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Morley's Patent Railroad Track Chair.

Above are engravings of a new rail joint chair, of more than ordinary merit, for which letters patent were granted to James H. Morley, of St. Louis, Mo., on the 2nd of December 1856.

Figure 1 is an end elevation. Figure 2 is a perspective view *from below*, and figure 3 a longitudinal section on the line S S, in figure 1. The chair has been proved to be extraordinarily effectual in holding the ends of the rails perfectly stiff, so as to make the strength and elasticity of the track as perfectly continuous as possible, and although its expense, (some 70 or 80 cents per chair) is considerably greater than any of the common cast iron, or even than the most approved continuous lip wrought iron chairs, it is far less than the elaborate fish joints employed on some heavily worked roads.

A A are the rails to be joined. H H shows a chair in place, composed of two parts, one on each side the rail. D D are bolts passing through each part closely underneath the rails, drawing the two parts of the chair together by means of the nuts, R, causing the parts of each, which we may term the lower and upper jaws, B B and C C, to grip firmly the flange of the rail on its top and bottom, the chair not touching the edge of the rails at F F. The upper face of the lower jaw, B, is slightly convex in its longitudinal section as shown in figure 3, and the lower face of the upper jaw is correspondingly concave, giving to the joints a tendency to rise slightly as the two parts of the chair are drawn together by bolts, D, and also preventing a too rigid gripe of the guides on the rail. The upper jaw touches the rails only at the ends of the chair, and the lower jaw touches them only in its center, on the ends of the rails, as shown in figure 3, so that the elasticity of the rail thus eases the jaws from their gripe, when the load is near the center of the rails, and allows the rails to move longitudinally in the chair at that moment, as changes of temperature may require. The rails are notched near the ends in the usual manner, and lugs or stops not represented are cast in the chair on the inside to fit the notches to prevent the rail from working out of the chairs; E E are notches where the chair is spiked to the cross tie or wooden sleeper of the track as usual.

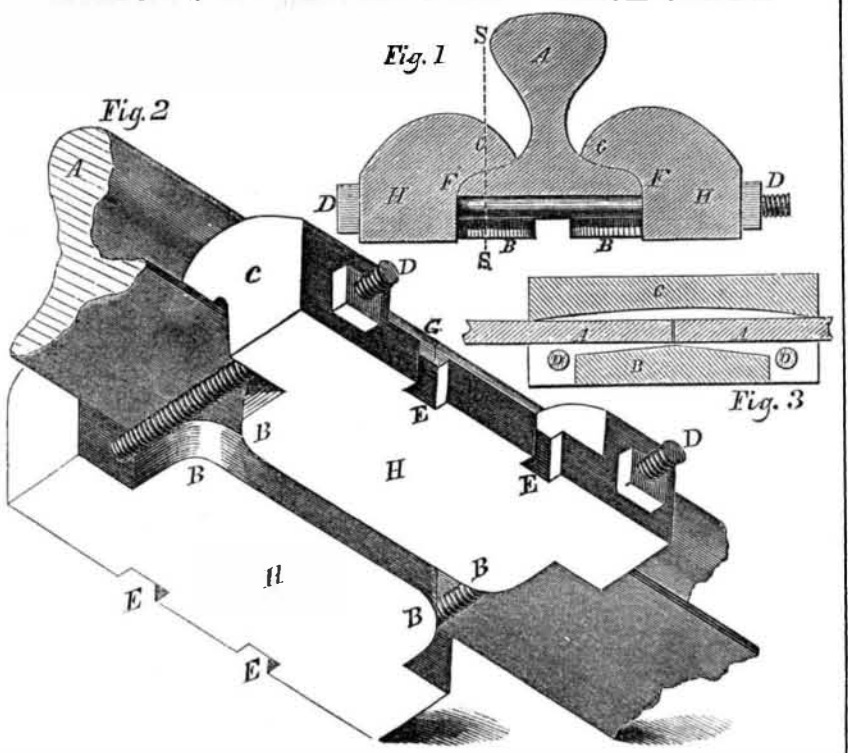
The bolts, D D, being below the jaws, act as a fulcrum in a manner to cause the jaws to bite the rail the harder while the load is on the joint.

The form given in the drawings is of a cast iron chair that has been in actual use on several miles of road during the past nine months, the exterior may by suitable machinery be made of wrought iron, if preferred.

The chair has been successfully used to some extent by placing the joints between the cross ties, so as to leave the chair altogether unsupported and free to spring like other parts of the rails. The external form may be changed with economy when thus used.

Experience and the opinions of some of the most prominent practical railroad men, lead to the belief that this makes one of the best joint fastenings in use. It effectually

MORLEY'S PATENT RAILROAD TRACK CHAIR.



braces the joint so as to prevent its settling under the weight of the heaviest engine, and this, too, on an unballasted road bed. The battering of the ends of the rails, which takes place with most chairs now in use, is effectually prevented by this one, as it renders any considerable working or sinking of the ends of one rail below its fellow impossible. These advantages, together with its cheapness and the ease with which it can be adapted to old tracks of whatever pattern of rail, recommends it to the attention of railroad companies.

Further information may be obtained by addressing the patentee as above, or Samuel Small, Esq., Boston, Mass.

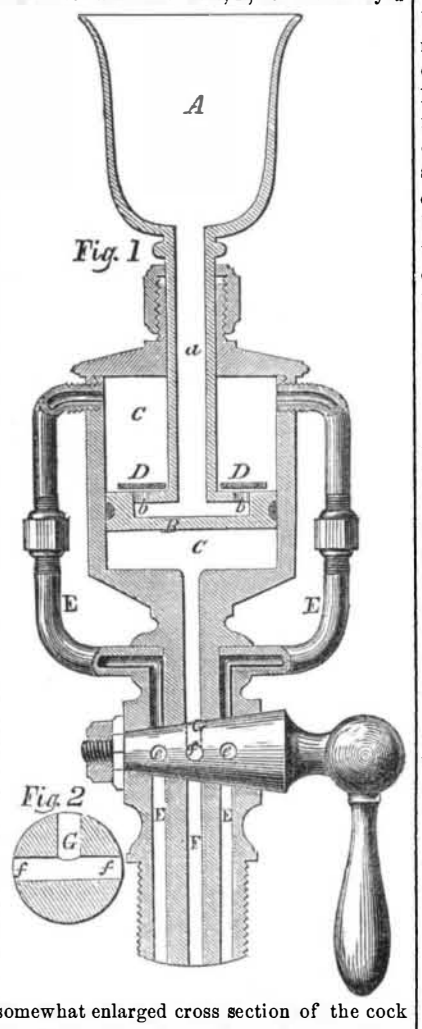
Henwood's Lubricator.

Various devices for feeding oil into the steam chests and working cylinders of steam engines to lubricate the valves and piston by the aid of two cocks, hand pumps, etc., have been adopted at various times, and many steps toward perfection have gradually been attained.

