. The positions of wheel F and sector G are such, that the outer surface of the ring stands just level with, or slightly above the table, A, through an opening, in which it works like the feed wheel of many sewing machines. The wheel, F, carries an arm, *c*, which projects outwards beyond the ring, and has a lever dog, *d*, pivoted to it, the point of which is in contact with the outer face of ring E, and the opposite end rests upon the front end of lever H, which hangs under the table. The back end of lever H, is depressed at every revolution of a cam, *e*, on the principal shaft, I, and by that means its front end is thrown up and caused to act upon the lever dog to make it confine the ring, E, to the wheel, F, and having done so, to move the wheel upon its axle, *b*, thereby moving the ring to produce the feed movement of the cloth; the ring is only allowed to move in the proper direction for this purpose. It is prevented from moving in an opposite direction by a spring dog, *f*, attached to a brace, *g*, that extends from axle *b*, to one side of the stand of the machine—the dog clamping the ring to a projecting piece, f^1, which is secured to the back of the brace, *g*, and stands within an opening, g^1, in the periphery of wheel F. The ring, E being retained in this way, the wheel, F, is allowed to be returned alone, to be ready for the next feed movement by a sping, *h*, connecting an arm, *i*, of it to the table. The length of feed movement may be regulated by a screw applied either to the arm, *i*, or the lever, H

J is an upright bar fitted to slide in the stand of the machine, and provided with a bent foot, *i*, at the bottom, to bear upon the upper surface of the cloth, and confine it to the surface by which the feed motion is imparted. This bar, or its equivalent, is rigidly secured in sewing machines, to confine the cloth. The common method, however, is to use a spring to press down the bar to confine the cloth. This bar requires to be raised to adjust a piece of cloth to start the work, and when a defect in the seam has to be remedied; when raised, it requires to be secured by a set screw. On account of this raising of bar J, the needle bar cannot be allowed to descend within some distance of the table, for if it were set in motion with the bar, J, raised, it would strike, and bend or break off the foot. For this reason, the needles of common sewing machines have to be made very long, and their great length renders them weak. To obviate this difficulty, and allow the needle bar to approach near the table, and thus allow a short needle to be used, the weighted trip lever, K, is employed to give pressure to bar, J, and also to hold it up as long as it is not struck by the needle bar in its descent, and then to let it drop. This weighted trip lever, K, fig. 4, has two curved slots, *k l*, in it. The former slot is nearly horizontal at its back part, and from there it gradually descends until it is nearly vertical at the front; it receives a stationary fulcrum pin, *m*, attached to the stand of the machine. The slot, *l*, is in the form of an inverted arc, and receives a pin, *n*, which is secured near the upper end of bar J. This lever, K, has also a curved inclined piece, *o*, projecting from its under side. When the bar, J, is down, the lever, K, occupies the position shown in full lines, figs. 1 and 4, the pin, *n*, at that time occupying the extreme back of slot, *k*, the lever being prevented from moving backwards on the pin, *n*, by the projecting piece, *o*, on its under side, it being in contact with a fixed stop piece, *p*, attached to the stand of the machine. In this condition the lever, K, gives the bar, J, such an amount of downward pressure as is due to the weight, *q*, on the lever. To raise bar J, the operator takes hold of the weighted end of the lever, and pushes it upwards or backwards until the bottom of the projection, *o*, on the lever arrives at the top of the stop piece, *p*, as shown in dotted lines, figs. 1 and 4, by which movement the character of the lever is changed from one of the second to one of the first order with *p* for a fulcrum; and instead of pressing on bar J, it holds it up. When the lever, K, is in this position, with the bar, J, raised, if the foot should be struck by the needle bar, and commence to be pushed down, the slot, *k*, would move down the pin, *m*, and, by moving a very little distance, would throw the lever bodily forward, and throw the bottom of the projecting piece, *o*, off the top of the stop piece, *p*, allowing the inclined back side of the projection to slide down the stop piece, *p*, and the slot, *k*, to slide all the way down the pin, *m*, bringing down the bar, J.—Another quality of this lever, K, is, that it does not readily yield to any sudden upward impulse which the bar may receive, consequently, if any accidental knot or kink occurs in the thread under the cloth, the foot will not yield to the next upward movement of the needle, but will still confine the cloth to the table, perhaps causing the thread to break, but doing no injury to the needle, as is often done with knots and kinks in machines where springs are used to confine the cloth.

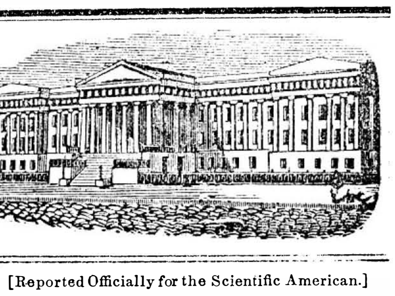
L, fig. 3, is the shuttle race. It is parallel with another line, forming angles of about 105 degrees and 75 degrees with the line, 8 9, in which the cloth moves, or with the plane of revolution of feed ring, E. The greater angle is on that side of the line, 8 9, from which the shuttle advances, and is towards that side of shuttle, M, which is furthest from the needle. The most common arrangement in sewing machines is to have the shuttle race parallel with the feed in the direction of the arrow, fig. 6; the eye* of needle, *a*, being at right angles, or nearly so, to the path of the shuttle. In this way the ends of those parts of every two consecutive stitches, which are seen on the upper side of the cloth, are placed side by side, as shown by fig. 6, which gives the seam a zig-zag appearance. By arranging the shuttle race as shown in fig. 3, obliquely, the dragging action of the shuttle on the outer side of the loop, or side furthest from the needle, draws every stitch into its proper place. The proper form of angle, L, 8 9, depends on the form of the shuttle.

N is the spool which carries thread for the needle; *s* is a screw spindle which passes through the hole in the center of N; its head, s^1, fig. 5, is conical inside, and enters a short distance in the hole. *s*2 is a nut which secures the spool to the spindle; it is also conical inside, and the two cones of s^1 and *s*2, entering the spool as shown, secure it concentrally to the spindle. This spindle is centered on the top of stand A at one end, and the other end in the small slider, *t*, working in a fixed guide, t^1. The slider, *t*, has a spring, *t*2, applied to force its center into contact with the end of spindle, *s*. This mode of setting and arranging the spool insures its working concentrically and with uniform friction, on its centers. This contributes to the production of uniform stitches, which cannot be obtained from common spools running loosely on a common spindle. The length of thread let off from the spool is regulated positively by a device consisting of a double fork, *u* (fig. 2 on the top of the stand,) and a movable clamping check piece, w^1, between which two pieces the needle thread passes on its way from the spool to the fixed guide, *v*, through which it is conducted to a guide at the top of the needle bar. The movable piece, w^1, is connected with a lever, *w*, which swings from one end on a pivot, w^1, and has its other end bearing upon the top of the cam, D, which operates the needle bar. The lever, w, is depressed by a spring, $w2$, to pull down the clamping piece, u, to make it bite the thread. The upper part of the cam is so formed as to leave the clamping piece entirely under the influence of the spring, and in operation upon the thread during the entire revolution of the machine, except from the time the point of the needle leaves the cloth till the ascent of the needle terminates, when it acts upon the lever, u, to raise up the clamping piece to free the thread, and allow a proper quantity to be drawn from the spool by the ascent of the needle; but during the time the needle is in the cloth, and when the interlacing of the two threads is being performed, it serves as a positive check to the needle thread. The length of thread given out is varied by moving the guide, v.

The device by which the thread is extended before the needle enters the cloth, consists of a lever, x, working horizontally on a pivot, x', having one arm opposite to the lower portion of cam D, and the other arm (which is elastic) so placed as to be capable of clamping the needle thread some distance above the needle, against the upright slide in which the needle bar works. The part of the cam which works on this lever is so formed as to leave it free, and not allow it to clamp the thread, except from the time the descent of the needle commences until the eye thereof reaches the cloth, thus keeping the thread extended as the needle enters the cloth and at the right side of the needle, thus preventing the kinking of the thread, and ensuring its entrance on the proper side of the needle. The thread must be liberated as soon as the eye of the needle has reached the cloth, to enable the needle to complete its descent without breaking the thread.

Attached to this machine there is also a very convenient small winding apparatus. It is secured on the plate, E', fig. 1, and is driven by the hand wheel, A', from which there passes a cord around the small grooved pulley on a spindle, P, supported on the arch, D', which holds the spools. The improvements in this patent embrace useful improvements, highly approved by those who have devoted attention to the numerous sewing machines brought before the public, and who know their defects and requirements.

More information may be obtained by letter addressed to Mr. Cowperthwaite, No. 1 Paul st., above 6th, Philadelphia.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING NOV. 20, 1855.

CUTTING TEETH OF GEAR WHEELS—G. W. Bigelow, of New Haven, Conn.: I claim giving the blank or wheel to be cut, an automatic feed motion, by means of the pulley, P, on the shaft, M, said pulley having a coil spring, Q, within it, the screw, S, on the shaft, L, the worm wheel, T, on the lower ends of the shaft, U, and the circular plate, O, having projections, e e, upon its periphery, and the pawl, X, and bar, Y, provided with the arm, Z, the cam being operated by the pins, i, on the inner side of the pulley, D, the parts being arranged substantially as shown and described.

[Common gear-cutting machines require the assistance of an attendant for every tooth that is cut. The blank is placed upon a table, and after the tool has descended and cut the tooth, an attendant rotates the table to the proper distance for a new incision.

Mr. Bigelow's improvement consists in the introduction of a feed motion, which is self-acting, and so arranged that after the blank is once secured in its proper place, it will be rotated at the right intervals and distances without the help of an attendant. All the hand labor required is simply to remove the finished wheels and substitute fresh blanks. One man may thus attend a dozen machines instead of being confined to a single one, as at present. We are much pleased with this invention. It is quite simple in its construction.]

LOCKS—J. H. A. Bleekmann, of Ronsdorf, Prussia: I claim the mode of constructing and arranging one or a number of tumblers, as described, which may be locked and opened with changeable key bits, as set forth.

COTTON GINS—L. S. Chichester, of New York City: I claim giving to one or both of the rollers of a roller gin, the separating motion, substantially such as described, to separate the rollers, for discharging the seed, after the fibers have been separated, as set forth.

I also claim the guard and discharge plate, substantially such as described, in combination with the two rollers of a roller gin having the separating motion, substantially as described and for the purpose set forth.

And I also claim the cleaning and collecting brush, arranged substantially as described, in combination with the ginning rollers, substantially as and for the purpose set forth.

POTATO DIGGER—A. A. Marcellus, of New York City: I claim, in combination with the revolving rakes, the undulating surfaced separator, C, and receiver, O, when arranged in the manner and for the purposes set forth.

KNITTING MACHINES.—Timothy Bailey, of Ballston Spa, N. Y.: I claim, first, actuating the sinking or other burrs, by means of a gear wheel, whose teeth are actuated or rather acted upon by the needles, as a rack, whereby the wings in said burrs are freed from contact with the needles, and do not nip the yarn, tightly, between said wings and needles, substantially in the manner and for the purposes described.

Second, I claim carrying back the old stitch, and holding it back by means of a disk wheel and segment, having a planetary motion, as set forth, and also the leading of the finished cloth through a ring, or its equivalent, surrounding a shaft, having a planetary motion, whereby the action of the drag weights is properly adjusted upon different portions of that circuit of the cloth which is being acted upon by the needles and levers, substantially as specified, and in combination with a cloth or knitted tube, to which is imparted, substantially such a revolving motion as is described.

Third, I claim a self-adjusting climbing drag weight, constructed substantially in the manner set forth.

Lastly, I claim a stationary series of needles in circuit, when constructed and arranged substantially in the manner described, in combination with revolving levers, driven by independent gearing, and traveling from needle to needle, whereby the turning of the finished cloth on its own axis, is avoided, and all difficulties incident thereto obviated.

MOP HEADS—Alex. Barns, of Ashtabula, O.: I claim attaching the screw, C, to the cross-piece, D, and riveting it in such a manner that its revolution is not obstructed, combined with the bow and nut, as described, for the purpose specified.

MARBLE SAWING MACHINE—F. Noette & A. Schmidt, of Brooklyn, N. Y.: We claim the combination and arrangement of the above-described devices, when the same are all arranged and operated in the precise manner, and for the purpose described, and not otherwise.

[In this improvement the block of marble to be sawn stands on end, instead of laying horizontally, and the taper is cut from the apex down to the base. The saws are strained between rods furnished with right and left screw threads; the spreading of the saws is accomplished by means of pins, which, at every stroke of the saws, come in contact with nuts on the screws; the movement of the nuts forces the saws apart.]

DOUBLE ACTING PUMPS—D. W. Clark, of Bridgeport, Conn.: I do not claim the mere intermediate arrangement of the driving gear to the two pistons in the one cylinder, as such is old; neither do I claim operating the pistons of pumps, by revolving cranks, or eccentrics, whether pitched in relation to each other, so that the pistons move simultaneously in opposite directions for the full length of their strokes, or only for the partial length thereof, when the said pistons operate in separate chambers, or barrels, and are not driven by intermediate gear in the one cylinder, or barrel.

