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Indian Wood Oils.—Dammer.

This class of resinous oils, known in the Indian bazaars as gurgun oils, is obtained by tapping certain trees of the order Dipterocarpeœ, and applying heat to the incision. The tree is a native of Chittagong, Pegu, Assam the valley of Kubba, and the jungles of the Malayan peninsula, and grows to a great hight. It is described as having a straight stem, of more than forty feet to the first branch. When not tapped too soon, the base of the trunk is often of a circumference of thirteen feet and upwards. About the end of the dry season, that is, in March and April, several deep incisions are made with an axe into the heart of the wood, and a good sized piece scooped out; into these holes fire is placed, and kept burning until the oil begins to run, when it is received into a bamboo, and allowed to ooze slowly, drop by drop. The average produce is about 40 gallons in each season. The oil which flows from the wound is a mixture of balsam and volatile oil, and when applied as a varnish to wood or other substance, the oil evaporating deposits a hard and durable coat of resin.

These wood oils are chiefly used as natural varnishes, either alone or in combination with colored pigments; also as a substitute for tar in paying the seams of shipping, and for preserving timber from the attacks of white ants.

Dammer is the eastern name for a kind of indurated pitch or turpentine exuding spontaneously from various trees indigenous to most of the Indian islands. The principal species are *Dammara Australis* (Don,) the Kauri tree of New Zealand, and *D. Orientalis*, the pitch tree of Amboyna. The trees yield the dammer in amazing quantity, and generally without the necessity of making incisions. It exudes through the bark, and is either found adhering to the trunk or branches in large lumps, or in masses on the ground under the trees. As these often grow near the sea side or on the banks of rivers, the dammer is frequently floated away, and collected in distant places as drift. It is exported in large quantities to Bengal and China, and is used for all the purposes to which we apply pitch, but principally in paying the bottoms of ships. About 200,000 bundles of dammer are annually exported from Siam.

The fruit of *Diospyros Embryopteris*, a native of the East, is so glutinous as to be used in Bengal for paying boats. A cheap and ready substitute for tar for preserving cordage, &c., might easily be found in some of the numerous resins and gum elastics of India.

The Horse Chesnut.

The horse chesnut tree (*Esculus Hippocastanum*) is among the most beautiful that adorns our pleasure grounds. It yields an abundance of nuts, but they are suffered to fall and rot, being considered more useless that the acorns of the oak. It has been proven that these nuts contain a great amount of starch, but the expense of manufacturing has been too great to compete with that made from grain or potatoes. It is stated that experiments which have been made in France, extending over a number of years, have resulted in entire success in making cheap starch from them.

IMPROVED PILE AND POST DRIVER.