The accompanying cut illustrates an excellent device for the purpose, invented by Mr. John Henwood, of this city, being an improvement on his lubricator patented March 10, of the present year. It works with a single cock, and injects the oil very certainly and speedily by simply turning the said cock one fourth of a revolution. It is only applicable to engines in which a tolerable pressure of steam is employed, as it might be liable to fail under pressures of only from three to ten pounds above the atmosphere, as are employed in some English engines.

A is a small cup or funnel, in which the oil is poured. *a* is a smooth tube connecting A to B, which latter is a hollow piston. *b* are holes in the top of B, and D is an annular valve of thin metal. The oil poured into A, descends into B, and lifting D, rises into the cylinder, C. The cock represented in the stem below this cylinder, is the only one employed, and the construction might be still further simplified by dispensing with one of the two passages E, but we will proceed to describe it as now constructed. The passages, E, lead from the top of C, and the passage, F from the bottom. By turning the cock quarter round, the holes, *e e* and *f*, coincide with and continue the passages, E E F, so that the pressure of the steam is immediately felt on both sides of the piston, B, but as the tube, A, is of considerable area, and of course prevents the piston from feeling any other than the atmospheric pressure on that part, the pressure on the under side is so much greater than on the upper, that it rises and drives the oil through the passages, E E, into the steam chest or other part to be lubricated.

The piston, B, is now nearly at the top of the cylinder, C, the slight space above it being filled with oil, and the whole cavity below with steam at full pressure. But by turning the cock back to the piston represented in our engraving, the hole, G, therein (which communicates with the hole, F, as shown by a



somewhat enlarged cross section of the cock in figure 2) allows the escape of the steam from the lower portion of C, through a side opening, and both sides of B being now subject only to the ordinary atmospheric pressure, it descends by gravity to its first position ready for a repetition of the operation; or in case the friction should chance to prevent its spontaneous descent it can readily be forced down by a slight pressure with the spout of the oiler when it is next used. We consider the apparatus a cheap and very convenient means of lubricating in every case where the entrance of the oil is resisted by any fluid at a considerable pressure.

For further information address the inventor, in care of Messrs. Mollers, Shotwell & Docher, sugar refiners, corner of Vestry and Washington streets, this city.

Turkish Cement.

The Turks use common red earthenware pipes with socket-joints, to convey water from springs to reservoirs and fountains. They make and use mortars and cements as follows:—

Mortar.—Fresh slacked hydraulic lime, one part, by measure; pounded brick or tile, finely sifted, one part, by measure; chopped tow sufficient to mix into the consistency of ordinary hair mortar. The ingredients are mixed dry immediately before use, and then well incorporated by the aid of water; the mortar is used fresh.

Cement.—Fresh slacked hydraulic lime, one part, by measure; pounded brick or tile, finely sifted, half part, by measure; chopped tow as above. The whole is mixed with oil, in place of water. The earthenware pipe-joints are made water-tight with this cement.

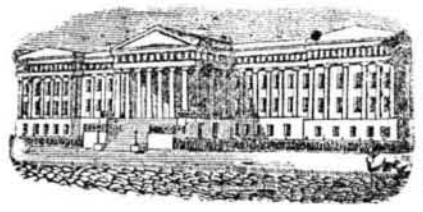
Hard Cement.

The following cement has been used with great success in covering terraces, lining basins, soldering stones, &c., and everywhere resists the filtration of water. It is so hard that it scratches iron. It is formed of 93 parts of well-burnt brick, and 7 parts of litharge, made plastic with linseed oil. The brick and litharge are pulverized; the latter must always be reduced to a very fine powder; they are mixed together, and enough of linseed oil added. It is then applied in the manner of plaster, the body that is to be covered being always previously wetted with a sponge. This precaution is indispensable, otherwise the oil would filter through the body, and prevent the mastic from acquiring the desired degree of hardness. When it is extended over a large surface it sometimes happens to have flaws in it, which must be filled up with a fresh quantity of the cement. In three or four days it becomes firm.

Drawing a Magic Circle.

Reuchlin, an Austrian sage, was once detained in an inn when it was raining very heavily, and, of course, had a book with him. The rain had driven into the common room a large number of persons, who were making a great noise. To quiet them, Reuchlin called for a piece of chalk, and drew with it a circle on the table before which he sat. Within the circle he then drew a cross; and also within it, on the right side of the cross, he placed with great solemnity a cup of water; on the left he stuck a knife upright; then placing a book—a Hebrew one—within the mysterious circle, he began to read, and the spectators who had gathered round him, with their mouths agape, patiently waited for the consequence of this conjuration. The result was, that he finished the chapter he was reading without being distressed even by a whisper of disturbance.

G. W. Kendall, formerly of the New Orleans *Picayune*, is farming in Texas, and experimenting upon the Chinese sugar cane. He says it will stand a drouth better than any thing he has ever seen.



[Reported officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING APRIL 14, 1857.

BORING MACHINE—Jonas Bosenbury, of Cherryville, N. Y.: I claim the arrangement of devices, as described, for the purposes set forth.

COOLER FOR WINE, BEER, AND OTHER LIQUIDS IN BARRELS—John F. Burgin, of Northumberland, Pa: I do not claim broadly the placing of one refrigerating vessel within another.

But I claim arranging the two cylinders, c d, eccentrically in respect to each other, when the widest portion of chamber B is directly below the opening, a, as set forth.

[This cooler is especially adapted to preserve fluids, such as wine, &c., at the proper temperature. In the inside of an outer case another case of zinc is placed, supported on skids, leaving an air space all around, thus forming a good non-conductor. The ends are enclosed, but the side opens to receive a barrel of wine, or other liquid, into the inner case, which is then filled with ice and water, through an adjustable opening. A pipe and faucet runs off the water when required.]

SCHOOL SLATES—Samuel R. Burrell, of New York City: I claim the application of a permanent or fixed pile, and also a movable pile to the ordinary slate frame of commerce, in form and manner as set forth and described.

CROSSING THE FIBERS OF FELT CLOTH—Thomas B. Butler, of Norwalk, Conn.: I claim the arrangement and use of the regular polygon heads, B B, cams, C C, guide plates, F, and traversing rods, G, connected with and operated by the shaft, A, substantially in the manner and for the purpose specified.

TABLE MANNA—Merano Butterfield, of Indianapolis, Ind.: I claim the use of the sulphate of alumina and potassa, or its equivalent, in the manufacture from white sugar of a substitute for honey.

HOT AIR FURNACES—John H. Cahill, of Philadelphia, Pa.: I do not claim generally making a hot air furnace surrounded with radiating flues combined with a central chamber having a damper, by causing direct and indirect draft through the furnace, as such arrangements are common and well known.