I claim giving to the two reciprocating pistons, when arranged to move in the one cylinder, by intermediate gear, as specified, a simultaneous travel in the same direction, at or about the period of change of stroke in the pistons, while, for the remainder, or the greater part of their stroke, they travel in opposite directions, to effect the required double action specified, of the two pistons in the one cylinder or barrel, and whereby the one piston serves to follow up the movement of the other in their joint action upon the one body of water, between the pistons, till a fair hold is got upon the water, to render the suction continuous, neutralize the effect of leakage, and prevent the formation of an air or vacuous space, between the two pistons at their turning stroke, and run apart from the water between them, substantially as specified, by means of the revolving eccentrics, G, or their equivalents, pitched or set with lead, in relation to each other, and the two pistons of the single cylinder, as set forth.

[In this pump two pistons are employed working in one barrel; both pistons are operated by a crank, and connected in such a manner that, by turning the winch, a steady continuous stream of water is thrown, without the employment of an air vessel. This improvement combines the advantages of a rotary pump together with those of the ordinary construction. It is strong, simple, compact, effective, and comparatively cheap. As a fire engine it may be employed with success, we should think, in stores, factories, vessels, and wherever it is desirable to force a steady stream to a great elevation.]

TICKET HOLDERS—E. P. Fraissinet and H. E. Reboul, of Paris, France. Patented in France Feb. 2, 1855: We do not confine ourselves to the forms described, as they may be varied, without deviating from the principle described.

But we claim the construction of an apparatus, or instrument, for carrying, securing and exhibiting tickets, as described and referred to.

PRINTING YARNS AND CLOTHS—Thos. Henderson, of Lowell, Mass.: I claim, first, the printing or coloring types, B, arranged and operated, essentially and for the purposes set forth.

Second, I claim the coloring distributors, and boxes in which they revolve, when they are constructed and operated, substantially as described, for the purposes set forth.

Third, I claim the types, B, in combination with jacquard operation, for printing and coloring figured goods, when they are arranged and operated substantially and essentially as set forth.

Fourth, I claim the types, B, in combination with the color distributors and boxes, arranged and operated essentially as set forth.

POLICEMENS' RATTLES—Joseph McCord, of Philadelphia, Pa.: I claim in policemens' rattles, the securing of the handle to the edge of the ratchet wheel, and at right angles to the axis of the latter, for the purpose of turning down the handle, out of the way, thereby rendering the instrument more convenient to carry in the pocket, and for the further purpose of combining a mace and rattle in one instrument, substantially in the manner set forth.

RAILROAD STATION INDICATORS—C. A. McEvoy, of Richmond, Va.: Disclaiming the use of an indicator, pointing to fixed signs, and also movable signs, where but one side is visible.

I claim presenting a movable sign, or symbol, to passengers of a railroad car, so that both sides of said sign shall be visible and utilized as annunciators, by swinging said signs to the angles of a polygonal reel, in such manner as to make each sign in turn drop through a slot, substantially as set forth.

GUN LOCKS—John Phin, of Rochester, N. Y.: I claim securing accuracy of aim and safety in the use of trigger cocking fire-arms, by means substantially as described, which consist, first, in the sear, s, and spring, i, to hold the hammer up.

Second, in the spring, a, acting on the trigger to release said hammer.

COTTON PRESSES—Wm. F. & Charles J. Provost, of Selma, Ala.: We claim, first, the manner of hanging and holding the platen, D, by means of the rod, k m, and the coupling link, r, so that the platen may be swung around out of the way, and the rod, m, let down, as described.

We also claim, in combination with the levers, G F, and their fulcras, the pivoting of the long one of said levers to one side of the center of the follower to cant, and to apply the power of the press in as near a direct line to the resistance as possible, as described.

COAL SIFTERS—Gerard Sickels, of Brooklyn, N. Y. I claim the peculiar manner of dividing the cylinder at A1, A2, for the purpose of furnishing a receptacle for the separated coal, substantially as described.

[The above improvement is intended for use in private families, the object being to separate the good coal from the ashes, without creating a dust. The contrivance consists of a round box, something like a half barrel. In the upper end, and set at an angle, there is a screen, between the bars of which the teeth from a revolving horizontal shaft pass. The ashes, as they slide down the screen, fall through into a receptacle immediately below, while the coal coming in contact with the teeth, is knocked along out of the way of the ashes, and falls into a separate receptacle. Housekeepers, we think, will be much pleased with this invention.]

PREPARING LEATHER FOR THE MANUFACTURE OF BOOTS AND SHOES—Charles Rice, of Boston, Mass., and Sylvanus H. Whorf, of Roxbury, Mass.: We claim, first, the retracting guard, G, in combination with the spring, n, and rod, m, when constructed, arranged, and operating from the rakers' seat, in the manner and for the purposes specified, and not otherwise.

Also the grain guard, P, when constructed, arranged, and operated in the manner, and for the purposes specified, and not otherwise.

TREATING LEATHER FOR ENAMELING—T. P. Howell & N. F. Blanchard, of Newark, N. J.: What we claim in our machine for softening tanned and dry leather, is not the details thereof, separately and apart from their use in combined action.

We claim tho combination of the cylinder, as constructed, with the elastic slotted bags, as constructed and used, for softening tanned and dry leather, for japanning purposes.

HAND SEED PLANTER—D. W. Hughes, of New London, Mo.: I do not claim, separately, or in itself, the perforated slide, D, working in a seed box for distributing seed, for that is an old and well known device.

But I claim the seed box, C', and perforated slide, D, when attached to the blades, A A', connected by a joint, a, arranged substantially as shown, for the purpose specified.

[Mr. Hughes' hand planter consists of two parts, pivoted together like a pair of tongs. The planting is done by thrusting the bottom parts, closed, into the ground, and then opening them by the handles at the top. The opening is done with the fingers, while the implement is in the ground; by this action the hole is enlarged and the right quantity of kernels deposited therein: the feeding of the grain is done by a slide which opens and shuts, in accordance with the opening and closing of the legs of the apparatus. This is quite a novelty among corn planters.]

ATTACHING TOPS TO SEATS OF CARRIAGES.—Lyman Jacobs and E. C. Landon, of Castile, N. Y.: We claim the described method of concealing the back rails of seats to carriages, by means of grooves in the back of the tops.

And we further claim, in combination with the grooves, the mode of fastening tops to seats of carriages, by means of beveled nuts and bolts, as represented at E E, and D D, fig. 1, and F F', and G G, fig. 2.

METHOD OF INSERTING TUBES IN EVAPORATING PANS, &C.—Geo. H. Thomas, of Kingston, Mass.: I claim the method of securing tubes to tube sheets, by making the tubes without projections on the surface, that they may be inserted directly through holes in the tube sheets, substantially as described, in combination with clamps at the ends of the tubes, and overlapping the joints, substantially as, and for the purpose specified.

REVOLVING MEASURING WHEELS—Louis Young, of New York City: I do not claim the manner of transmitting the motion from the measuring wheel, a, to the connecting wheel, B.

But I claim the arrangement of the box containing the count wheel, B, in connection with the stock carrying the measuring wheel, a, in such a manner that said box is made to serve as a convenient handle for working the instrument.

NUTMEG GRATERS—Hiram Carsley, of Lynn, Mass. assignor to himself and Edmund Brown, of same place: I claim the combination of the box and holder, and the pressure spring or contrivance with the rasping surface of the grater, the whole being applied and made to operate together, substantially as specified.

LIFTING JACKS—Francis Drew, of South Boston, Mass., assignor to himself and Solomon S. Gray, of same place: I claim the described jack, consisting of the sockets, F F', with their connecting arms, H H', and pawls, I I', in combination with the ratchet wheels K K', and cog wheels, C C', arranged and operating in the manner set forth.

FILTERING FAUCET—Louis Finger, of Boston, Mass., assignor to himself and Lazarus Schell, of same place: I claim the brush, O, in combination with the plate, L, and passages, K, operating in the manner, and for the purpose substantially as set forth.

STREET SWEEPING MACHINE—M. W. St. John & Isaac Brown, of Leonardsville, N. Y.: We claim, first, the reciprocating brooms or brushes, W, attached to a bar, T, which is connected with the pitmans, P P, the parts being arranged as shown, or in an equivalent way.

Second, we claim the endless apron, X, placed underneath the machine, for the purpose of receiving the dirt from the brooms or brushes, W, and conveying it from underneath the machine, and depositing it in winrows in the street, as described.

Third, we claim the combination of the endless apron, X, and reciprocating brooms or brushes, W, arranged as shown and described.

Fourth, we claim connecting the swivel wheel, J, with the back end of the draught pole, L, by a bar, N, substantially as shown, for the purpose specified.

Fifth, we claim placing the driving wheels, C C, and pinions, F F, loosely on their respective shafts, and operating the ratchets, G G, by means of the flanched sliding plate, H, substantially as shown, for the purpose of throwing the working parts of the machine in and out of gear with the driving wheels.

[Street sweeping by machinery is no longer a novelty; it is rapidly becoming one of the common institutions of society. In London, Paris, New York, Philadelphia, and other populous cities, the hand broom is fast disappearing, and the mechanical sweeper doing ten times the work, operating with equal certainty in the night time or the day, and never becoming weary, is taking place.

Rotary brushes, operated by means of gearing connected with the cart wheels, are employed in most of the sweeping machines; but in the present improvement reciprocating brushes are employed. The brooms are made to move back and forth, and sweep over the ground in almost precisely the same manner as the hand broom. Each brush works independently of the other, and is pressed into place by a spring from behind; this arrangement permits a yielding movement, and allows the brooms to lift, separately, over stones or other impediments, which happen to lie in their way, without disturbing the other brooms. The dirt is swept on to an endless revolving belt, which carries it one side and discharges the same on to the ground. As the machine advances through a street, the filth will be thrown up into long winrows, to be subsequently removed by shovels or by another machine.

There are some other excellent features belonging to this patent, one of which is a novel way of connecting the third or steering wheel with the draft tongue of the cart. Taken altogether the invention strikes us as one that promises to be of great value and utility.]

MILLS FOR GRINDING COFFEE, &C—Cornelius W. Van Vliet, of Fishkill Landing, N. Y., assignor to Charles Parker, of Meriden, Conn.: I claim the peculiar arrangement of the crushing and the grinding cones, as described, and in combination therewith the passage, i, leading from the largest circumference of the upper cone to the smallest circumference of the lower cone substantially as set forth, and for the purposes specified.

ENVELOPES—Emanuel Harmon, of Washington, D. C.: I claim the manufacture or preparation of envelopes with parallel lines on the interior of the back, as set forth.

GRINDING APPLES—W. O. Hickok, of Harrisburgh, Pa.: I do not claim the cylinders on whose surfaces grooved and fluted helical ribs are formed, and which move with different velocities, as these were patented by Samuel W. Powell, in 1849.

But I claim the breakers, d d, constructed and applied substantially and for the purpose as described and set forth, whether the said breakers are used in combination with the helical ribs, c c, and the tube, b b, so as to produce a separate and distinct depression, e, around each tooth, as described and set forth, or whether the said breakers are used in combination with the teeeth above, as shown.

DESIGN.

STOVES—Benj. Wardwell, of Fall River, Mass.

Making Hams.

As this is about the period of the year when most families *lay down* their meat for winter use, a few suggestions on the subject will be acceptable to many.

PORK HAMS—When the meat is perfectly cold, after being killed, it is ready to be salted. The salt should be of the best quality—solar evaporated, ground fine, is, perhaps, the best kind—and to every pound of it one ounce of fine white sugar should be added. The hams should be laid upon a table or bench, and every part carefully rubbed with this salt; then they should be laid in a dry tub until the next day. The same operation should be repeated every day for four days, taking care to turn the hams in the tub every time they are laid down. After this, the operation may be repeated once every two days for a week, when it will be found that the meat has absorbed sufficient salt to preserve it for family use. After this they may be slightly smoked, or hung up to dry. Hams intended for sale should be once rubbed over with the salt, as described, then placed in a strong pickle. This pickle should be made of the best salt—10 lbs. to the 100 lbs. of pork, with one ounce of sugar to the pound added, and half an ounce of saltpeter to the ten pounds of salt, all boiled for about fifteen minutes, and the froth skimmed off; it is then set aside to cool. When cold, the hams may be placed in this pickle and left for three weeks. They should then be lifted, hung up for three or four days to drip, and are then fit to be smoked.

For family use, instead of smoking the hams after they are salted and dripped, if they are simply rubbed over with black pepper and hung up for a few days to dry, the meat acquires a very fine flavor. A mild smoky taste may be given to hams without smoking them, by simply smoking the barrels in which they are to be laid down in pickle. This is a good plan, because the taste of the smoke—which some persons like—is given to the meat without discoloring it. Sides of pork should be treated in the same manner as hams laid in the pickle; but for home use, during winter, by merely rubbing the sides with salt every day for a week or ten days, then hanging them in a moderately cool place to dry for use, the meat is much sweeter than that laid down in pickle. This information we have derived from one long engaged in curing pork, and we have satisfied ourselves, practically, of its correctness. The amount of salt for rubbing on the meat does not require to be stated; no person can go wrong by rubbing on too great a quantity. The sugar is used for the purpose of nullifying the bitter taste of the saltpeter, and also that of any *bittern*—sulphate of magnesia or sulphate of soda—that may be in the salt.