Fig. 1

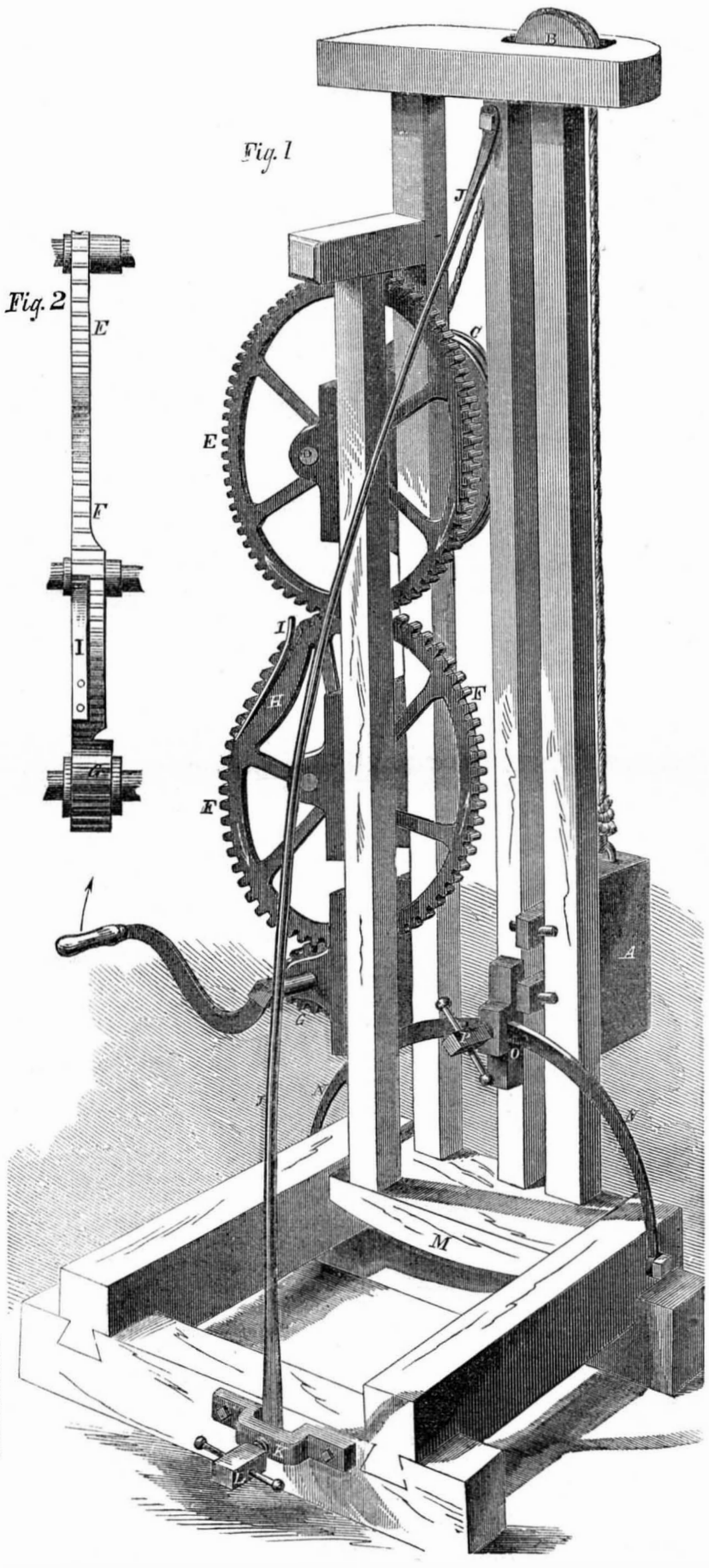


Fig. 2

Improved Pile and Post Driver.

The accompanying engraving exhibits an improved apparatus for driving posts and piles, the invention of Mr. Junius M. Sampson, of Waynesville, Ill. Patented March 25, 1856.

The weight, A, by which the post is driven into the ground, is attached to a rope which passes over a pulley, B, at the top of the machine, and winds on a drum, C, on the shaft, D. Shaft D is revolved by means of gear wheel, E, which meshes with another wheel, F, and the latter is operated by the pinion, G, to whose shaft the crank is applied.

In order to allow of the sudden disengagement of wheel E from F, so as to permit the instantaneous fall of weight A, when it arrives at the top of the machine, a break is made in the teeth of wheel F, at H. The wheels continue to turn in the direction of the arrows, until the teeth of E arrive at H, where there are no cogs, and is thus disengaged; whereupon the weight falls, the direction of E being reversed during the descent. The direction of F, however, is not changed; it continues to move on until the teeth at the opposite end of the break, H, engage with E, and the weight is wound up again. I is a spring secured to the flat surface of H; on end of I catches in the teeth of E, and brings them properly into gear, with F, after each disconnection. By means of this spring all sudden jar, breakage, and missing of the teeth, in their sudden re-union, after having been disconnected, is avoided. Although the wheel, F, has a break in its cogs which liberates E at the proper moment, no such break must exist, so far as the driving pinion, G, is concerned, else there could not so well be a continuous rotary motion of F. This difficulty is overcome by setting a row of cogs on F at one side of H, and making the pinion, G, quite broad, so that F, although broken at H, is nevertheless continuous in its periphery as relates to G.—Fig. 2 is a side sectional view, showing this peculiarity of construction.

A noticeable feature of this machine is the facility with which it may be adjusted, so as to drive posts at an angle, or when standing on uneven ground. J is a rod extending from the top to the base frame. This rod passes through an eye, K, which is furnished with a set screw, L. The base, M, on which the upright guide posts, weight, and gearing are sustained, has a rocking movement backwards and also sidewise. If it is desired to cant the machine backwards, the screw, L, is loosened and the rod, J, pushed down through the eye, K, and secured.