I claim the clean out holes, l, in the lower radiator, C, in combination with the short stopper tubes i fitting adjustably within the same, and opening through the lower plate of the said radiator, substantially and for the purposes described.

LEVELS OR INCLINOMETERS—Thomas A Chandler, of Rockford, Ill.: I claim the combination of an entire graduated circle, provided with a pendulum and index, with the two parallel sides of the level stock, whereby I am enabled to apply either side of said stock to the surface whose direction is to be ascertained, and at the same time have the index facing the operator, in whatever position he may be placed.

I do not claim the level stock, with its opposite sides parallel, nor the graduated indicating circle or dial, nor the indicator with two horizontal and one vertical pointer, nor the knife edge bearing, upon which the indicator and pendulum are mounted, nor the pendulum, because separately and for other purposes they are all well known; but they have never before been combined to form a level, nor has a level of any kind ever before been made capable of performing the functions of this combination.

Therefore I claim the level composed of the before enumerated parts in combination, whereby, among other things, either edge of the instrument may be used uppermost, with its face or dial towards the operator, and when any two of the pointers are screened from sight by an intervening body, the third will indicate the inclination of the surface to which the instrument is applied, and the angles at the head and foot of a rafter will be indicated at the same time

LIFTING JACK—John S. Chesnut, of Philadelphia, Pa.: I claim, in combination with the rack lever, C, and the bracket, D, the thumb lever, E, so that the user may, with one and the same hand, work the jack, and throw the bracket in and out of gear with the rack at pleasure, the whole being combined in the manner and for the purpose set forth.

RAKING DEVICES FOR HARVESTERS—Isaac H. Conklin, of Rockford Ill.: I claim operating the hopper, j, attached to the shaft, K, by means of the pin, n, on the plate, m, in combination with the pinions, h h, on the shaft, K, when the said parts are constructed and arranged in relation to the platform, A, in the manner and for the purpose set forth.

[This harvester delivers the cut grain in gavels or sheaves in a gentle manner, not shaking or jarring them (as in some machines) to displace the grain. A curved sickle is employed, and curved bars on the rod; the grain is laid upon the platform in the radius of a circle, and the rake sweeps it into a hopper, which measures the gavel, and when full it is tipped, laying each gavel neatly on the ground—an ingenious invention.]

SAWING SHINGLES—Jonathan Creager, of Cincinnati, O.: I claim the combination of the bench, i, rocking rest, f, and adjustable stops, g g', with circular saw, fed transversely of the shingle by treadle, and cutting longitudinally, when arranged and operating in the manner substantially as and for the purposes described.

LIFTING JACK—Robert W. and Daniel Davis, of Yellow Springs, O.: We do not claim the ratch bar gripe, pawls or connecting rods described.

But we claim the application of the power centrally beneath the self-clutching gripe or collar, whereby its action is directed in the line of the axis of the ratch bar, for the purpose specified.

We also claim the free upright connecting rods, G G, upon which the reciprocating gripe rests, arranged and operating in combination with said gripe and the lever, substantially as specified.

FILTERING LIQUIDS—Benjamin N. De Buffon, of Paris, France. Patented in France May 3, 1856: I claim first, the general arrangement and construction of tritular apparatus for filtering water and other liquids, as described and shown.

Secondly, the mode of constructing stationary and tubular filters, in which the impure water to be clarified is passed from the exterior to the interior of the filter, as described.

Thirdly, the compressing of the filtering material, as described.

TANNING HIDES—D. H. Kennedy, of New Alexandria, Pa.: I claim the combination of valonia, the sulphate of soda, sulphate of magnesia or sulphate of potash, and sulphate of alumina, sal soda, borax, or boracic acid dissolved in water, or tan bark liquor, for the purpose of tanning hides and skins, substantially as set forth.

CHAMBERED BREECH FIRE-ARMS—James Kerr, of London, England: I do not limit my claim of invention to the peculiar form of the cam part of the lever, nor to the manner of catching and holding it against the barrel, as these may be modified within the range of my invention.

I claim fitting the rammer for ramming the charges in the chambers of the rotating breech of fire-arms in a longitudinal groove in the side of the body or frame, substantially as described, in combination with the cam lever fitted to a mortise, in the rammer, for operating it in the manner substantially as described.

INDIA RUBBER HOSE—Thomas B. De Forest, of Birmingham, Conn.: I do not claim generally the combination of a rotating mandrel pressure rollers, and guide rollers, for the purpose of forming India rubber hose

But I claim, first, the employment of a pressure roller or rollers, e e, of a length equal to a comparatively small portion of the length of the mandrel, when such roller or rollers, or the mandrel, have a longitudinal movement, substantially as and for the purpose set forth.

Second, giving the mandrel a rotary motion independently of the pressure rollers, and causing the latter to derive motion from the mandrel, substantially as and for the purpose set forth.

Third, making the pressure rollers of a tapering form, so as to exert less pressure nearest where the laying or winding of the fillet or fillets takes place, and a gradually increasing pressure as the wound fillet advances farther between them, substantially as described, for the purpose set forth.

Fourth, the mode of operating the mandrel and the pressure and guide rollers, whereby the fillets are first wound upon the mandrel to form the hose, and the hose is afterwards pushed longitudinally off the mandrel, substantially as described, viz., by giving rotary motion to the mandrel while the carriage which contains or supports the rollers moves in one direction longitudinally in relation to the mandrel, and suspending the said rotary motion while the rollers move in the opposite direction.

Fifth, the combination of the clamps, a a, flanged collars, b b, pins or screws, x, springs, y y, and elliptic collars, z, applied and operating in the head stock, C', to clamp the hose to the mandrel, and liberate it therefrom, substantially as set forth.

Sixth, the combination of the two spring clutches, P P', and Q Q, the levers, P Q, the spring bolts, p q, the tappets, t u u', and the sliding bar, T, the whole operating together, as described, to cause the roller carriage to be driven in opposite directions alternately.

[This improvement relates to the formation of water hose from strips of India rubber, by winding them spirally on a mandrel, and submitting them to peculiar pressure by rollers, to unite and cement their edges, thus forming the tubing. To form water hose in this manner is not new, but this improvement renders a machine used for such a purpose self-acting, and produces superior and more economic results.]

WASHING MACHINES—Thomas A. Dugdale, of Richmond, Ind.: I claim combining the vibrating frames and rollers, F F F F, the plate, G, the knob, H, and pin, m, with the wash boards, B, and rollers, D, substantially as described

REEFING SHIPS' SAILS—James Emerson, of Worcester, Mass.: I claim the adjustable clamps, D, when arranged so as to be enlarged or decreased, as required.

Secondly, I claim the screws, E, and claws, X, on the roller, C, for spreading the sail.

REVOLVING FIRE-ARMS—Josiah Ells, of Pittsburg, Penn.: I claim, first, the use of a self-acting spring stop, operating directly by the trigger, in combination with suitable recesses, t t, in the revolving chambered breech, or their equivalents for the purpose of locking the breech at the moment of firing, and leaving it free to rotate at other times, substantially as described.