BEEF HAMS—The finest beef hams are made by cutting out the entire bone of the hind-quarter, then rubbing in the salt and sugar, the same as described for pork hams, turning them over and rubbing them every day for one week. After this they are hung up to drip in a cool dry place for three days. They are now taken down and rubbed all over, on a table or bench, with some fine salt, black pepper, and cloves, all ground together. About one ounce each of salt and pepper and half an ounce of cloves are sufficient for thirty pounds of meat, but the exact quantity cannot be given. No person can go wrong if he rubs every part of the whole surface of the ham with some of this salt and pepper composition. The ham is now fit to be rolled. This is accomplished by rolling it into a cylindrical form, swilling it round from the narrow to the thickest end, and hanging it up to dry for about ten days before it is used. It is cut in round slices for frying by commencing at the butt end. A stout cord is used to swill, or tie such hams, and it must be looped or turned under on both sides along the coils of the cord, so as to have every coil firmly bound and held in place when the ham is being cut in slices for daily use. Hams made in this manner are the finest in the world—a luxury.

Smoked beef is to be found in abundance in our markets, but it is a poor catable of the meat kind in comparison with beef prepared as described. We hope some of our farmers will make some such beef hams this fall for family use. They will not keep in summer weather so well as smoked beef—so it is said—but of this we are not certain.

[For the Scientific American.]

Photographs and Stereoscopic Angles—The True Theory.

A communication appeared in No. 5, this Vol. Scientific American, with the above heading, the doctrines of which appear so monstrous, that, were it not for the high position the author occupies in the daguerrean art, I would not have seen fit to controvert them. I have come to the conclusion, after perusing this article carefully, that the author has not studied, nor does not understand the article which I had the honor to contribute to your valuable journal on page 251, Vol. 10. I have there proven that stereoscopic pictures, possessing all the stereoscopic relief to which they are, by nature, entitled, can be taken from two points of sight, distant from each other only 2 1-2 inches, or the same distance the human eyes are apart, without having recourse to Messrs. Southworth & Hawes' patented arrangements, the fallacy of which, I supposed, would, ere this, have become apparent to the inventors themselves, or I should have given the subject more than a mere passing notice in my article alluded to.

The human eyes can only coalesce objects that are parallel to the base of vision, and they cannot coalesce vertical and horizontal objects of the same picture at one and the same time, (the implied assertion of Mr. Southworth to the contrary, notwithstanding.) He makes this strange assertion, "that the human eyes, in one fixed position, do not see objects correctly." If this were true, I would ask Mr. Southworth if he does not believe the Creator, in his infinite wisdom, would have placed one eye in its present position and the other in the place now occupied by the bump of causality?

That Mr. Southworth has read inattentively, is evident from the allusion which he makes to a paper read by Sir David Brewster before the British Association for the Advancement of Science, and illustrated his theory by experiments, attempting to prove that "the distortions universally noticed in stereoscopic pictures was caused by using lenses larger than the lens of the eye," &c. Now any person that will take the trouble to obtain and read the article of Mr. Brewster's, which originally appeared in the report of the British Association for 1852 and 1853, and which I find is the same that I alluded to on page 358, Vol. 10, of your journal, they will find that not one word is said in the whole article about stereoscopes at all!

Let Mr. Southworth take a 1-4 size daguerreotype plate and draw a line lengthwise upon it in such a manner that the line will divide the plate into two equal portions, and fix a pin say four inches long, perpendicular, upon the middle of said line, then take, by means of his patented arrangement, a stereoscope picture of the plate so arranged, in such a manner that the resulting pictures will be as large as will fit a one-quarter sized stereoscope, he will find that by looking at the picture through the stereoscope it will be impossible for him to coalesce the two pins on the pictures into one (which they will do, however, if the pictures are taken in the manner pointed out by me on page 251,) and the reason why they do not do so, is perfectly obvious, from the fact that the upper ends of the pins do not (in the picture) fall upon the line of the arranged plate; the base of the pins do, but the tops do not; whereas, if the pictures are taken either in the ordinary, or in the manner pointed out by me, both the base and the top of the pin will fall upon the line.

The human eye possesses the power of coalescing pictures situated parallel to the base of vision, to the extent of 37 1-2 degrees, and they can, and do see one and the same object naturally, under every angle of convergence, from 37 1-2 to 0 degrees, simply by viewing the object at a greater or less distance from the eye; but they cannot coalesce pictures situated vertically to the eyes. They can combine pictures taken vertically, that is to say, by two cameras, one immediately above the other, just as well as those taken horizontally, that is, if they are put into the stereoscope in a laying or horizontal position. In that case a picture taken of a man, for example, while standing, would, when properly put in a stereoscope, appear, in that instrument, as if he were lying down; but there is no compromise between the vertical and the horizontal position.

Writers on binocular vision have always spoken of the eyes as if they possessed no compensating power for the loss of stereoscopic relief of distant objects. The fact, however, is, that they *do* possess such power to a considerable extent, which they exercise by means of two very ingenious contrivances. The first is the ball and socket joint of the eye, by means of which they move further apart for distant than for near objects, thereby increasing the angle of vision. The other is, they possess the power of contracting their aperture, and they do so when viewing distant objects. Now I have established the fact in the article before alluded to, that the stereoscopic relief of pictures is increased by a diminution of the aperture of the lense, and consequently the contraction of the diaphragm of the eye also increases the stereoscopic effect. Hence it is that we find in small insects not only small eyes, but also that they are situated close together. Their sphere of vision is comparatively limited, from the very fact of their eyes being small, and objects to us invisible become visible to them. Their eyes are natural microscopes—ours natural telescopes. If our eyes were no larger than a mathematical point, the most minute atom of matter would be visible to us.

In conclusion, I may state that I speak from experience, having, as soon as Messrs. S. & H.'s patent was issued, taken a picture according to their claim, which picture possesses the fault one might naturally expect, namely: if the two pictures are placed in the stereoscope in such a manner that the four eyes of the portraits are parallel to the sides of the case, the rounds of the chair upon which the person sits, will not be parallel, producing a strain and contortion to the eyes of the observer in their endeavor to assimilate this unnatural picture. This contortion is somewhat similar to what takes place when viewing ordinary stereoscopic pictures, that have not been put up parallel—an occurrence that often takes place in the hands of the inexperienced or careless artist. I have very frequently met with pictures which were put up, one at least a quarter of an inch higher than the other. Indeed, it is not unusual to meet with pictures in the rooms of some of our best artists, which are put up stereoscopic *reverse*, that is, the right picture where the left one should be, and *vice versa*. How is it possible to see such pictures correctly?

John F. Mascher.

Philadelphia, Nov. 14, 1855.

British Association for the Advancement of Science.—No. 1.

The above association held its Annual Meeting, this year, in the latter part of the month of September, in the city of Glasgow, and it has been generally acknowledged to be the best ever held. In a series of two or three articles, we will endeavor to present an abstract of some papers read before it, which, we believe, possess an interest for our readers.

Alloys of Metals.—Amongst the papers submitted to the meeting in the department of Practical Science, was an important one on some alloys of iron and aluminum, by Professor F. Crace Calvert, of Manchester. The experiments on the subject had been undertaken with the view of solving one of the great chemical and commercial questions of the day, namely, that of rendering iron less oxydizable when exposed to a damp atmosphere. Professor Crace Calvert, in conjunction with Mr. Richard Johnson, had succeeded in producing two new alloys, composed of iron, combined with that valuable metal lately obtained by M St. Claire Deville—aluminum. These two alloys are composed as follows: First, 1 equivalent of aluminum, 5 equivalents of iron; second, 2 equivalents of aluminum, 3 equivalents of iron; and the last alloy possessed the useful property of not oxydizing when exposed to a damp atmosphere, although it contains 75 per cent. of iron. Messrs. Crace Calvert and Johnson hoped to discover, before the association next met, a practical method of preparing this valuable alloy, which would render essential service to arts and manufactures. The following alloys were also described: One composed of 1 equivalent of aluminum and 5 equivalents of copper; one other of iron and zinc, composed of 1 equivalent of iron and 12 equivalents of zinc. This last alloy is not only interesting from its extreme hardness, but it is produced at a temperature of about 800 deg., being formed in a bath of zinc and iron, containing 14 tuns of metal, through which iron wire is passed, when coated with zinc, or galvanized. The action of acids on those alloys was stated to produce this curious fact—that, although hydrochloric acid violently affects zinc and tin in alloys containing those metals, with copper they are but very little affected by this powerful acid, and similar results with sulphuric and nitric acids.

Fire Arms—On their Length, Bore, and Composition—W. B. Adams read a paper on artillery and projectiles, which attracted much notice, the object of the author being to establish the importance of the length of the bore in proportion to the diameter, and the propriety of increasing length rather than diameter, with a view to more extended range. Long guns were more difficult of construction than short ones, but the American rifle proved the advantages of length, by which were obtained, first, greater certainty of aim; secondly, greater truth of direction; and thirdly, expansive action of the powder, in addition to the mere explosive force following up the projectile, instead of being wasted in the air. Reasoning by analogy, if the American rifle was right, modern artillery was wrong. It had been shortened for convenience of weight in transport, and to save space on shipboard; and it was sought to compensate the advantages thus lost by increasing the strength, and the quantity of powder. Mr. Adams urged the necessity of using breech-loading guns, and suggested that, in steam vessels, streams of water could be driven through them, to cool them down when heated.

Professor Robinson observed, that the exact flight of a projectile, that it may with more certainty strike the object, could only be attained by making it rotate in its flight. To effect this by any external wings or curved grooves was impossible, as it was well known that there is a certain mass of air carried always along with the shot, which prevents any external spiral from producing the desired effect. In a 24-pounder, the pressure of explosion is 72 tuns on each square inch, which is ten times the force of the tensile resistance of a square inch of the metal. The additional strength is obtained by the greater thickness of the iron forming the breech, and which gradually diminishes towards the muzzle. Every discharge changes the form and structure of the gun. The force required to give the rotatory motion to a ball is equal to one-half of the simple projectile force; and hence, while a shot from a plain bore is projected with a velocity of 1500 feet per second, that from a Minie rifle is not more than 900 feet. It was clear that cast-iron was not the best material, as it had not sufficient power to resist repeated percussive action, and the attempts to make guns of wrought-iron had failed. The older guns were made of bronze, and it was rather singular that the guns which Mahomet II. had made of that material were still at the Dardanelles, where they had been used with great effect. They had a bore of 3 feet, and were fired with a charge of 200 lbs. of powder, projecting an enormous granite ball, a yard in diameter. If the Turks could formerly cast cannon to stand such a charge, is it not strange that we cannot now surpass them?

Mr. Fairbairn observed that most of the iron of which our guns are now made is inferior to that in use some years ago. He had recently been at Woolwich, where some experiments with malleable guns had been made, but they failed; and it is necessary, therefore, that the metal should be solid. All the guns were now cast solid, and then bored out; but the unequal cooling of such a large mass of metal forms a varied granulation, which is not so strong in the center as at the outside. The Americans still follow the plan, which, it was remarked, was adopted more than a century ago in this country, of casting all their guns with a core; they then run a current of cold water down the center, which cools the metal inside and outside more equally. With regard to the length of guns, Mr. Fairbairn observed that the 13-inch mortars at present in use, should be at least 1 foot longer, as 50 lbs. of powder would have more effect, because its force was exerted for a longer time upon the shell than 60 lbs. with the shorter bore. The form of the mortar was also objectionable, as the thickness of the metal was the same at the muzzle as immediately above the chamber, while it would be better if the thickness were diminished at the muzzle, and increased at the breech. With regard to the durability of guns, he remarked that those of ordinary caliber were supposed to stand from 600 to 700 rounds, but they always give way at the vent or touch-hole, which became conical; but, by putting a tube in the bore, they were found to stand about 700 rounds more. The Russian iron ores were chiefly magnetic, and made excellent guns, while almost all the Turkish ordnance was made of gun-metal, a mixture of copper and tin. There was great difficulty in making guns in parts, as every explosion changes their relative position; he, therefore, preferred casting them perfectly solid.

Purifying and Softening Hard or Lime-water—Dr. Campbell read a paper on this subject, describing the process of Dr. Clark, now in use in many places in England. This process for softening water may be applied with advantage to water from the chalk strata, water from the new red stone, and waters which contain carbonate of lime in solution from any strata. It is briefly described as follows: namely, by adding a quantity of quicklime to the water, it takes carbonic acid holding carbonate of lime, throwing down at the same time the quantity of carbonate of lime held in solution by the carbonic acid, and thus renders the water soft. The works and operations for carrying out the process were fully described. One peculiar feature in the water after it has been softened, and which was not anticipated by Dr. Clark when he first took out his patent, is, that it does not show the slightest sign of vegetation though exposed to the sun and light for upwards of a month, whilst the water before softening can not be kept above a few days without producing Confervæ; and if this be not immediately removed, decay commences quickly, and small insects are soon observed, which feed upon the decaying vegetable matter, and the water soon assumes a bad taste. This is continually the case when the water is kept in large reservoirs, and its removal occasions considerable trouble and expense. The author had endeavored to explain the reason of this marked difference between the unsoftened and the softened water; and he was nearly satisfied that the vegetating principle in the water was more especially due to the carbonic acid holding the carbonate of lime in solution than to the volatile matter, or, as it is sometimes called, organic matter. The process is applicable to many towns already supplied with waters from the New Red Sandstone, and if properly applied will be found to pay the expense of its working, and confer a great boon upon the populations, the enlightenment of whose corporations may induce them to adopt it.