N is a side guide rod, passing through an eye, O, in which is a set screw, P. By means of this screw the machine may be set and secured at any side angle, with the utmost convenience. In fence building these adjustments will be found of peculiar value.

Machines of the above description are of great value in building fences, as they afford a ready method of driving down the posts firmly, without digging. Fences thus built will be much more durable and firm than where the post holes are dug out by spade in the common manner.

The weight of the machine, independent of the driving weight, is small. It can be readily shifted from place to place, quickly applied, etc. Fence posts can be set much more rapidly by its aid, than in the common manner. For further information address the inventor, as above, or apply to J. A. Knight & Co., 334 Broadway, New York City.

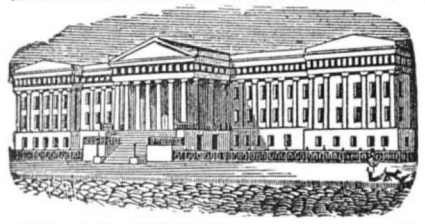
Taking Care of Farm Implements

Every farmer should have a house for keeping his implements. It should be tight and dry; and adapted for repairing, altering, cleaning and sharpening them. Every implement, when not required for use, should have its proper place, and before it is laid past for winter, all the bright metal belonging to it should be carefully dried and well greased to prevent rusting. Rust is a viper which poisons the farmer's purse: many farmers allow their plows, harrows, and cultivators to rust and rot in the corners of open damp sheds during six months of the year, and they seem surprised that their implements do not last longer.

All farm implements, after having been used during spring, summer, and fall, should have their wood-work painted, also their coarse metal work; and every bolt and nut should be oiled. The loss of an ounce of iron by rust, is equal to the loss of an ounce of gold. Carefulness in all things is economy, and a little extra trouble saves extra expense.

Liquid India Rubber.

India rubber cut into thin strips and immersed in spirits of turpentine in a close vessel and kept warm, will dissolve, and in that state can be put on with a brush, forming a water-proof coating for anything to which it may be applied. It has the objection, however, of keeping its *tack*—stickiness—and in this respect it is seldom used, except for coating wood or other work placed in water.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING SEPTEMBER 23, 1856.

FLY-TRAP—Samuel Arnold, of Green Hill, Tenn.: I claim, first, the employment of the revolving perforated and grooved hollow cylinder C, applied in connection with the reticulated piston D, and glass vessel B, substantially as and for the purpose set forth.

Second, the arrangement for retaining the piston elevated while the flies are being entrapped, in connection with the device for releasing it when necessary, substantially as set forth.

OVENS—Hosea Ball, of New-York City: I claim, the perforated interior chamber, in combination with the rotary reel, and the swinging platforms thereon, self-discharging, substantially as set forth.

REEFING TOPSAILS—Isaac Boss, of Brooklyn, N. Y.: I claim, first, the running of lines from the reef, between the head of the topsail and the fore part of the yard, thence direct to the top mast head.

Second, I claim the arrangement of reef tackle beneath the yard, running from the end of the yard to the quarter on deck.

Third, I also claim the peculiar mode of strengthening the sail by bands and double ropes, as described.

CORN PLANTERS—Malender Bates, of C lton, N. Y.: I do not claim the application of a valve to the bottom of a tube.

Neither do I claim the construction of a tube for the purpose of conveying seed from the hopper to the ground, for these principles have been variously applied, for the same purpose, in various machines.

Nor do I claim operating an axis by means of a hand-lever, and spring attached to the handle of seed planters, for these also have been used in other machines, to effect different purposes—such as drawing slides, reciprocating plates, and opening apertures.

But, I claim, the rotating ratchet-wheel, r, provided with feeding apertures, in combination with the wire-screen, w, or its equivalent; the spring pawl, m, guard-pin, i, and wire button, o, acting in the manner and for the purpose described.

FEEDING AND SAWING SHINGLES—George Craine, of Fairfield, Iowa: I claim, so arranging the carriage, with regard to the saw, as that the saw shall enter the bolt at or near the center, in length of the shingle, and cut towards both its ends at the same time, in manner, and for the purpose set forth.