Second, Making a cam, o, for the bearing of the trigger spring on the trigger back of the center, on which it springs, in order to admit of easy play and short motion of the spring, where a long sweep of the trigger is necessary.

Third, Constructing and arranging the trigger spring in such a manner as to serve the double purpose of a trigger spring and spring stop for locking the bolt, as described.

Fourth, The combination and arrangement of the claw, b, and notch, y, on the hammer, the pawl or catch, w, and cam, o, on the trigger, or other equivalent devices, for the purpose of retaining the hammer in their respective positions when at full cock, and for effecting the rotation of the breech and cocking of the hammer, preparatory to firing, either by lifting the hammer or pulling the trigger, substantially as described.

FORMING THE BRIMS OF FELT HATS—W. A. Fenn, of New Milford, Conn.: I claim the employment or use of the rollers, d e, vibrating bar E, working over the bed m, and the serrated segment M, with plate, S, attached, arranged and operating conjointly as shown for the purpose set forth.

I further claim, in combination with the rollers, d e, segment M, and clamp formed of the lever, E, and bed, m, the adjustable frame, C, which receives the block, O, the frame, C, being fitted within the frame, B, as shown and described.

[This machine is the first produced to effect the object hitherto performed by hand labor, and as the forming of hat rims by hand is more difficult and tedious since machine felted hat bodies came into use, because their fibres are more closely matted together, such a machine was much needed. By the use of a corrugated roller, vibrating clamp bars, and stretching segments, the hat body on the block has its lower portion drawn out, stretched at right angles to the block, and the rim properly formed.]

HOISTING BUCKET FOR COAL, &c.—George Focht, of Reading, Penn.: I claim, first, the knife-edged bar, E, arranged with a link, C, and hook, D, whereby the handle is clasped with the front edge of the bucket as before described, or any arrangement substantially the same.

Second, Pivoting the handle to the sides of the bucket near the bottom, as herein described, and clasping said handle to the front of the bucket, whereby said bucket is completely inverted when said clasp is unlocked from said bucket, and whereby the tendency of any weight in the bucket is to keep said handle clasped with said bucket as set forth.

GAS BURNERS—E. P. Gleason, of Providence R. I. I am aware that a combination of a central conducting pipe, with a capping pipe, has been patented by Brick; I therefore disclaim said device irrespective of a combination with the peculiar self-regulating check.

I claim the peculiar arrangement of the holes, e e, in combination with the connecting tube, I, and the perforations, i, i, i, i, for the purpose specified.

TREATING GUTTA PERCHA—Robert Haering, of New York City: I claim in vulcanizing India rubber and similar gums the use of pipe-clay, or its equivalent, for the object set forth, in combination with sulphur, substantially in the manner and for the purpose described.

EXPANSIVE BIT—Alex. Hall, of New York City: I claim, in combination with a boring tool, an expanding bit or bits, whose turned cutting edge and shank passes through a mortise in the shank of said boring tool, and is secured therein by a pin, as herein set forth, so that said expanding bit or bits may have a cutting edge from the center of the boring tool to its extreme outer edge, as set forth.

FEEDING FUEL TO FURNACES—James Hemington, of Richmond, Ind.: I do not confine myself to the employment of a trunk, H, containing a series of moving blades or scraper, i i, to supply the box, A, as any other suitable means of keeping it properly supplied may be used.

Nor do I confine myself to the use of any particular number of feeders, e e, upon each shaft.

But I claim attaching the feeders, e e, to their shafts by joints, f f, and applying springs, g g, thereto, substantially as and for the purpose set forth.

[This improvement is specially applicable to steam saw mills. It supplies saw dust or other similar lightfuel in proper quantities without admitting more cold air than is necessary to furnaces. A box in the mouth of the furnace has two adjustable openings in front and two behind, and no air passes into the furnace but through those of the front. Two revolving wings or shafts in this box feed the saw dust into the furnace, and an endless apron, with scoops, conveys the saw dust from a hopper to the feeding box.]

COATING METALS WITH SILVER—Levi L. Hudson, N. Y.: I do not claim the use of cyanid of silver, for this has been used in the electrotype art, nor the use of the grape sugar or Paris white separately considered.

But I claim the combination of cyanid of silver, grape sugar, essence of sassafras, clay and Paris white, or any of their equivalents respectively, substantially in the manner and for the purpose described.

ATTACHING BUCKETS TO WATER WHEELS—J. R. Howell, of Alexandria, Va.: I claim the method described of adjusting and securing the buckets, A, to the arms, c, of the water wheel, that is to say, the arrangement of the ribs, B, mortises, or their equivalents, and bolts, E, in combination with the flanged end, a, of the arms, c, of the wheel, substantially as set forth

ENGRAVED PLATE PRINTING PRESS—M. C. Gritzner, of Washington, D. C., assignor to M. J. Gritzner, of same place: I claim covering the wiping rollers, or their equivalents, with oilcloth or oiled silk, or any other material impervious to ink, for the purpose of having a wiping surface from which ink can be constantly removed by a scraper or otherwise so as to keep it clean, in contradistinction to cloth, leather or similar materials which absorb ink.

I also claim, in combination with a reciprocating bed plate, carrying an engraved plate, or its equivalent, to be printed from one, two, or more wiping rollers, revolving each upon its own axis, when the said axis has a reciprocating, rotating, or any other motion, in a plane parallel with the plane of the bed plate.

I also claim passing a wiping band over two or more wiping rollers, when said rollers have the compound motion given to them in the manner described.

I also claim producing the proper degree of pressure between the cleaning surface and the plate, by means of a compressed gaseous or liquid fluid.

I also claim the manner specified of securing the plate to be printed from the bed plate.

WARDROBE OR BUREAU BEDSTEADS—J. S. McCurdy, of New York City: I do not claim constructing a bedstead that may be folded up into the form of a bureau, irrespective of the particular means by which that is effected, as several forms of bureau bedsteads have before been made.

But I claim the combination of the leaf, B, and slatted sliding frame, c c, and folding legs, a a, constructed, arranged and operated in the manner and for the purposes set forth.

STEAM BOILERS—Nelson Johnson, of Jasper, N. Y.: I claim, in combination with the employment of a direct internal flue, and a direct passage, F, under the bottom of the boiler, both leading from the fire place to the chimney, I claim the arrangement of the two dampers, G and H, substantially as described, for the purpose of controlling the direction of combustion, and using the boiler as a direct draft cylinder or boiler, or direct flue boiler.

[By this arrangement of dampers in steam boiler furnaces, the products of combustion can be diverted from under the bottom of the boiler through the flues to the chimney, or vice versa, according to the depth of water in the boiler—a very useful arrangement.]