Solvents of India Rubber and Gutta Percha.

Messrs. Editors—The usual solvents in the manufacture of these articles are camphene, rectified naphtha, and spirits of turpentine; and in the laboratory bi-sulphuret of carbon, alone or with alcohol, caoutchoucine, chloroform, &c. According to M. Payen (whose essay on gutta percha and india rubber, Paris 1851, contains the best information on the subject, chemically considered, yet published,) the very best solvent is the sulphuret of carbon, with alcohol anhydrous (absolute,) in the proportion of 6 or 8 of the latter to 100 of the former. This process was patented in France by M. Gerard, of Grenelle, on the 24th Sept., 1849, and differs from the action of the ordinary solvents inasmuch, that whereas these last swell the rubber and dissolve a portion only, the former dissolves the entire mass, and while to the manufacturer it is objectionable on the score of expense, and from its excessively inflammable nature, to the experimental chemist it leaves absolutely nothing wanting to the production of a perfect solution. J. T. S.

New York.

The mechanics of San Francisco have formed a Mechanic's Institute, which promises to be useful. It now numbers 216 members, and a library has been started with every prospect of success in raising a first rate one.

New Inventions.

Recent Foreign Inventions.

Railway Axles—Mr. G. M. Miller, C. E., of Dublin, Ireland., has patented some improvements in axles and axle boxes of engines and carriages in use on railways, which consist, first, in fitting the cylindrical journals of axles with one collar only instead of two, in order to reduce the friction. Second, in constructing axle boxes so that the main portion of the same, and the step or bearing for the axle journal, can be removed without lifting the carriage off the wheels. For this purpose the lower part of the axle box is made to open at the top, in order to receive the step or bearing, and that portion of the box which forms the upper grease chamber or hopper.

Hats—John Blair, of Glasgow, North Britain, has obtained a patent for constructing hat bodies in such a manner as to form a thin space between the interior surface and the outside of the hat, at the part where the hat fits on the head, such space communicating by perforations with the interior of the hat about the upper part of the head, to provide for ventilation. This is a pretty good idea in manufacturing hats. Who among our hat makers will be the first to carry it out into practice?

Mosaic Rugs—F. Crossley, M.P. for Halifax, England, has obtained a patent for placing a thick pile carpet on the back or underside of mosaic rugs. These beautiful rugs have their separate colored pieces pasted with a solvent of india rubber; the backing of a thick pile of carpet for which Mr. Crossley has taken out a patent, renders the india rubber solvent less susceptible of becoming stiff in cold weather, because it is thus placed between woolen substances, which are very good non-conductors.

Sawing Logs.

The accompanying engravings represent a method of sawing logs by their own weight in descending a bluff, precipice, or incline, for which a patent was granted to Francis A. Wolff, of Ripley, Tippah Co., Miss., on the 8th of May, 1855.

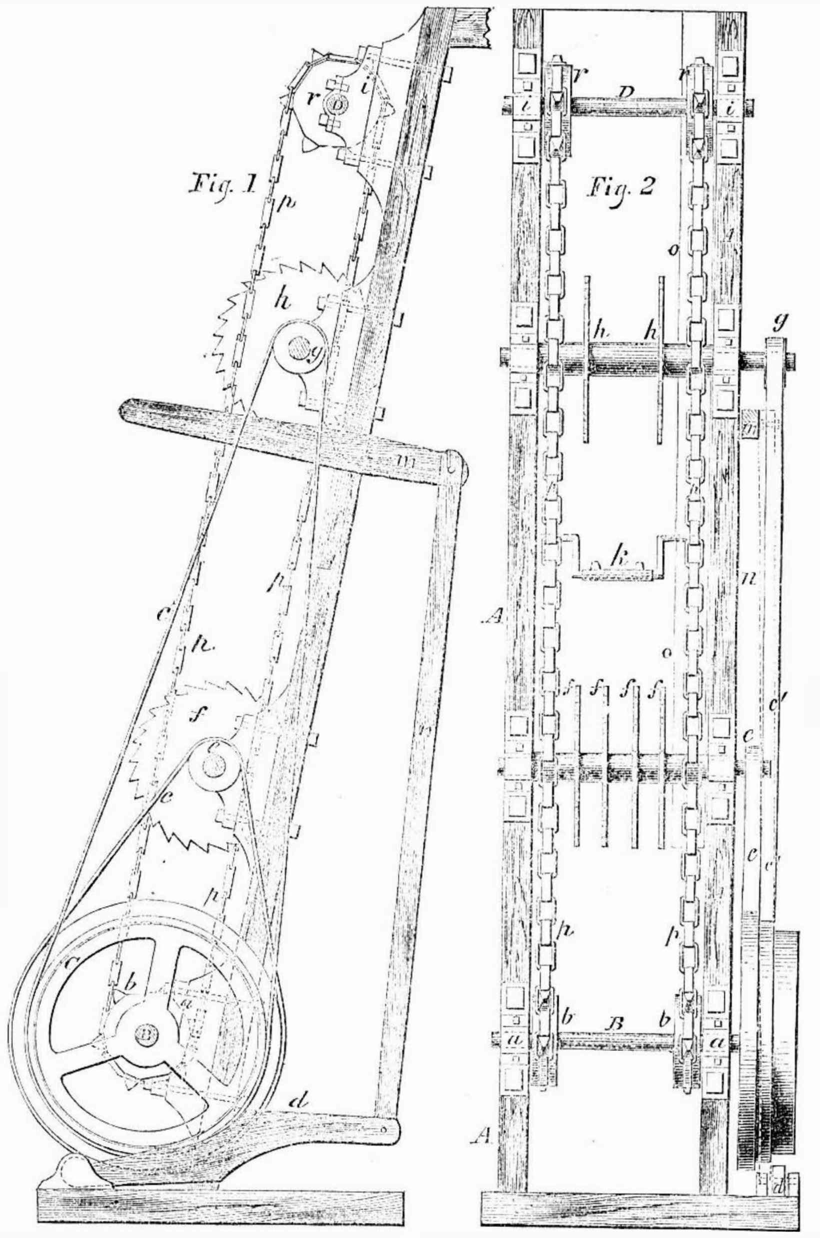
Fig. 1 is a side elevation of the mill, to carry out the object stated, and fig. 2 is a front elevation. Similar letters refer to like parts.

The nature of the invention consists in an arrangement of machinery whereby the weight of one or more logs of timber, when attached to an endless chain or chains, is made to propel a gang of circular saws while the log or logs are descending a bluff or valley; the invention being adapted to sections of country where bluffs are common.

A represents a framing erected on the side of the bluff, and leaning against it at an angle of elevation of about 75 or 80 degs. At a convenient distance from the bottom of this framing is a horizontal shaft, B, supported in journal boxes, *a a*, secured to the frame. Fast on this shaft are two chain wheels, *b b*, between the journals, one near each; they are made with teeth or prongs, which enter every alternate link of the chain, the intermediate links being flat, rest upon the part of the periphery of the wheel between the prongs. At one end of this shaft, outside of the journal, is a large band wheel, sufficiently wide on the face for the two bands, *c c'*, to run on it, side by side, and a further breadth of the same or smaller diameter, for the friction brake, *d*, to bear against for the purpose of stopping the saws at pleasure. The band, *c*, passes over a pulley, *e*, on the axis of a gang of saws, *f f*, fixed at suitable distances apart to saw the log into boards of the desired thickness. The band, *c'*, extends over the pulley, *g*, on the axis of a pair of saws, *h h*, set at about the same distance apart as the two outer ones in the gang before alluded to. Above these saws at the upper end of the framing, A, is another horizontal shaft, D, also supported in journal boxes, *i i*, secured to the frame, and likewise having two chain wheels, *r r*, fast on it, corresponding, and in line with those on the shaft, B. Around these chain wheels on the two shafts, D D, are two endless chains, *p*, to which the logs are attached by suitable dogs, *k*, suspended in the links thereof. *m* is a lever, and *n* a connecting rod, for operating the brake, *d*, when it is desired to stop the saws. The back of the frame, A, between the bluff and the saws, is planked up to form a bearing for the logs to slide against in their descent. Between the frame and saws at one side is a guide or gauge, *o*, to guide the log in a direct line to the saws, and against which the logs incline, by a slight inclination of the chains towards that side, or they may be borne against it by a spring and friction rollers on the opposite side. If found in practice that a single driving wheel would have to be inconveniently large to give sufficient speed to the saws, a counter shaft may be used with a pulley and wheel on it, of such size as may be found necessary to give the required speed.

In operating this mill, the log must be first slightly slabbed on one side to prevent its rolling on the ways, it is then lowered down in any convenient manner, till the top end of it is about level with the upper chain wheels. It is then secured to the endless chains by the dog, *k*, near the top; its weight now being borne by the endless chains, *p p*, puts the saws in motion. In descending, the upper saws, *h h*, take a slab off each side. When the dog by which it is held comes nearly down to the saws,

SAWING A LOG BY ITS OWN WEIGHT.

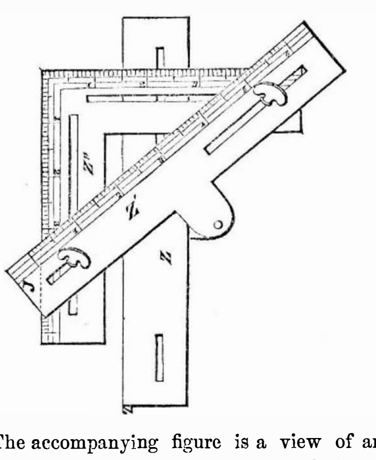


another dog is attached below, and the weight taken off the upper one, so that it may be removed. As soon as the log is clear of the upper saws, the mill is stopped by the friction brake, *d*, applied to the wheel. The log is then turned on its side, and secured at its upper end to the chains as before, and another log attached above, as at first, and the saws again put in motion. The lower log is then ripped into boards by the gang of saws, *f f*, whilst the upper log is being slabbed on two sides, as in the first case. When the saws are about half way through the log, it may be supported by running a straight bar of iron through the links of the chains, beneath the log, and the dog above the saws removed, so that the weight of the boards remains on the chains, to assist in driving the saws until they reach the lower chain wheels, when the carrying bar is drawn from under them in passing round the chain wheels.

The power applied in this manner to the sawing of logs will be according to the hight of the hill on which the mill is erected. The power can also be transmitted to operate a grist or other mill, if the bluff is of considerable altitude, and affords more power than is required for sawing the logs. When all the timber in one locality is sawn up, this mill may be taken to pieces to put up at another wooded hill. The inventor believes it will supersede water saw mills, which are usually placed in unhealthy localities, especially in warm climates. He believes that when once a mill of this kind is put up on a large scale, 'it will soon find its way over our diversified country, and be carried ultimately to the Alps, the Pyrenees, and the mountains of Norway." To any person or company that will fully test the practicability of this mill on a large scale, he is ready to afford them patent rights on the most liberal terms.

More information may be obtained by letter addressed to Mr. Wolff, at Ripley, Miss.

Mechanic's Companion.



The accompanying figure is a view of an instrument bearing the above name, designed for a square, scale, level, and bevel—very diversified uses—for which a patent was granted to Josiah Shanklin, on the 4th of October, last year.

Z Z' Z'' are three blades or pieces; Z'' is of the form of a common square graduated in inches and parts of an inch, from 1 to 5—or more—beginning at the corner or right angle and extending each way. At or near the middle of each of the blades is a groove about a quarter of an inch wide, cut parallel with the outer edges, as shown. On the opposite side (not seen) of the square, degrees are marked. Z' is a blade about 7 inches long; the upper edge is spaced out in inches and parts of an inch, and it has a slot on each side, to correspond with those in Z''. The left hand groove is shorter than the other, but they may be made of equal length. On the under edge of this piece there is a tongue about an inch long and three-fourths of an inch wide. Z is another blade; it corresponds with Z' in every respect excepting the graduated edge; and a flange which it has on its upper edge, which serves for a rest when applied to a piece of timber This blade is so made that both sides will be perfectly balanced when suspended by the pivot joint by which it is united to Z'. A thumb screw working in a nut on the back side, is inserted through each groove as shown. When the instrument is used for a bevel, one of the screws is tightened, so that the square may turn upon it. When used for a bevel the thumb screws are taken out, and the under cross piece, Z, with the flange upon it, is allowed to hang loosely—the square and the upper piece being screwed together, as shown in the figure. When thus adjusted, the under cross piece, Z, serves for the level, the degrees being marked on the under side of the square. If found more convenient, the corners of the upper cross piece may be clipped off, and in this respect be very convenient for masons and carpenters.

The claim of the patent is for the combination of the three blades with the grooves and thumb screws constructed and arranged in such a manner as shown, so that the instrument may be used for a square, bevel, level, and scale, for braces, stair cases, &c., &c. and for a great number of other purposes, so apparent to mechanics, that it has been termed "the Mechanic's Companion" by its inventor. It may be made of wood or metal, as may be found most convenient. These instruments are manufactured by E. Bless & Co, Newark, N. J., from whom more information respecting it may be obtained by letter.