I also claim a device for feeding the bolt to the saw, so as to take the shingles therefrom "but and point," alternately; the worm-wheel, o, working into the double-racks, q q, in the manner set forth.

I also claim the combination of the hinged piece G, with its pin, i, and feeding tooth, c, and the ledge, f, and trigger, g, on the fixed piece, M, for the purpose of connecting and disconnecting, at proper times, the carriage with the feeding shaft, H, so that it may traverse on its ways, as set forth.

STAVE JOINTER—A. H. Crozier, of Oswego, N. Y.: I do not claim the wheel, A, for that has been previously used.

But I claim the wheel A, with cutters, D, attached—in combination with the adjustable gauges or plates, G, arranged as shown and described, for the purpose set forth.

ADJUSTING THE SLATS OF WINDOW BLINDS—Benajah C. English, of Hartford, Conn.: I claim, first, the manner of adjusting the slats of window blinds, by the use of the gear-wheel and rack.

Second. I claim the method of fastening the slats at any required angle, by the use of the clutch.

Third. I claim, the whole in combination, as set forth.

MACHINE FOR PAINTING CARRIAGE WHEELS—S. B. Tuller, of Worthington, Mass.: I claim, the vibrating and rotating shaft, C, passing into the tub, B, and arranged and operated as shown, or in an equivalent way, for purpose specified.

EXPLOSIVE SHELL—A. M. George, of Nashua, N. H.: I claim, the described arrangement and combination of the chambers, D E, and b b, c, to constitute a new projectile, for the scattering of melted metal or other incendiary substances.

FEED ROLLS FOR STRAW CUTTERS—Alex. Gordon, of Rochester, N. Y.: I claim, the construction and arrangement of the feed roller, B, and shaft, s, in the manner substantially as described, whereby the advantages set forth, are secured.

METALLIC BRACES FOR HEELS OF BOOTS AND SHOES. George W. Griswold, of Carbondale, Pa.: I am aware, a metallic plate has been inserted in the heel and counter of an overshoe, for the purpose of forming a bearing, or nut, for a screw to pass through to hold the overshoe to the inner shoe—this I do not claim, as it will not effect the object I have in view.

But I claim the application to boots, or shoes, of a brace or support, for uniting the heel and counter, and to prevent one from twisting, or running over on the other, substantially as described.

DEVICE IN MACHINES FOR MANUFACTURING BED PINS—Henry Gross, of Tiffin, Ohio: I disclaim the throwing out of the finished pin, by a spring, and the employment of a movable cutter for forming the head, when a distinct and separate operation is required to bring it into action, as in W. McBride's patent of Feb. 28th, 1854.

But I claim, fixing the head forming V cutter to a lever operated by the longitudinal movement of the pin, as described, whereby but one hand of the operator is required for forming the entire pin.

HAND STAMP—Chas. W. Hackett, of Elmira, N. Y.: I claim, the arrangemement of a rotating printing press with two sets of type alternating with each other, in such manner that at the same time one set of types is leaving its impression, the opposite or corresponding set is being supplied with ink: the whole constructed and arranged, substantially as set forth.

CORN SHELLERS—James J. Johnston, of Allegheny, Pa.: I claim, the drum, D, with the two sets of teeth, arranged as described, and its combination with the vertical guide boards, E F, and spring plates, G H, substantially as set forth, and for the purpose described.

BRICK MACHINES—Wm. A. Jordan, of Thibodaux, La.; I do not claim the use of double tables or the employment of a rotary scraper, as such devices have been used before.

But I claim, the tables A and B, and shoving heads, e and f, when arranged to operate in relation to each other in the peculiar manner described, in combination with the rotary scrapers, K K', and curved guards, O O', the whole being constructed and operating in the manner and for the purposes set forth.

MANUFACTURING INGRAIN CARPETING—David B. Kerr, of New-York City: I do not claim the invention of a party-colored carpet; nor the manufacture of a carpet composed in part of solid colored yarn, and in part of party-colored yarn, when the two are combined in a manner different from that described as my invention.