RAKING ATTACHMENT FOR HARVESTERS—D. W. and H. A. Laietra, of Batontown, N. J.: We are aware that reciprocating rakes, provided with teeth, fitted in a slotted platform, have been previously used, and various devices have been employed for operating them. We therefore do not claim a reciprocating rake, irrespective of the means employed for operating it.

But we claim operating or giving a reciprocating motion to the rake, B, by means of the spirally grooved cylinder, C, in combination with the spirally grooved collar, K, constructed and arranged substantially as shown and described.

We further claim rotating the cylinder, c, by means of the self-adjusting wheel, or roller, E, and vibrating shaft, F, when the same are constructed and arranged in the manner and for the purpose substantially as described.

[In this raking attachment, the rake receives its reciprocating motion by a spirally groved cylinder, which is placed underneath the platform. In the groove of the cylinder is inserted a projection which is attached to a bar connected with the rake, and as the cylinder rotates, the groove in it guides the pin or projection connected with the rake to give the latter its proper motions—all in a very simple and effectual manner.]

TO PREVENT INCRUSTATIONS IN BOILERS—Robert McCafferty, of Lancaster, Penn.: I claim the application and use of gum catechu to prevent and remove the incrustations in steam boilers and steam generators, in the mode and quantities described.

MOLASSES CUPS—D. W. Messer, of Boston, Mass.: I do not claim any vessel to contain viscid fluids.

Neither do I claim a cover or diaphragm as described; nor do I claim any method of fastening the spout or channel way to the vessel as by a screw or solder, as all mentioned above was known before.

But I claim the adaptation of a movable surface or lip (to vessels intended to contain molasses or fluids of the same viscidity), said surface so situated in relation or position with the spout or channel way and forming part of the same; that by moving the said surface in the manner set forth, and described in my specifications and drawings, the viscid fluid or molasses which remains on the movable surface or lip, after pouring from the said vessel, is by the practice of my invention returned to a position where by the force of gravity it returns to the vessel, but in ordinary vessels drip from the mouth or lip.

SEWING MACHINES—W. H. Nettleton and Chas. Raymond, of Bristol, Conn.: We do not claim a single or double loop stitch, as that is well known; neither do we claim a needle feed as this has already been used, neither do we claim the slide cam, o, and slot 11 in themselves, as these have before been used; and we are well aware that diverging grooves have been used for stretching the cloth width ways in shearing and similar machinery, but we are not aware that the press bar has ever before been grooved in the manner shown, to prevent the needle puckering the cloth, as it is fed along in the manner shown.

What we claim is forming the face of the press bar next the material to be sewed, with diverging grooves to keep the cloth stretched width ways, and prevent puckering under the operation of the needle, substantially as and for the purposes specified.

We also claim the looper (r or v) formed with the notch 13, into which the needle enters to insure the taking of a loop, when said looper is combined with the slide, o, and slot 11, or their equivalents, for giving the necessary sideways motion for the purposes and substantially as specified.

DRYING AND PRESSING PAPER—John North, of Middletown, Conn.: I do not claim passing sheets of paper between heated cylinders or over-heated plates to dry the same, as that has repeatedly been done in the manufacture of paper; but such apparatus as heretofore used would not answer for printed paper, the printed surface of which must not be touched during the process of drying.

But I claim, first, the apparatus for cleaning the pressing cylinders, substantially as set forth.

Second, I claim, in combination with the pressing cylinder as described, the drying apparatus, consisting of heated plates or chests, between which the sheets of printed paper are passed on tapes without touching or dragging thereon as specified.

BOOT AND SHOE HEELS—Stephen Oliver, Jr., of Lynn, Mass.: I claim my manufacture of heels as made by a mould, and in other respects substantially as specified—that is, with a gutta percha body and tenon, a concave upper surface, and a bottoming of leather, or its equivalent.

ICE BREAKING BOATS—Zachariah Oram, of Camden, N. J.: I do not claim to be the inventor of the various parts described.

But I claim the arrangement of a series of pointed plungers operating vertically and in line which each other, whereby I have the advantage of the series for line or continuous splitting off the ice instead of breaking in mass.

RELEASING DOORS OF COTTON PRESSES—G. W. Penniston, of North Vernon, Ind.: I do not claim the duplex toggle joint, nor the mode of operating it described.

But I claim the traversing bar, e, in connection with the arm, i, of the plunger, for the purpose of retracting the key, f, to release the doors when the plunger arrives at the proper point to make the bale being pressed the size required.

FLUTES—John Pfaff, of Philadelphia, Pa.: I do not desire to confine myself to the exact form of bent tube shown, as the same may be modified and ornamented in various ways without altering the desired result.

But I claim the placing of the mouth pieces of flutes at right angles or thereabouts to the stems or bodies of the same for the purpose specified.

WATCHES—G. P. Reed, of Waltham, Mass.: I claim arranging and fastening the barrel, B, with respect to the pillar plate, essentially as described—that is, so that it shall extend through the pillar plate, and be fastened to the dial side of it—in combination with arranging the main gear wheel, G, so that it shall operate as a barrel head or cover to the barrel, and have the retaining power applied to it, substantially as set forth.

LIME KILNS—Wm. Robinson, of Baltimore, Md.: I claim, in connection with the central fire and partition, B, the arrangement of the side or auxiliary fires, G H, for the purpose of more equally introducing the heat into the stack, and promoting more uniform burning, as set forth.

RAILROAD CAR BRAKE—R. L. Smith, of Philadelphia, Pa.: I do not claim the employment of sliding rods for causing a simultaneous braking of the wheels of the cars throughout the whole train, neither do I claim exclusively the use of inclined planes for operating the rubbers.

But I claim the sliding rods, I I and J J, with the bars, H H, having double inclined planes in combination with the rollers, j j, and the rollers, K K, when the latter are hung to the axles the whole being arranged and constructed substantially in the manner and for the purpose set forth.

PORTEMONNAIES—D. C. Smith, of Tecumseh: I claim the combination of the several parts of the lock and clasp of a portemonnaie, as described for the purposes specified.

CURTAIN FIXTURES—C. H. Wheeler, of Boston, Mass.: I do not claim broadly fastening the curtain to the rod by securing it to a wire that is introduced into a groove into the roll, having a narrow slit ter the passage of the curtain; but this I only claim when the sides of the groove are straight and dovetailed, as described, whereby the curtain is securely held to its roll, without other fastenings as set forth.

SHIRT STUDS—Dutee Wilcox, of Providence, R. I.: I claim my improved stud as constructed with the arrangement and application of a slide bolt, E, with respect to the disc, B, and the two arms turning on separate fulcra, and so as to operate therewith, and be operated as described.

I also claim so constructing and arranging the disc, B, of the slider, E, that its periphery shall extend or lap beyond that of the disc, A, in manner, and so as not only to cover the said disc when closed down upon it, but also to enable a person to grasp the said disc, B, between his thumb and finger, without at the same time grasping the disc, A.