Spark Arrester Patent.

On the 12th of February, 1842, W. C. Grimes, of Philadelphia, obtained a patent for an improved spark arrester. The patentee has applied to the Patent Office for its extension seven years from the 12th of next February.—The petition is ordered to be heard on the 28th of January next, at the Patent Office, and all objections to it must be set forth in writing, and sent to the Commissioner of Patents at least 20 days before the hearing.

Patent Laws.

Before we were aware of it, our last edition of the Patent Laws was quite exhausted.—Until we have a new edition printed, we shall be obliged to send the official (Patent Office) edition to those ordering, in lieu of our own. When our edition is ready we shall send copies to those who have remitted for it, even if a copy of the official edition has been sent. So all who have paid for them will, eventually, get their shillings worth in the very article ordered.

Acclimating Animals.

The Zoological Society of Acclimation, in France, has been the means of doing wonders in this line already, and has now commenced operations on a flock of Angora goats. Such a society would do a great deal of good in our own country. It would be far wiser for our agricultural societies to offer prizes for acclimating useful foreign animals than for successful feats of female equestrianship.

The inmates of the various prisons, hospitals, asylums, workhouses, and almshouses of the city of New York, number seven thousand souls. The annual expense of their maintenance is six hundred and fifty thousand dollars—a little short of one hundred dollars a year for each individual.

Scientific American.

NEW-YORK, DECEMBER 1, 1855.

New Motors.

During the past few months we have enjoyed the pleasure of witnessing the operations of three engines propelled by new agents never before successfully applied to driving machinery. These are, the engine of B. Hughes, in which the bi-sulphuret of carbon is employed as a substitute for steam; the "Cloud Engine" of Mt. Storms, in which a jet of cold air is is mixed with the steam; and the third is the engine of Dr. Drake, of Phila., the motive agent of which is gas and air. The bi-sulphuret of carbon engine performed in a superior manner to steam in our presence; but we only witnessed two experiments, and have had no opportunity of testing it or seeing it tested under different conditions; we were pleased, however, with its performance. The "Cloud Engine," which was in operation at the Fair of the American Institute, gave evidence, in our presence, on one occasion, of being more economical than simple steam. How this was obtained by injecting a jet of cold air with the steam into the cylinder, we could not divine, nor did the explanations of the inventor satisfy us, but its superior performances have been endorsed by Horatio Allen, Esq., of this city, an engineer of distinguished reputation. C. W. Copeland, M. E., has also been making a series of experiments with the "Cloud Engine," and his report of it will, no doubt, throw much light on the subject. Every improvement in prime motors is of vast importance, but the advantages of any new engine must be clearly established before it takes the place of steam, and we are of the opinion it will not be easy to do this; still, we hope it may soon be done, as we wish for and welcome every new and useful improvement in science and art.

The other motor, called the "Ignition Engine," was lately erected by its inventor in the Crystal Palace, as noticed by us on previous occasions. After many failures, causing no small amount of mortification to himself, and disappointment to great numbers of curious spectators from far and near, the inventor at last, just as the Fair closed, discovered that the cause of his ill luck was owing to a deficient supply of gas. Having remedied the defect, we were invited, on the 20th inst., to visit the Crystal Palace once more, and see it operate for a certainty. We accepted the invitation, and did see it work freely and powerfully for a considerable period, at the rate of 60 revolutions per minute.

The motive agent of this engine is carburetted hydrogen,—the gas used in our streets and houses for illumination—and a mixture of atmospheric air. It is well known that when this gas is saturated with oxygen it becomes an explosive mixture, which, when ignited, suddenly explodes with great violence like gunpowder. Many attempts have been made to construct gunpowder and explosive gas engines, but Dr. Drake is the first inventor who has succeeded in harnessing this mighty agent, and making it submissive to his will in driving machinery; for this he deserves great praise. He commenced his experiments in 1837, and by perseverance and ingenuity has brought his gas engine to its present operative condition.

In external appearance Dr. Drake's machine bears a close resemblance to a horizontal engine. It has a piston and cylinder, but in its other parts a number of new devices are involved that are not required for steam. Motion is produced by exploding gas in the cylinder, first behind and then in front of the piston, just the same in effect as steam is employed. At every stroke of the piston nine times more atmospheric air than gas is admitted to the cylinder; this is done by a peculiar valve, which takes in the proper quantity of air from the atmosphere, while the exact quantity of gas is being admitted through a pipe from the supply reservoir. The heat generated by the explosion of the gas is very great; the piston is, therefore, made hollow, while the cylinder is surrounded with a jacket, through which a stream of cold water circulates for refrigeration. Two red hot igniting capsules are placed through the side of the cylinder, one at each end. After the mixed gas is admitted it comes in contact with the hot iron, ignites, and instantly expands, giving motion to the piston. Valves of the puppet kind, operated by toes and springs, are used alternately to cover and uncover the igniting irons, as well as to open and cut off the gas supply. The mixed gas being composed of nitrogen, oxygen, and carburetted hydrogen, these, when ignited, unite chemically in the cylinder—suddenly forming carbonic acid gas, a little steam, and nitrogen. The amount of expansion is stated by the inventor to be twelve or fifteen times the the original volume of the gases, so that the power obtained from a small volume of gas is very great. We had no means of knowing the amount of pressure on the piston, but Dr Drake informed us that the engine could work up to the power of 20-horses. It is a little more bulky than a steam engine of the same power.

This engine can be set in operation in a few seconds when there is a supply of gas, which can always be had by keeping it ready made in a reservoir. In this one respect it has an advantage over steam. By the perfect combustion of fuel under a steam boiler, and under retorts to generate the gas, the expense of the two—gas and steam—may not differ much, to be used as motive agents; but there are great advantages on the side of steam. The process of obtaining steam is more simple than generating gas, and consequently cheaper. The construction of the steam engine is also more simple, and so are most of its appendages.—The action of the steam on the piston is altogether superior to that of an explosive mixture. Steam is rapid in its motion, silent, elastic, and equable in its pressure, making the piston move without jarring and noise. The explosive gas operates like small discharges of artillery; it expends much of its force suddenly on the cylinder heads, and shakes the whole machinery with great violence. This is a difficulty which cannot be overcome; it belongs to its very nature, and its continued use in a large engine would soon shake it to pieces, For these reasons we conclude that this new motor will never supersede the steam engine; but we entertain great respect for the sincerity, the ingenuity, the perseverance, urbanity and intelligence of its inventor.

Award of Prizes by the American Institute.

We present herewith the award of the prizes for novelties at the late Crystal Palace Fair, in as correct a manner as it was possible to obtain the same during the past week. This portion of the Institute's business appears to have been managed in a helter-skelter, old fogy, sort of a way, which is as disgraceful to the concern itself as it is injurious to the exhibitors and discorteous to the public. The managers have been bragging through the papers about the large number of prizes awarded this year, and the amount of money they have spent for the same; but up to this time they decline to tell, with much exactitude, who were the recipients of their medals, or for what they were given. They propose, so we understand, to keep their list as private as possible for some time to come, for the alleged purpose of revision, but in reality to yawn over. The operation will probably occupy all the active energies of this take-it-easy establishment during the remaining portion of the present year. Some time in 1856 an official list of the awards will doubtless be given.

The nomination of jurors, or examining committees, this year, appears to have been very unfortunate. We have seldom seen such displays of stupidity and ignorance as are manifested in some of the awards. Take, for example, the Wood Planing machines; the gold medal was given to an apparatus that, unless we are greatly misinformed, was incapable of successfully working an ordinary sized board. It was an imperfect machine, and generally stuck fast whenever the attempt was made to put it in operation. We have no doubt that it is a good invention, but it utterly failed in its performances at the Palace, and was far from being entitled to a medal. It barely deserved a diploma. On the other hand, there was Barlow's newly patented and truly novel planing machine in full practical operation at all times during the Fair, which was only deemed worthy of a silver medal.

A bed-quilt, which, we were informed, had taken eleven different premiums at as many previous Fairs of the Institute, being exhibited one year by Maria, the next by Jane, then by Elizabeth, and so on, received this year another silver medal; while the specimens of flax cotton, made by a new process, and justly regarded as one of the most important improvements of the day—exhibited by the Knowles Patent Linen Fiber Company—received a diploma.

A pair of unpatentable window sash hinges received the award of a silver medal; while an ingenious dove-tailing machine, by Mr. Gleason—a fresh invention, and one of the gems of the whole exhibition, so far as novelty and utility was concerned—merely received a diploma.

A wealthy confectioner on Broadway, N.Y., took a gold medal for a display of candies; while the Patent Bread of Messrs. Crum & Paul, made by a new method, undoubtedly of great value, was not noticed at all.

We might cover a page with contrasts similar to the foregoing, but it is unnecessary. Great dissatisfaction exists among exhibitors at the careless and ignorant manner in which many of the prizes were distributed. Although few of the disappointed competitors would, in any case, feel wholly satisfied, no matter how just the decisions, still, as we have shown, there appears to be good reason for complaints at this time. If the Premium Committee, in their dozings over the list, can manage to correct some of the grossest of these errors, they will not only do an act of simple justice, but gain for themselves, and the Institute which they represent, a considerable degree of credit.

We subjoin our list, which, the reader must remember, is only intended to comprise the awards for the principal novelties in the exhibition. The premiums given for wigs, toupees, parasols, umbrellas, canes, bed-quilts, needlework, hats, caps, and all the various articles of common use, we have purposely omitted.

Gold Medals.

J. Echols, Columbus, Ga., Hydraulic Rock Drill.
C. B. Morse, Rhinebeck, N.Y., Wood Planing Machine.
Wheeler & Wilson, New York, Sewing Machines.
Howard & Davis, Boston, Mass., Sewing Machine.
G. Whipple, Brainard Bridge, N. Y., Knitting Machine.
American Stone Dressing Co., New York, Stone Dressing Machine.
Loudon & Co., New York, Expansion Bolt and Screw Fastener.
Machine Manufacturing Co., Boston, Rotary Cutting machines.
F. Ransom, Brooklyn, Anti-Choking Ship Pumps.
W. H. Bramble, Cincinnati, O., Grain Scales.
Geo. Vail, Morristown, N. J., Smut Machines.
Danforth, Cook & Co., Paterson, N. J., Cop Spinning Frame.
Lowell Machine Co., Bobbin & Fly Frame.
N. Aubin, Albany, N. Y., Portable Gas Apparatus.
Lieut. W.D. Porter, U.S.N., Wood Gas Apparatus.
H. S. Leonard, Moodna, N. Y., Oil Tester.
C. Potter, New York, Printing Press.
J. Dixon & Co., Jersey City' N, J., Black Lead Crucibles.
Fairbanks & Co., New York, Scales.
Fenn & Baker, New York, Mathematical Instruments.
G. Tagliabue, New York, Meters.
Nathan Thompson, New York, Life Seat.
John Kennedy, N. Y., Marble Mantels.
F. G. Johnson, Brooklyn, Windmill.
American Plate Glass Co., New York, Plate Glass.
National Plate Glass Co., Lenox, Mass., Plate Glass.
Col. S. Colt, Hartford, Ct., Pistols.
World's Safe Co., New York. Bank Lock.
W. G. Creamer, New York, R. R. Brake.
H. N. Smith, Rochester, N. Y., Car Seat.
L. L. Smith, New York, Galvanic Battery.
C. L. Goddard, New York, Burring machines.
Leonard & Clark, Moodna, N. Y., Turning Lathe.

Silver Medals.

Webster & Miller, N. Y., Metal Bending and Tubing machine.
Liddell, Kepler & Co., Erie, Pa., Shearing and Punching machine.
D. G. Condit, N. Y., Blind Slat and Tenoning machine.
Daniels & Raymond, Woodstock, Vt., Straw Cutter.
C. P. S. Wardwell, Lake Village, N. H., Tenoning machine.
Brown Bro., N. Y., Turning and Boring machine.
Lane & Bodley, Cincinnati, O., Power Mortising machine,
Ball & Ballard, Worcester, Mass., Planing machine, Gray & Wood's patent.
C. B. Hutchinson & Co., Auburn, N. Y., Stave and Barrel machine.
N. Y. Circular Molding Co., Circular Irregular Molding machine.
Ball & Ballard, Worcester, Mass., Sash, Molding, and Slat machine.
Burley & Putnam, Boston, Dovetailing machine.
Southwick, Thomas & Co., Brooklyn, Match machine.
S. Carpenter, Flushing, N. Y., Self-acting Turning machine.
Crane & Tompkins, N. Y., machine for Turning Irregular Forms.
J. A. Conover, N. Y., machine for Splitting Kindling Wood.
Smith & Cowles, Amherst, Mass., Upholstery Shaving machine, and a Felly machine.
J. B. Nichols & Co., Boston, Sewing machine.
Enos Woodruff, Elizabeth City, N. J., Self-acting Gate.
Atkins, Whiting & Co., Bristol, Ct., Patent Thirty-Day Clock.
Allen, Thurber & Co., Worcester, Mass., Revolving Pistol.
H. N. Thistle, Wrought-Iron Cannon, with new method of loading.
W. B. Hartley, N. Y., new method of Twisting Gun Barrels.
Holmes, Valentine & Butler, N. Y., Rotary Door Lock,
J. H. Butterworth & Co., Dover, N. J., Combination and Permutation Bank Lock.
G. M. Ramsey, N. Y., Rolling Hinges.
W. T. Ford, N. Y., Sliding and Folding Window Sashes.
A. D. Clark, N. Y., Door Fastener.
A. A. Starr, N. Y., Window and Sash Blind Adjuster.
L. Page, Cavendish, Vt., Car Brake.
D. A. Hopkins, N. Y., Car Coupling.
Carpenter & Powers, N. Y., Railroad Jack.
Peter Dorsch, Schenetady, N. Y., Car Wheel.
James Kelly, Sag Harbor, N. Y., improved Weighing Apparatus and Bushings.
Mrs. C. Vann Eppe, Ovid, N. Y., Cocoons of Raw Silk.
Gurney & Co., N. Y., Cocoons and Raw Silk.
Albin Warth, N. Y., Self-acting Turning Lathe.
Glass Silvering Co., N. Y., Samples of Silvered Glass.
J. Smart, Philadelphia, Pumps.
G. Arthur Gardner, N. Y., Hand Rock Drill.
Hotchkiss & Sage, Windsor, Broome Co., N. Y., Frame Block for Mill Spindle.
W. P. Coleman, New Orleans, Grain Mill.
Troy Portable Grain Mill Co., Troy, N. Y., Cob and Corn Mill.
J. Cochrane, N. Y., Anti-Freezing Valve.
Vergennes Scale Co., Vermont, Platform Scales.
Troy Patent Cordage Co., Cordage machine.
Darlington, & Co., N. Y.. Oscillating Engine.
Pease & Murphy, N. Y., Model of United States Ship Niagara's Engines.
Clark's Steam and Fire Regulator Co., N. Y., Steam and Fire Regulator.
J. Whitehead, Manchester, Counter Twist Speeder.
W. C. & J. P. Burnham, N. Y., Double Acting Pump.
J. P. & W. F. Dodge, Newburgh, N. Y., Anti-Choking Pump.
American Steam Gauge Co., Boston, Steam Pressure Gauge.
Novelty Iron Works, N. Y., Clocks, Steam and Water Gauges.
American Portable Gas Cooking and Heating Co., Gas Cooking Stoves.
S. Doren, N. Y., Dry Gas Meter.
J. L. Douglass, N. Y., Kidder's Gas Regulator.
R. Dudgeon, N. Y., Hydraulic Jacks.
H. M. & G. H. Babcock, Westerly, R. I., Polychromatic Printing Press.
Wendell Wright, N. Y., Friction Clutch Pulleys.
H. W. & D. Davis, Yellow Springs, Green Co., Ohio, Parallel Vise.
G. Vail, & Co., Morristown, N. J., Portable Steam Engines.
L. Brooks, Great Falls, N. H., Bar Level.
Farr, Briggs, & Co., N. Y., Improved Candle Molds.
G. W. LeBow, Jersey City, Miter machine.
G. C. Wilkinson, N. Y., Bellows.
E. Brown, Lowell, Mass., Alarm Money Drawer,
C. Parker, Meriden, Conn., Jeweler's Vise.
J. Brombacker, N. Y., Cutting Machines.
S. A. Holmes, N. Y., Double-Acting Camera.
R. L. & C. H. Lundy, N. Y., Petrified Stone Drain Pipe.
W. Smith, N. Y., Petrified Drain Pipe.
Dr. D. C. Ambler, Fleece of the Cashmere Shawl Goat.
F. Riddle, N. Y., Calendar Clock.
J. S. Curtis, Hartford, Ct., Calendar Clock.
John Sherry, Sag Harbor, N. Y., Turret Clock.
A. D. Perry, Newark, N. J., Breech-loading Rifle.
Farr Briggs & Co., N. Y., Candle Molds.

Fire Engines.

First Class.—No. 3, Brooklyn, First Cup; No. 13, Brooklyn, Second Cup.

Second Class—No. 8, New York, First Cup; No. 29, New York, Second Cup; No. 11, New York, Diploma.

Third Class—No. 28, New York, First Cup; No. 45, New York, Second Cup. No. 2, Newark, N.J., best truck with long ladder, and best running gear. First Cup; No. 13, New York, second best truck, Second Cup.

Hose Carts—No. 22, New York, Second Cup; Hose Carriage Phenix. Easton, Pa., Third Cup; No. 8, and No. 38, New York, Silver Medals.

Recipe for Making Gold.

Various have been the attempts of philosophers and alchemists, in all ages, to discover some easy process of obtaining that precious metal, which, to the generality of mankind, is the great talisman of happiness and bliss. Futile and impracticable as all such efforts have hitherto proved, the subject still maintains its interest, and people are quite as ready at the present time to hear about and engage in golden speculations as they ever were in the days of old. This fact prompts us in bringing afresh to the consideration of our readers a method to which we have, on several previous occasions, called their attention.

The process we are about to notice is not, we are happy to say, apparently one of a visionary character. It appears to be simple and practicable; we presume if faithfully followed, agreeable to directions, it will result as set forth. True, the amount of bullion capable of being made by any one individual, under the plan proposed, is not very large. It will not suddenly make him rich; but it will infallibly fill his pockets with plenty of loose change, and amply repay him for all the time and labor spent in its obtaining. Our recipe is as follows:—

Take in one hand a clean subscription paper, and in the other a fair copy of the Scientific American; thus equipped visit every shop, store, and dwelling in the town or village where you happen to reside; explain, in eloquent terms, to every individual who will listen, the nature, merits, and advantages of our valuable journal; wind up with a strong appeal to his or her good sense, and obtain a year's subscription if you possibly can; continue this course with perseverence, until a long list of subscribers has been secured; then forward the names and money to this office; and on the first of January next, provided your list is the largest, you will receive from us in gold the sum of *one hundred dollars.*

If another competitor, however, has carried off the largest sum, by sending a larger list, you will stand a chance for the second prize, which is seventy-five dollars, and so on down. Fourteen splendid recipes of this kind, for making gold, are offered by us; for further particulars see Prospectus on our last page, and then read, reflect, act. The opportunity is certainly a rare one.

Improved Marking Ink.

Mix 11 parts (by weight) nitrate of silver, 22 of liquid ammonia, 22 crystalline carbonate of soda, 50 of gum arabic, 2 of sap green, and 13 of distilled water. The linen printed must be exposed to the sun or pressed with a hot iron until the letters no longer increase in blackness.—[London Artisan.

The Cotton Gin.

Many incorrect opinions are entertained respecting the nature and action of the saw gin which it may not be improper to notice. Some of these opinions have been the cause of attempts to remove evils which have never existed. Two of these opinions have been presented to the public through the medium of the SCIENTIFIC AMERICAN. The first is that the "staple or fiber of the cotton may come in contact with two saws at the same time, and be thereby injured." The second is "that by long direct action of the saw upon one part, as in the common saw gin, the staple will be cut." These two opinions have come out in connection with two late improvements. One in gin saws and one in a cotton gin.

There is no intention, in this article, to depreciate the value of any improvement in this direction, but simply to defend the saw gin from some of the wrong charges made against it.

That two saws cannot take hold of the fiber of the short staple cotton at the same time, so as to injure it, may be ascertained by taking a single lobe of cotton and placing it on a saw, and turning it slowly by hand.

As respects the second of these opinions, those who are familiar with the cotton gin know that there is a constant counter circular motion called the "role," caused by the action of the saws in taking the fiber from the seed; so much of the fiber as is taken into the teeth at one time, passes through the spaces in the ribs, is immediately blown into the room, and never returns. In this circular motion, new fiber is constantly presented to the action of the saws, until the seed are cleaned, and fall out at the lower end of the ribs.

In defence of the saw gin, it may be said that it never cuts the staple unless it is imperfectly made or badly regulated by those who attend it. The fiber is so easily separated that if a seed is held in one hand and the staple in the other, it may be pressed off with a penknife without injury. There is on every seed of cotton one portion of fiber shorter than another. The ignorance of some in reference to this peculiarity in the growth of cotton has furnished the idea of the saw gins cutting the staple.

JOHN DU BOIS.

Greensboro', Ala., Nov. 1855.

How America was Formed; and the Cause of the Flood.

Clark Mills, of Washingten, states that the fountains of the great deep being broken up, the waters must have retired in great agitation to the east and west from the sides of the rising continent. The various opposing currents caused immense deposits to be made, and the rush of water, with the flaming ocean beneath, generated an immense evaporation. The winds, which, before this, moved from east to west around the globe, were suddenly obstructed by the towering burning mountains. They rolled back as if astonished at the new phenomena, laden with the vapors of a boiling ocean. The clouds, in their sublime evolutions, moving in the direction of the waters to the east and west from America, met in awful array over the Old World. There they discharged their burdens, the vapors descending for forty days, and after the earth revolved 150 times in her cumbrous mantle, the waters retired to the caverns from whence our continent arose.

Pennsylvania Coal.

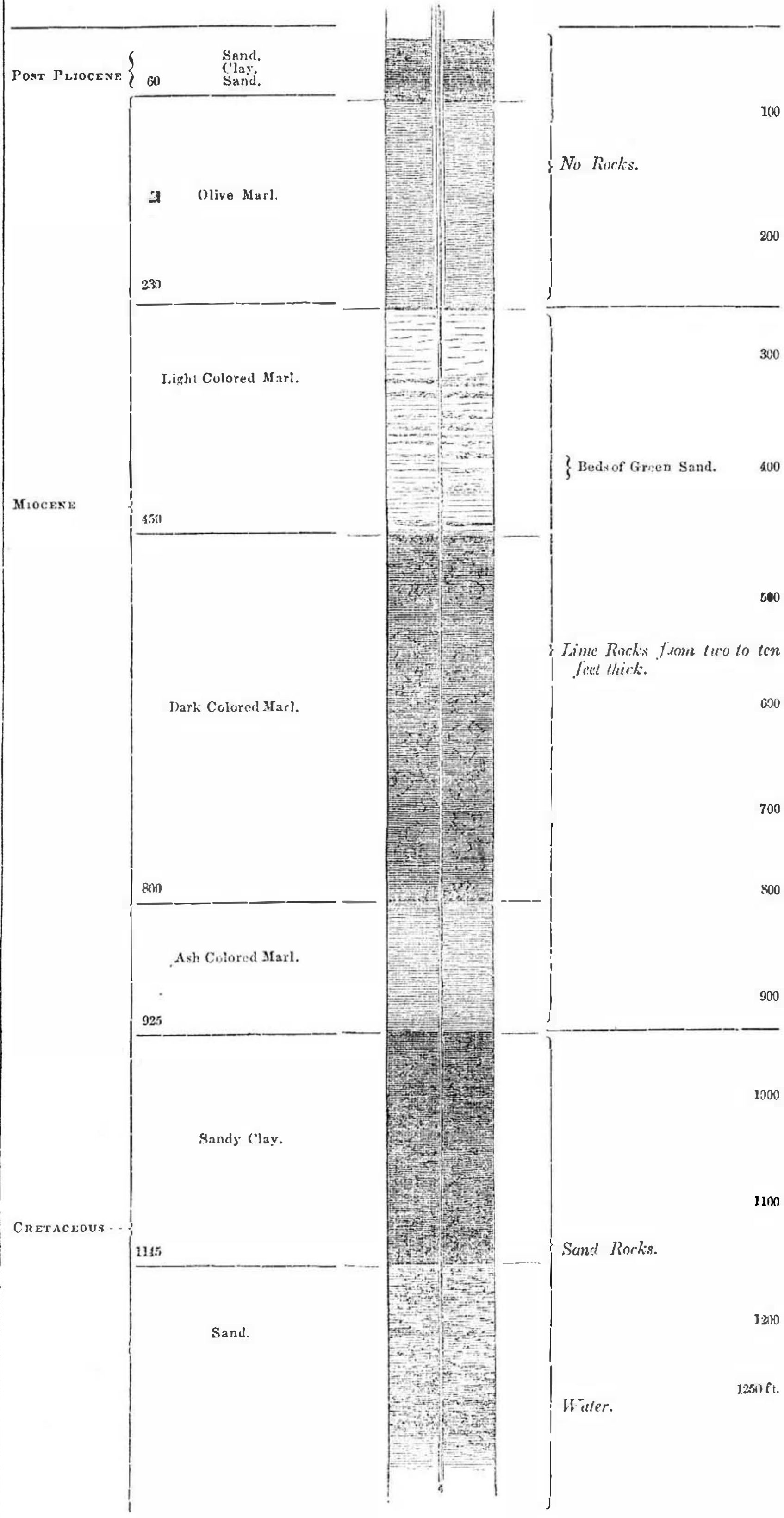
It is more than twenty-five years since Pennsylvania coal began to be a recognised article of production and commerce. This year the product will amount to no less than six millions of tuns. This, as delivered at the mines, is worth at least twelve millions of dollars—so that this great sum may be regarded as the auount of solid wealth dug annually at the present time, from the bowels of the earth.—[Pottsville Register.

A Chance for Inventors.

The Belgian Government, rather than interdict the use of corn and potato starch in manufactures, which would be to stop labor for the purpose of econmising food, has offered a prize of 10,000 francs for the discovery of a non-alimentary substance to replace the use of starch in those industrial occupations in which it is now employed.