I also claim forming the two levers with recesses in their heels so that they may readily lap over and pass by one another without interference, while being turned on their respective fulcra, and the heels be brought close up to the locking slide, to enable it to lock them, as set forth.

MACHINE FOR SPLITTING WOOD—Wm. L. Williams, of New York City: I claim, first, the combination of the feeding chains arranged as set forth, with the stationary conveying floor for effecting the feeding up of the sticks in a firewood splitting machine, substantially as described.

Second, I claim the moveable side clamps operated by a positive motion, governed by the motion of the knives and proportioned to the displacement of the wood by said knives, for the purpose of supporting the sticks laterally, and also of relieving the pressure upon the same, substantially as set forth.

Third, I claim the arrangement of the two separate knives, each extending entirely across the feeding floor, and being set at such angle to each other, and such distance apart as will effect the cross or second cutting upon a block, which is not at that feed receiving the first cut, substantially as described.

THRESHING GRAIN IN THE FIELD—J. C. and T. G. Wilson, of Cedar Hill, Texas: We make no claim to the threshing and cleaning mechanism, nor do we claim endless conveyers, as such; we further disclaim the employment of endless conveyors for receiving cut grain as it falls, such as are shown in certain combined reapers and threshers.

But we claim the arrangement with a traveling thresher, as described, of an endless gatherer and conveyor armed with hooked teeth in rows conforming to the surface passed over, and operated as specified, to lift cut grain from the swath, and deliver it to the threshing mechanism, the relative position of the several parts being as set forth.

ATTACHING HUBS TO AXLES—Lorenzo Winslow, of Rochester, N. Y.: I claim the method described of attaching the boxes of carriages to the axles thereof, by means of a ring, a, and pin, p, operating in combination with the ring, b, and pin or pins, c c, in the manner set forth.

ARTESIAN WELLS—Jesse N. Bolles, (assignor to M. W. Bolles,) of Philadelphia, Pa.: I claim the combination of cylindrical boring rods with cutters and valves so constructed as to discharge the detritus upon the surface of the ground at every stroke of the drill, as described, or any other mode substantially the same, which will produce the same effect.

WINDING MACHINERY FOR MINES—Edmund M. Ivens, (assignor to himself and Lucien H. Allen,) of Tamaqua, Pa.: I am aware that rotating drums have been made to travel laterally by means of a screw around their axes. This therefore I do not claim,

But I claim the arrangement of the traveling drums on concentric axes, when operated in the manner and for the purposes substantially as described.

I also claim rotating the traveling drums by means of the rollers, J, and ribs or guides, L, arranged at or near their inner periphery, or in any equivalent manner, whereby their hubs and axes are used merely as guides, as set forth.

PHOTOGRAPHIC BATH—John H. Morrow, (assignor to himself and Edward Bennett,) of Baltimore, Md: Being well aware that baths for photographic purposes have been made of glass and earthenware, and disclaiming the invention of chemical immersing baths.

I claim the improved form of constructing a compound or double chambered immersing bath, having an immersing chamber, a a a and a, dripping receptacle, b b b, formed with slopes or inclined upper surfaces, b2 b3 b2, as described.

I also claim the suspension forked dipper device or tablet holder, formed with the spur or ridge, i, as shown and described.

I also claim the bracket or rests, e e e e, in combination with the immersing bath, a a a b b b, as set forth.

BOOT TREES—Wm. W. Willmott, (assignor to himself and Henry F. Gardner,) of Boston, Mass.: I am aware that a rod has been used in connection with jointed levers and nuts for forcing the parts of a boot tree asunder; and I am also aware that a right and left-handed screw rod has been applied to a boot tree, to work in combination with rollers, inclined planes, and wedges to force the parts asunder. I do not, therefore, claim such as my invention.

But I claim applying the rollers, n n, to curved transverse springs so that such springs may cause the parts, e f, to give or spring transversely, to correspond with the dimensions of the boot leg, substantially as set forth.

RE-ISSUES.

CARPENTERS' GAGES—Joel Bryant, of Brooklyn, N. Y. Patented Aug. 19, 1856: I no not claim the invention of gages, nor the invention and use of markers or cutters for gages, unless operated as set forth, by a screw.

But I claim the invention and exclusive use of point holder or holders for the points, markers, or cutters of gages, and instruments equivalent thereto, irrespective of any particular or definite form or kind of gage, and irrespective of any definite form or kind of holder, means or contrivance, having a screw thread cut within the same, and corresponding with a screw thread cut upon the said points, markers, or cutters, so as that the said points, markers, or cutters are operated within the said holders, to be raised or lowered through the instrumentality of the said screw threads within the said holders, and upon the said points, markers, or cutters of the said gages, or instruments equivalent thereto, as set forth.

REAPING MACHINES—Obed Hussey, of Baltimore, Md. Patented Aug 7, 1847: I claim the improved beveling of the edges of the blades of scalloped sickles, as described.

REAPING MACHINES—Obed Hussey, of Baltimore, Md. Patented Aug. 7, 1847: I claim the combination of a vibrating scalloped cutter, the indentations of whose edge act as a series of a moving shear blades, with slotted guard fingers, the sides of which act as a corresponding series of fixed shear blades, the parts of such fingers forming the slot, being connected at the front ends only, leav-

ing the rear of the slot open and free for the escape o material that would otherwise clog the cutter, substan tially as described.

REAPING MACHINES—Obed Hussey, of Baltimore, Md. Patented Aug. 7, 1847: I claim the combination of a slot formed between the long and short parts of the guard finger, with an opening in the rear of the short part, substantially as described.

SEWING MACHINES—Joseph P. Martin, of Philadelphia, Pa., (assignor of John A. Bradshaw, of Lowell, Mass.) Patented Nov. 23, 1848: I claim regulating the tension of the thread, after it has been unwound from the bobbin by means of apertures and bars, with, upon or through the thread case, either separate or combined, or by any equivalent means, when said means are within, upon, or form part of the bobbin case itself, for the purpose specified.

Springs or screw bearings upon the bobbin, separately considered, are not claimed.

I claim, secondly, regulating the tension of the shuttle thread in the act of leaving the bobbin, by a combination of one or more screws with a spring, or any yielding or elastic substances, or any equivalent devices for producing the same effect.

SEWING MACHINES—Joseph P. Martin, of Philadelphia, Pa., (assignee of John A. Bradshaw, of Lowell, Mass.) Patented Nov. 23, 1848: I claim the covered shuttle to be used as a sewing machine, or in other words, constructing that portion of the bobbin case which comes in contact with the top, cylindrical, or in any other form which does not present edges in its transverse section.

DESIGNS.

STOVE PLATES—A. C. Barstow, of Providence, R. I.

CLOCK CASES—Elias Ingraham, of Bristol, Conn.