Sectional Plan of the Artesian Well at Charleston.

The accompanying outline sketch represents the Charleston Artesian well. The entire depth penetrated is about 1,250 feet. The water is now running at the rate of 40 gallons per minute, at a hight of 6 feet from the surface of the earth. If the water is conducted higher than this, it diminishes in quantity until it reaches the hight of 23 feet, when it ceases running altogether. The tube is only 3 inches in diameter, and it is inferred that a larger one would yield a proportionably larger amount of



water. It is understood that the city will make an appropriation for the purpose of commencing another of a much larger caliber.

About 60 rocks have been drilled, the first commencing at the depth of 230 feet. For some weeks the well has thrown up large quantities of sand and finely comminuted shells, of a marine character, common in the cretatæ tous formation. The quality of the water is good, although, on account of the presence of the carbonate of soda and a little salt, it is not particularly palatable. J. H. STEARNS

Charleston, S. C.

[Messrs. Welton & Stearns, the engineers of this well, give personal attention to contracts for sinking Artesian wells, or boring for minerals.

The people of Charleston, S. C., deserve a great deal of credit for the patience and perseverence they have shown in boring this Artesian well. There are now a great number of Artesian wells in our country, especially in Alabama, Missouri, and some of the Western States; but California distances all our Atlantic States put together, for deep bored wells, but these do not throw their water above the surface. In San Francisco alone, there are 175 bored wells, averaging 110 feet in depth, in all of which the water remains at some distance below the surface. Perhaps by deeper boring a stratum of water of greater pressure might be obtained. The wells of San Francisco, however, give out a great deal of water—30,000 gallons being pumped from one in a day without exhausting it. In San Jose, Cal., there are about sixty Artesian wells, which are used principally for irrigating the soil of gardens and farms. The water of these wells rises above the surface of the earth. The least plentiful well supplies twenty to thirty gallons per minute, and the largest (as we are informed) ejects 100,000 gallons per hour, and throws a solid body of water eight inches in diameter to a hight of eight feet above the mouth of the pipe. The water rushes up with such force that stones as large as two fists are often thrown out. The Artesian wells of San Jose are 60 to 250 feet deep, the whole distance through gravel, clay, sand, and cement without rock.

In Alameda County, Cal., there are four or five Artesian wells, averaging about 150 feet in depth. The water in none of them rises to the surface of the earth.

In Sacramento an Artesian well was sunk to the depth of 80 feet, where hard boulders, (apparently in an old bed of some ancient river,) from six to ten inches in diameter, were encountered. These boulders were loose, and could not be drilled through nor taken out without very great expense, and the well was abandoned.

In Stockton an Artesian well was sunk to the depth of 400 feet without finding water, and then the City, which was managing the enterprise, allowed it to drop.

In Marysville an Artesian well has been commenced and carried to the depth of 300 feet without obtaining water. They are, we believe, still working away.

In Los Angeles an Artesian well has reached the depth of 537 feet, without getting water. This is probably the deepest well in the State.

In Napa an Artesian well has been bored 225 feet without finding water, and there stopped.

For the above information we are indebted to the California *Chronicle*, which also gives the following strata, encountered in boring a well on the corner of Powell street and Broadway, San Francisco:

115 feet hard sand; 3 1-2 feet fine gravel with considerable water; 12 feet tough blue clay; 1 1-2 feet fine gravel; 10 feet yellow clay; 120 feet very hard grayish sandstone rock. Total, 260 feet.

These strata, encountered in the search of water, afford us a curious insight into the formation of the earth's crust in Charleston and San Francisco. An account of the geology of California was given on page 11, this Vol., SCIENTIFIC AMERICAN, being an abstract of W. B. Blake's paper, read before the American Association for the Advancement of Science.

Marshall Hall on Consumption.

Marshall Hall, an eminent English physician, says: "If I were seriously ill of consumption I would live out of doors day and night, except it was raining or mid-winter, then I would sleep in an unplastered log house." He says that consumptives want air, not physic—pure air, not medicated air—plenty of meat and bread. "Physic has no nutriment; gaspings for air cannot cure you; monkey capers in a gymnasium cannot cure you; and stimulants cannot cure you."

A Stinging Ant.

In Australia there is a species of ant about an inch long, called the "bull-dog," which stings with its tail as fiercely as a wasp. They are very tenacious of life, and the only way to kill them is to crush them to pieces. Speaking of them, Wm. Howitt says "as to killing them by cutting them to pieces, that is hopeless; cut them in two, and the head will immediately seize the body, and gripe it fiercely with its nippers, and the tail will sting away at the head. They never trouble themselves to die."

Sugar from Honey Dew.

In Utah a great quantity of sugar is made from the honey dew which collects on the leaves of cotton wood. The leaves are soaked in water, after which precisely the same course is pursued as in the manufacture of maple sugar.

Bituminous Coal in Texas.

The Victoria (Texas) *Advocate* states that a large body of bituminous coal has been dis covered in the upper part of Lavaca county, and adds, "We have seen at Hallettsville specimens equal to any of the kind from the mines of Pennsylvania or Indiana, and the quantity is said to be inexhaustible."

Great Canal Project.

A project has been started in Louisiana to connect the Mississippi river with Lake Borgne by a canal, cut from a point eleven miles below New Orleans to an intersection with Bayou Philipon. It is believed that by the construction of this work, up-country produce could be landed at Mobile, and other places of consumption along the Gulf seaboard, at one-half the cost of freight and charges, and vice-versa, by the avoidance of the reshipments and expense of consignment at New Orleans.

TO CORRESPONDENTS.

Z. M. J., of Va.—You say "you have lately seen two inventions, suggested by you, published in the Sci. Am., upon which patents have been secured by others." You now perceive the advantage of bringing out your inventions as soon as possible after they are made, and the impropriety of communicating them to others without preserving evidence of the time you made them. Inventors are often careless in these respects, and suffer by their extreme tardiness in making their applications for patents. Your fire alarm appears to be a complicated apparatus for the purpose, and we do not think you have any encouragement to prosecute it any further. Fuse has not, to our knowledge, been employed for sounding an alarm, but wires have been used in connection with bells for the urpose. The wire expanding under the effects of heat starts off the alarm, and thus effects the purpose without the necessity of using any other agent.

L. M. Y., of Ill.—It is not new to drive a saw directly from the piston of the engine, thus dispensing with the crank. This device was illustrated in Vol. 3, Sci. Am., and it has since been presented to us several times. We fail to discover any novelty in your arrangement for sawing.

E. G. F., of Mass.—We can furnish you Vol. 9, bound, for $2,75. We published, in that volume, two illustrated articles on calico printing, which you will no doubt find very interesting. The articles on Dyeing are published in Vol. 10—a bound volume of which you can also procure for the same price.

C. A. C., of Mass.—We are not acquainted with any preparation that is capable of removing superfluous hair without injury to the cuticle. We would not advise you to try any experiments or nostrums advertised to do this.

L. M. L., of Ohio—A pawl and ratchet wheel employed as you propose. does not, in our opinion, embrace any patentable feature. We do not see how its application to this particular purpose could be secured by patent, as it has no intrinsic novelty. We do not think the prize offered by Mr. Beach for a paper feeder has been withdrawn. The idea of feeding paper into the press in an endless sheet, is old and well known.

G. W. M., of Ga.—If one hundred pounds, placed on one of your springs, will close it, by taking ten springs of the same size and strength, and bending them together, they will be ten times the thickness or depth, and according to experiments, they will resist forty times the crushing strain of the single spring. That is, they will be bent only one-fortieth the distance of one spring on which one hundred pounds are placed.

E. S. R., of N. Y.—You should consult with some lawyer in your place on the point of inquiry involved in your letter.

J. D. B., of Ala.—Printers' rollers, after they become impaired, cannot be renovated by any process known to us. The practice in this city, among printers, is to throw them aside as useless under such circumstances.

J. E. S., of Mass.—Your device for indicating the stations to be stopped at along the course of a railroad, as the train approaches them, without the necessity of a verbal notice being given, appears to be new, although others are in use, but those who are unused to traveling would be very apt to misunderstand its object unless some one was especially appointed to explain what it meant.

S. W., of N. H.—You will understand that you cannot patent a principle in a machine or device. The claim must necessarily be based upon its construction and mode of adaptation to a specific purpose.

P. S., of N. Y.—A great deal of genius has been expended on windmills, and especially has this been the case or the past two years. Your arrangement seems to possess some novelty upon which we think a patent could be secured.

E. D. C., of N. Y.—Assignments of patents should always be recorded in the Patent Office within three months after their date. This is the law.

C. E. A., of Me.—The process of galvanizing iron, etc., to prevent its oxydation, to which you refer, was patented in 1837, by M. Sorel, of France. He made application in 1851 to the Commissioner of Patents for its extension for the term of seven years. This application was refused, and the invention is now public property. You will find the complete specification published in Vol. 7. Sci. Am. This process is very generally practiced in this country we believe.

Don Juan Santiago Baggally, of Mexico—Your long letters we have received, and read attentively, and hold them subject to your friend's—Mr. Bentley's—order. It would cost you $500 for government fees, and about $30 probably for agency fees, to make an application for a patent in this country, unless you have taken oath of allegiance to Mexico, in which event you would have to pay but three hundred dollars for government fees. Your order for lamps, etc., we cannot attend to filling, but will hold your letters subject to Mr. Bentley's order, and from them he will know as well what to select for you as we do. A circular of information in regard to the rules to be observed in getting your model and specimens ready for the Patent Office, we will hand to Mr B. for you. It is no economy for a foreigner to assign his interest in an invention to a citizen before it is patented, for all applicants for patents not only have to swear that they are the inventors, but also make affidavit that they are citizens of some country, and specify what country, so that the Commissioner may determine whether the amount of government fees he has deposited is correct or not.

W. H. W., of N. J.—Communications sent to us without the name of the writer are neither read nor preserved. no matter what the nature of the inquiry is, we will not attend to unsigned letters.

N. Y. G., of N. Y.—In Vol. 10, page 35, Sci. Am., you will find a very interesting reminiscence of the first ocean steamer—the "Savannah." She made the passage in 1819, and on her return she was converted into a sailing vessel. We have a right to claim the honor of first crossing the ocean with steam, an honor that we can certainly boast of with pride and pleasure.

G. A., of Mass.—You err most egregiously in concluding from our remarks on gas engines at the Fair of the American Institute, that "we appear to think gas cannot be made to propel machinery." No inference of the kind can be drawn from our remarks. On the contrary, we know that gas, air, and electricity can be made to perform this office, but we think the work can be more advantageously and cheaply performed by steam This is the great essential, and we believe that steam is by far the most economical agent yet devised. Carbonic acid gas is much inferior to steam in this respect, and must stand back for the present.

N. P., A., of N. Y.—We have none of the instruments on sale that you want.

E. & R., of Pa.—Your model has arrived, and will be sent to the Patent Office, to take the place of your imperfect one, immediately. We are sorry you did not make it precisely like the original one; still, as it deviates only in so small a point we guess the Office will not demur at it.

S. S. M., of S. C.—The first screw propeller ever made consisted of perfect screws having two or three turns of a a thread. Some with single threads, others double. The formation of the screw of a number of segments is a later improvement. The screw was used as a propeller long before the commencement of the era of steam navigation.

J. S. S., of Mass.—Throughout the entire category of invention, it is not perhaps too much to say, that on no class has so much real genius been wasted as upon rotary steam engines. It has been a great desideratum with inventors to realize a compact rotary machine, capable of economising all the power in this concentrated form. The intended advantages of the rotary engine are to allow the steam to act directly upon the wheel to be turned, without the intervention of piston rods, cranks, etc., but inventors are strongly warned, by past experience, against the error inherent in engines of this character, and we believe we can say, without fear of contradiction, that not one rotary has yet fully realized the expectation of its projector. Examine Vol. 4, Sci. Am., and see how many worthless plans have been proposed, and you will thus be able to steer clear of the rock on which so many have foundered. If you send your sketch to us we will examine it, and give our opinion of its novelty. As to the question of utility this is always a matter of experimental test.

M. F. W., of Tenn.—Stirrups for the purpose of relieving the foot in case of sudden overthrow of the rider, have been frequently suggested, and patents have been secured for them. Your modification, we think, is new and patentable, as we have never seen the same thing before.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Nov. 24, 1855:—

A. M. G., of N. Y., $25; N. & W., of N. Y., $30; J. H., of Ohio, $55; A. J. P., of Mass., $20; R. E., of —— $30; C. & D., of Ct., $25; T. D., Jr., of Pa., $30; J. D. A., of Ohio, $25; R. W. J., of Ind., $55; R. D., of N. Y., $20; H. S., of Ct., $25; L. A. C., of Mass., $55; C. & S., of Pa., $25; T. H., of London, $550; W. H. B., of Pa., $80; W. C. B., of N. Y., $25; F. S. C., of Mass., $30; W. W. H., of Va., $25; D. L., of N. Y., $27; J. S., of Ind., $10; A. P., of N. Y., $30; J. R. H., of N. J., $30.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Nov. 24:—

D. L., of N. Y.; W. C. B., of N. Y.; W. W. H., of Va.; W. H. B., of Pa., 2 cases; T. H., of London; A. J. P., of Mass.; J. D. A., of O.; R. P. W., of N. Y.; C. & D., of Conn.; S. W., of N. Y.; E. B., of N. Y.; H. S., of Conn.; C. & S., Pa.