CLOCK CASE FRONTS—Chauncey Jerome, of New Haven, Conn.

[We admire the improvement in taste which is now manifesting itself more generally in our country, viz. to combine beauty of form with usefulness in the article—whether it be a machine, stove plate, or clock case, &c. New designs call forth high inventive powers, and their authors should take care to protect themselves by patents, to derive such advantages from them as cannot otherwise be obtained. The design of Mr. Jerome for clock case fronts exhibits a cultivated taste in its author.]

COOKING STOVE PLATES—N. S. Vedder, (assignor to Smith & Sheldon,) of Troy, N. Y.

ADDITIONAL IMPROVEMENTS.

FILTER—David N. B. Coffin, Jr., of Newton Center, Mass. Patented Sept. 2, 1856: I claim, first, so constructing that part of filter to which the filtering medium is attached, and providing it with a seat in the case, that it may be raised from said seat or turned upon it, so that the water shall be free to pass in from the faucet, through and around the filtering diaphragm, in such manner as to wash away the impurities from the surface of the diaphragm, substantially; also to relieve the force of the stream of water when drawn without filtering.

Second, I also claim in combination with the ring, i the flange, n, for holding in their place the additional layers, as set forth.

Third, I claim the grooves on the outer surface of J, in combination with the ring, whether separate or continuous, like the thread of a screw, with or without a corresponding inside screw formed in the ring, for greater certainty in holding the diaphragm, also the rebate shown, so that the ring may reach a little below the largest part of J, at f and h, for the same purposes.

SAFETY HATCHES FOR WAREHOUSES—William H. Thompson and Eostis P. Morgan, of Biddeford, Me. Patented June 24, 1856: We claim the opening and closing of vertical doors attached to the tube or box of an elevator by means of the action of a traversing car or platform and its attachments, asset forth.

[NOTE—The residence of A. P. Wilson, whose patent claim for improved windmill appears on page 219 of the present Vol. should have been Solon, instead of Salem, Ill.]

Manufacture of Car Axles and Iron Castings.

MESSRS. EDITORS—In the SCIENTIFIC AMERICAN, No. 20, this volume, there is an extract from the *American Mining Magazine*, under the head of "Crystalization of Wrought Iron." In regard to the manufacture of railroad car axles, I am of the opinion that much may be done to improve their strength and durability. The object of our people, apparently, is to manufacture everything cheap, railroad axles forming no exception. This is bad and expensive policy. No one kind of iron ore should ever be used alone in the manufacture of wrought or cast iron.

The experience that I have had for some years in the use of metals from the pigs is this:—I find in all cases that it greatly improves the castings to mix different qualities of iron. I have tried the best brands of the Scotch pig alone, also a large number of American brands, to obtain strong, soft and tough castings—some anthracite and charcoal brands, hot and cold blast, made from magnetic hematite and silicious beds of ores—and in every instance failed to accomplish my object; but when I mixed or crossed the brands I succeeded. I do not believe in the mode which is now in practice in the manufacture of solid car axles. It is generally supposed that old wrought scrap iron is the best for this purpose. The question may be asked why is this? The fibre of this iron is cut too short, and oftentimes pieces of the poorest kinds of iron find their way into the bloom from which an axle is to be made; and these same pieces are laid into the bloom or package of metal crossways, and in this manner the workman attempts to weld or consolidate them for an axle. If the fibre of the iron is thus cut and laid, how can it be possible that this method should make a perfect axle?

I will now state what course should be taken to make the best solid axle, not that I think, however, that kind of an axle the best. First, the stock should be selected from a mixture of ores, which have been smelted together. Then the pigs when puddled should be well refined and rolled into bars, not too large but of sufficient length for an axle, without being cut between ends. In this manner the fibres will all be laid one way by the rolling process, and that lengthwise. Enough of these should be taken and well welded—say ten or twelve bars to form the axle. By this method a good refined solid axle can be produced without flaws or cracks. I am of the opinion that charcoal pig iron is the best, and should be used exclusively for such purposes. The smallest amount of crystalization in the center of a bar of iron virtually destroys its utility. I also find it so in the manufacture of malleable iron castings, and crystalization in them will cause them to brake like pipe stems, even after they have come from the annealing furnace.

Too hard pig iron is often used in castings. I have seen it so hard that it was impossible to molify it for castings in a furnace made for the purpose. I have taken castings of such metal, melted them over, and tried to run the metal into large moulds, but it would separate from other iron melted with it while in the cupola, and I found it difficult to get it out. The subject of crystalization was noticed in the SCIENTIFIC AMERICAN some months since, in regard to brittle malleable iron castings. It is clear to my mind that their stock was too high or hard, and this was the cause of their brittleness. B. B.

Westmoreland, N. Y., April, 1857.

[The brittle casting of malleabilized iron to which our correspondent refers was *cold short*. The opinions of our correspondent accords with the experience of skillful iron and steel manufacturers. The importance of sound and tough axles for passenger cars and locomotives cannot be overrated. The breaking of axles has caused some of the most serious and fatal accidents on record. The late very fatal occurrence on the Great Western Railway was in all probability, as shown in another column, due to this cause. Scrap iron is decidedly inferior to good native iron. Ames' very extensive works in Connecticut, devoted to the manufacture of locomotive tires and car axles, uses no metal but that direct from the Salisbury ore beds, smelted by charcoal fuel with a cold blast, and subsequently many times drawn out under the heaviest hammers and repiled. Such processes with our best American ores produce work far superior in strength and toughness to the best foreign brands, and absolutely free from the flaws and weak spots incident to the scrap iron blooms. The manufacture of such important forgings as car axles from the very finest iron, in the best known manner, is a point that should merit far more attention than it does; and we mention these works, and the processes therein, as the best with which we are personally familiar, but presume there are others in our country which conduct the work in the same way, and with the like superior results.

Inks and the Manufacture of Paper.

MESSRS. EDITORS.—I notice a communication in the SCIENTIFIC AMERICAN, April 11, upon "Inks," signed H. A. S., which contains a clear explanation of the inferior value of modern paper, for the preservation of either written or printed documents. Nearly all white papers now produced are bleached with chlorine in some form; and since paper stock has risen in price, poorer qualities are used, which require more chlorine and acids, and these latter are removed only with increased washing—and, in fact, mere washing cannot wholly remove them. These substances remaining in the paper discolor it, soften it, and make it furzy so as to clog the type, and act on the ink to make it fade. While it is impossible to remove it by washing, it may be promptly and perfectly neutralized by chemical agents known as anti-chlorines. The use of these articles is universal in Germany and France, as well as England, and they are now used in this country by many of the best manufacturers of both book and writing papers, among whom are Platner & Smith, May & Rogers, and Whyte & Hulbert, of Lee; Brown, of Adams; Carew, of Hadley; Imlay & Weston, of Hartford; Platner & Porter, of Unionsville, and many others. These anti-chlorines are comparatively inexpensive. They render excessive washing, and the loss of pulp, time and power that attend it unnecessary; they preserve the wires, blankets, and other parts of the machinery from destruction, and effectually prevent any change in the color or firmness of the paper or permanency of the ink. The cheapest and best dechlorinating agents are anti-chlorine and anti-chloride of lime, manufactured in Providence, R. I.

H. E.

Iron Water Tanks.

MESSRS. EDITORS—A correspondent of the SCIENTIFIC AMERICAN (J. E. B.) is in the same difficulty that I was some months ago, being in want of a tank to hold water fit for drinking, bathing and culinary purposes. I wanted also to have mine strong enough to bear Croton pressure, so as to carry a waste pipe up to the top of the chimney, and form a lightning conductor. I had one made of iron, No. 16 gage, galvanized, and riveted together with copper rivets. The diameter is about 29 inches by 6 feet high. It holds 215 gallons, and cost $75. The heads are of boiler plate, 1-4 inch thick, and consequently strong enough to lap for connections legs, &c., to stand upon, so as to be entirely independent, and require no wood work around it. I shall be happy to show the tank to him on calling at my house. T. PROSSER,

No. 28 Platt street.

New York, April 10, 1857.

Notes on Science and Foreign Inventions.

Preserving Timber.—R. W. Sievier, of Brussels, Belgium, has patented a process for treating wood to preserve it, which, apparently, embraces some excellent features. The timber is first saturated with certain solutions, then compressed between rollers, so as to close up the interstitial spaces, to render it impervious to air and water, the attacks of insects, and destructive influences of the weather.

The wood to undergo this process is first dried in any manner, to expel moisture and air, then it is plunged into a bath of pitch, rosin, or asphalt, dissolved in turpentine. This part of the process is best accomplished in an air tight iron tank, connected with an air pump for exhausting all the air.

If the timber is designed for ship's planking, and to resist the attacks of the *toredo navalis* (ship worm) or other insects, it should be first impregnated with a solution of corrosive sublimate, and then dried before its pores are filled with the bitumen.

When the timber is saturated with the resin solution, it is taken out of the tank and allowed to stand on a frame for some hours to drain itself of all the superfluous fluid. After this it is subjected to the action of powerful pressure between rollers, the surfaces of which may be so formed as to give the shape or form desired to the timber. The pressure squeezes the cells of the wood close together, and owing to these being filled with the resin gum, they become impervious to air and moisture. The pressure on the wood must be commenced very slow and with a small force, otherwise if it be commenced quick and with great force, the fiber will be injured. It is stated that American pine may be compressed into half its original bulk, by slow and careful pressure, and all the strength of its fibers retained. The solution for impregnating the wood may be colored to imitate mahogany, rosewood, and black walnut; and coarse woods thus made to receive as close a grain, and as hard and beautiful surfaces as the most expensive and dearest woods employed for cabinet work.

The same kind of rollers as those employed for rolling iron are the best for carrying out this invention. The wood should be passed several times through them, each time increasing the pressure. It is preferable to compress it after it is sawn into the form of plank, or veneers; but the invention is applicable to timber of every size and form for which pressure machinery can be constructed.

New Fertilizer.—A patent has been taken out by G. Wariner, of Withernsea, Eng., for the use of ground charcoal mixed with glycerine, to be placed among barn-yard liquids for the purpose of absorbing all the ammonia, and thus saving that most valuable fertilizing agent. The compound is stated to be superior to all others yet tried for this purpose. Glycerine cannot be profitably employed by farmers in our country for this purpose, excepting in the neighborhood of soap factories.

Printing Colored Designs on Glass.—Newton's *London Journal* for last month contains an abstract of a novel and ingenious process for printing colors on glass, for which a patent has been secured by Henry Page, of London. The surface of calico, paper, or other suitable material, is coated with size, gum, or starch, and when dry the design is printed on it with colors made up in varnish or oil. The size prevents the printed colors from entering the surface on which the design is printed, and when the whole is dry, maybe kept rolled up until wanted to be fixed on the glass.—The glass is now prepared by taking off its polished surface with emery, or other suitable material, and made quite rough. It is then ready to receive a coat of hard white varnish, japan, copal, or other suitable body varnish, and when that is done, and before it dries, the surface of the printed design is turned down upon it, and pressed down evenly. When quite flat the back is wetted with water, which softens the size, and allows the fabric on which the design was printed to come away, leaving only the printed design on the glass. The whole is dried off together, and then washed well in water, to remove any size that may have passed in the transfer. The design or ornament now only requires hardening, and this is effected by placing the glass in a drying stove, oven, or other suitable apparatus. Care must be taken that the heat is applied slowly, and not carried high. The heat must never be carried beyond the degree the nature of the colors will allow without injury.

A New Anesthetic Agent.—The vapor of amylene has been used, it is said, with good effect by Dr. Snow, in King's Hospital, London, as a substitute for chloroform. In the case of a severe operation on the face of a man, although there was some amount of consciousness, complete insensibility to pain was manifest; and when the operation was concluded, which moreover occupied some time, the faculties were very quickly indeed restored, and the man walked to the wards without support, instead of being carried, as after chloroform. In seventeen instances in which Dr. Snow has given the amylene, in not a single case was there any sickness or vomiting, which is a decided advantage over the chloroform, although it requires a much larger amount to be used to produce its desired effects. Dr. Snow believes a substance will yet be found that will produce anesthesia without loss of consciousness.

Straw Paper.—A great deal of paper is now made from straw, but it is coarse and hard—too brittle—and unfit for the purposes of printing upon. Improvements, no doubt, have been made in the manufacture of straw paper within a few years; it has been bleached perfectly white, and made of a tolerable smooth surface, still the best of it is harsh and hard, in comparison with rag-made paper.

An improvement has recently been made in Belgium by M. Helin, by which, it is said, paper of a soft, yet firm and excellent texture, far superior to any hitherto made, can be manufactured from straw.

The common plan of preparing straw for pulp has been to boil it first in alkaline solutions. The new process of M. Helin consists in employing a prior process to ferment the straw, something like that for retting flax. The straw is first steeped entire for sixty hours, or more, in water of 55° to 85°, varying according to the season of the year.—After some hours the water becomes gradually warm and discolored, and an active fermentation takes place; after sixty hours the liquid is suffered to run off, and the straw must be washed with a plentiful supply of water, in order to remove therefrom all the soluble coloring matter. The straw is then drained, and while still damp is subjected to the action of millstones, rolling on a plain surface, or passed between a pair of rollers, in order to flatten it. It is then forced between other rollers furnished with cutters, or other suitable apparatus, whereby the straw may be formed into filaments or fibers, as long and continuous as possible. After this it is dried in the sun, then steeped or boiled in an alkaline solution preparatory to being reduced to pulp, and bleached by any of the methods in common use.