Important Items.

Going Rapidly—The back numbers of the present volume are fast being exhausted, and those who desire the numbers of Vol. 11 complete, must not wait much longer before remitting their subscriptions, else they will be disappointed.

Models—We shall esteem it a great favor if inventor will always attach their names to such models as they send us. It will save us much trouble, and prevent the liability of their being mislaid.

Subscribers or exchanges who are entitled, to the paper and fail to receive it regularly are desired to inform us that any omission may be corrected. Missing numbers are furnished gratuitously where the fault rests with the publishers.

Patent Claims—Persons desiring the claim of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office stating the name of the patentee, and enclosing $1 as fees for copying.

Terms of Advertising.

4 lines, for each insertion,	$1
8 " " "	$2
12 " " "	$3
16 " " "	$4

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

☞ All advertisements must be paid for before inserting.

Science and Art.

New Views Respecting Geology.

Do Fossils and Rocks Grow—A practical miner of great experience, named W. Ennor, has recently communicated some very curious views and strange information to the London *Mining Journal* relative to the growth of rocks and fossils. His views are entirely opposed to the Plutonic theory, and the common opinions of geologists, who believe that the fossils found in rocks, however deep, once lived and moved on the face of the earth, and were submerged by some convulsions of nature, and buried where they are now found, in the coal measures and sandstone, &c. He says:—

"We have also ample proof that quartz grows in a short space of time, which I could prove to any one who likes to accompany me through the mines. A person visiting Devon Consols will have it pointed out. I am, for various reasons, inclined to think that all lodes where quartz or other crystals are seen in the act of growing are progressive lodes. While on this subject, I would call attention as to how these things first form. Do they germinate from a seed of their own kind? or what is the first formation, as I at all times find the first or center to be of a different character from the outer portions? Again, how do they increase in size? I, at first, was inclined to think the addition took place on the outer side, by accumulation from aqueous gases passing through the earth; but I now discover it is not the case, as the very crystals at Devon Consols have shot up by thousands from the lode in the bottom and sides of levels where there is a current of air, which clearly proves that they draw their nutrition from the rocks below, which is carried up as the sap passes up in a tree; and rings may be often seen in quartz crystal when broken across, similar to those in a tree when sawn.

Minute crystals of copper, sulphur, or arsenical mundic, adhere to it. Crystals are often found adhering to clusters of quartz.

I next call attention to the fossil plant so often found on stones, and notice that they are at all times found to take the cleavage way of rocks, and to incline south or west, with the top of the plant upwards. Were these plants once embedded in sediment which had undergone upheavals, they would now be found lying in all directions; and not passing between the cleavage, as the cleavage is often contrary to the bed. Every different rock appears to produce its own species of plant. I have long doubted the fact of a large portion of them being plants which once enjoyed the sun's rays. Query, are these plants the rock's natural produce, or the seed of living plants that became embedded, and strove hard with Nature to produce what we see? or did all plants germinate from the earth?

I must mention a plant which I saw growing last Christmas, in a level from 70 to 100 fathoms deep, at North Wheal Crofty. These plants might be seen coming out of the joints, some not above 6 inches long, and others of various sizes—one was perfect, 4 feet high, spreading 4 feet, and stuck to the side like ivy to a wall. There were many others as large, but injured, as it was a working level. I can produce impressions of plants of the same kind, and as large, printed between the cleavage of stone. All these things are to be seen, as I never promulgate mere hearsay."

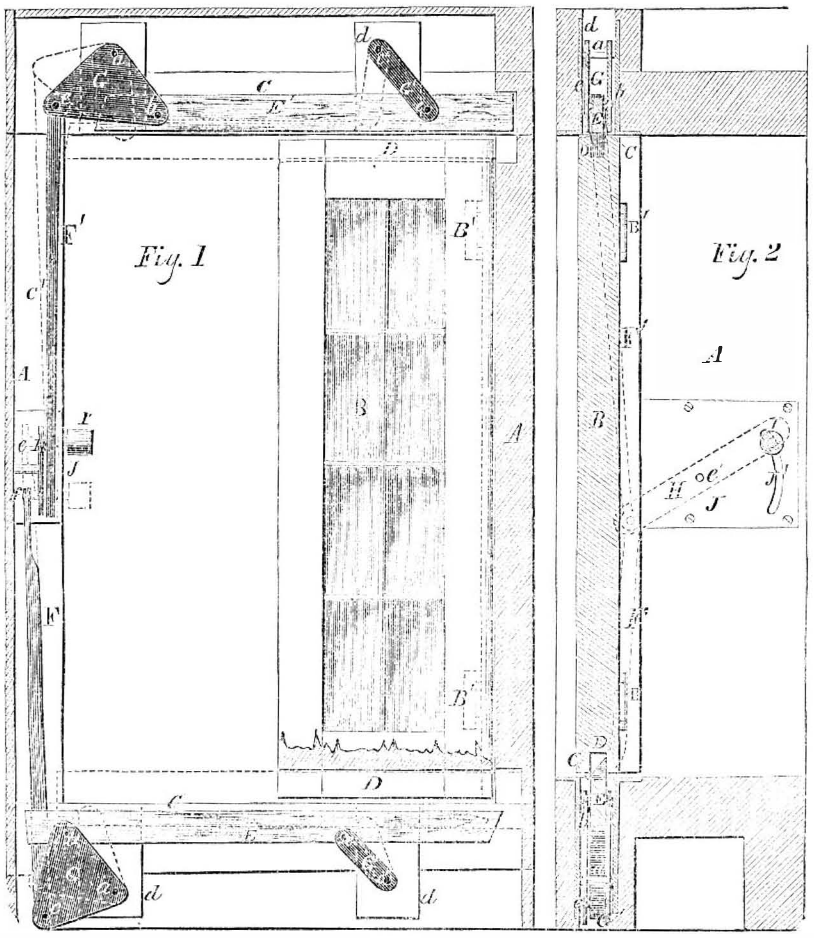
Heading Cabbages in Winter.

A number of our agricultural exchanges give the following method of making cabbage head in winter, which we hope is correct:—

"Select a suitable spot in a garden or field, six feet in width, of any desired length, free from standing water; run a furrow the proposed length of your bed, and throw a back furrow upon it. This double furrow will form a side wall of your cabbage house. In the trench stand your cabbages on their roots, leaning towards the furrow at an angle of 40 to 45 degrees Let the next furrow be thrown upon the roots and stalks of the cabbages, and another row be placed in the trench made by the second furrow; thus proceed until your six feet of width is planted, then let the last furrow be a double one—making the other side wall about the hight of the cabbage head.—Through the whole length of the middle of the patch lay rails lengthwise, supported by crutches, at the hight of about two feet from the cabbages; this will form the ridge of the cabbage house. Lay light brushwood from the side-walls to the ridge pole; then throw on salt hay, or bog hay, or straw, two inches in depth. As the cold weather advances throw on dirt till you have a depth of say six or eight inches—or even more when the winters are severe, and finally spank the dirt roof with the flat of a spade until it will shed the rain. Fill up two ends of your house in the same manner, leaving only small air holes of a foot or two diameter, which may be closed with hay. The length of the house should be on a north and south line.

In the early spring you will find your most unpromising plants have heads of their own, and all will be thriving and fresh."

COMBINED WEATHER STRIP AND LOCK.



The accompanying figures represent an improved combined weather-strip and lock for French windows, &c., invented by Alfred Speer, of Passaic, N. J., who has taken measures to secure a patent.

Fig. 1 is a vertical longitudinal section—looking from the outside—of a French window with the locking weather-strip applied to it; and fig. 2 is a vertical transverse section of the same. Similar letters refer to like parts.

The nature of the invention consists in making a groove in the top and bottom of the window frame, and also in the top and bottom sash of the window, and providing a thin weather-strip hung on links connected with rods, secured in the frame, which rods, when operated by a knob or pin set in a curved groove, force the weather-strips into the grooves of the window sash, thus sealing the frame and window sash completely, preventing the entrance of rain, wind, and dust, and locking the window on the inside of the house.

A represents a window frame made in the usual manner externally, but provided with grooves, C C, at top and bottom, and a recess, C', at one of its sides. B represents a sash hung in the frame on hinges, B' B'. D D are the grooves in the top and bottom of the window sash—the grooves of both sashes being in line with themselves and those in the frame. E E' are the weather strips—one at the top and the other at the bottom of the window frame. These weather strips are connected by pivot joints, *b b* and *e e*, to the bell-cranks and links, and these latter are connected by axis pins, *a a* and *c' c'*, to the support pieces, *d d d d*. F F' are vertical rods at the one side of the window frame; they are connected to the bell-cranks or elbow links, G G, by pins, *c c*, and are kept in the recess, C'. These two rods, F F', are connected at about the middle of the window frame by a pin, *f*, which also passes through the small arm, H, that turns on an axis pin, *e*, fig. 2, inside of the plate, as represented by dotted lines. I is a knob on the end of a shank attached to the front end of arm, H. The shank is inserted in a curved slot, J', in plate, J, the knob, I, being outside of the plate. By moving the knob, I, in the curved slot, J', fig. 2, the weather-strips, E E', are operated. This knob is placed in the inside of the window in the room.

Operation—As represented distinctly in fig 1, the weather-strips, E E', are in position in the grooves, C C, of the frame, and not in those of the window sash. In order to force the weather-strips into the grooves, D D, of the sash, so as to unite the frame and the sash, and close up the seam or space between them, and lock them together, all that is required is simply to move down the knob, I, in the curved slot, J', fig. 2, so as to make the arm, H, turn on its axis, *e*, and assume a horizontal position, or else to move the knob, I, to the bottom of the slot, J, and make the arm, H, assume an angular position, the reverse of that which it now occupies in fig; 2. The dotted lines, fig. 1, show the position of the rods F F', the weather strips, E E', and the elbow links, G G, and links, G' G', when operated as described. The upper rod, F', is forced upward and the lower rod, F, is drawn upwards. In this position these weather-strips seal up the spaces between the top and bottom of the sash and the frame, rendering the window air and water tight. In this position these weather strips answer the purpose of bars, locking the window to the sash in such a manner that it cannot be opened from the outside. This improvement in weather-strips may also be applied to doors, and either one, two, or three weather-strips may be used. The weather-strip may be made with a groove in its face, to match a bead on the bottom of a door, instead of being forced in a groove; the principle is the same in both cases. Among the many kinds of weather-strips which have been brought before the public, this one appears to us worthy of attention, on account of its positive action. It is evident that it will effectually lock the frame and sash of the window together, and at the same time be a positive weather-strip to keep out the rain wind and dust. We have seen weather-strips composed of fewer parts, but not so effectual in their action. Owing to the dotted lines on the figures, which are necessary to show the action of the parts, this weather-strip appears more complicated than it really is. It is a very simple means for accomplishing the objects stated, and will be clearly understood by a careful examination of the description and figures. It is a neat weather strip, as no part of it is seen, and it can be attached by any carpenter to casings already set. The price for each, applied to a French window, the inventor informs us, is but two dollars.

More informatfon may be obtained by letter addressed to Mr. Speer, of Passaic.

Literary Notices.

The Year Book of Agriculturs—This is a new book, forming an Annual of agricultural progress and discovery, published by Childs & Peterson, Philadelphia, and edited with marked ability by David A. Wells, A. M. It is a handsome volume, numbering 400 pages of closely printed matter, illustrated with a steel plate frontispiece of the celebrated Downing. The object of this Annual is to collect, and present in a clear and attractive form, all the new discoveries, and everything useful connected with each branch of Agriculture which have been developed during the year. The first section is an able review, by the editor, of the progress and prospects of agriculture; the second section is devoted to new agricultural machines, implements, &c., and is illustrated with a great number of excellent wood cuts, such as planters, straw cutters, plows, harrows, &c., &c. A very large section is devoted to Agricultural Chemistry, and contains many able and useful articles, all of which bear the impress of judicious selection. The editor being an able practical chemist, his views and comments on agricultural chemistry are of great value. Botany, Horticulture, and other kindred branches of agriculture are treated with judgment and perspicuity. The book is a volume of condensed knowledge, and fills up a gap in our agricultural literature long felt by many of our farmers. Hereafter it will form a yearly volume, and present to our people the annual progress of agricultural science and art. It is for sale by Saxton, & Co., No. 152 Fulton st., this city.

Amy Lee—By the author of "Our Parish." We are not acquainted with the writer of the last mentioned book, and therefore can give no further information as to who originated "Amy Lee." It appears to be well written, and to contain many scenes of absorbing interest. The typographical appearance is highly creditable to the publishers, Messrs. Brown, Bazin, & Co., Boston, Mass.

Teverino, is the title of a novel by a well-known French authoress, Madame Sand. It is prefaced by a biographical sketch of the writer, from the pen of Mr. Oliver S. Leland, Boston, published by Fetridge & Co.

Crotchets and Quavers—by Max Maretzek. This is a spicy book of revelations. It treats of things behind the scenes of various opera establishments in this country, with which the author was connected as manager or conductor. There are a good many personal allusions that should have been left out; but on the whole it forms a very lively readable volume. S. French, 121 Nassau st., N. Y., publisher.