Nor do I claim any particular method of party-coloring yarn for carpets, nor the weaving of carpets in a power-loom. Nor do I limit myself to a carpet in which all the warp threads are party-colored.

But I claim, a party-colored Ingrain carpet in which the warp threads of one or more plies are party-colored, whole or in part, and are combined with solid colored weft threads to form the design, substantially as set forth.

MACHINE FOR NOTCHING HOOPS—Daniel Lamson, of East Weymouth, Mass.: I claim the knife, E, attached to the reciprocating frame, B, in combination with the inclined plate, D, attached to the frame, A, substantially as described, for the purpose specified.

OMNIBUS—D. O. Macomber, of New-York City: I claim the arrangement, substantially as specified, of two series of independent seats, on each side of the carriage-body; but this I claim only when the backs of the seats are curved, and the front edge set obliquely, as set forth, and for the purpose specified.

I also claim, connecting the body with the frame of the running gear, so that it will rock thereon, substantially as described, in combination with the screw-bolts and adjusting nuts at the ends, or equivalent therefor, for the purpose of setting the body at any desired inclination with the frame of the running gear.

And finally, I claim, connecting the brake levers with the shaft of the stop and foot-wheel, substantially as specified, in combination with the strap which passes into the inside of the carriage-body, to be operated by the passengers if required, substantially as described.

SECURING SPOKES IN THE HUBS OF WHEELS—Robert Moor, of Westport, Ind.: I do not claim as my invention, the device of two screw-nuts working on one bush, for the respective purpose of securing the spokes in the hub, and the hub on the axle.

Neither do I claim the dove-tailing of the spoke within the hub; knowing these devices to be old.

But I claim, first, the described oblique form of spoke-mortise, enabling all the necessary beveling and taper of the spoke to be on that side which is in advance, when the wheel is rotating forward, leaving the rear side straight for its entire length—thus adding to the strength, and reducing the labor of constructing the spoke, as fully explained.

AIR ENGINES—Thomas McDonough, of Middletown, Conn: I am aware that the alternate expansion and contraction of atmospheric air, and other permanent gases, have been employed as a motive agent, in engines of various constructions.

And I am also aware that the gases so employed, have been made to pass alternately in opposite directions, through a vessel presenting a large amount of metallic surface—so that in passing in one direction, such metallic surfaces should take up caloric from the heated gas when passing in one direction, and transfer it back to the said gas when passing in the opposite direction.

And I am also aware that such metallic surfaces have been composed of a series of metallic disks or sheets of wire-gauze, but so arranged that the air or gas had to pass through the meshes of the wire-gauze which had the effect of impeding the passage. I do not, therefore, wish to be understood as making claim to any of these things.

I claim, combining the hot and cold cylinder (or cylinders) by an intesposed cylinder, substantially as described, to prevent the one from being affected by the temperature of the other, as set forth.

I also claim, the working piston (or pistons) working in the cold cylinder, in combination with the dumby pision, (or pistons,) which extends from the cold to the hot cylinder, substantially as and for the purpose specified.

I also claim, the vertical position of the pairs of cylinders, snbstantially as described, that the heated part of the engine may be above the cold parts, for the purpose set forth, in combination with the means described, for keeping the lower part of the engine cold, substantially as described.

And I also claim, the arrangement of the metallic surfaces through which the air or other gas, passes—by making such metallic surfaces of sheets of wire-gauze, rolled up and placed in a surrounding vessel, so that the air or other gas shall pass in films, between the several coils, substantially as and for the purpose specified, in contra-distinction to passing through the meshes of wire-gauze, as set forth.

MAKING BRASS KETTLES—O. W. Minard, of Waterbury, Conn.: I claim, the use of rotary shears or cutters, having a hinged or sliding piece, constructed and operating as described, to carry one of the shafts and one of the cutters from a cutting position, and to quickly and accurately replace it when desired.

MACHINE FOR GRINDING SAWS—Albert S. Nippes, of Lower Merrion, Pa.: I claim, in combination with the face-plate of a machine for grinding saws, a guide, pattern, or former, which can be used for giving shape to the saw-plate, by causing the face-plate or stone to approach or recede from each other, to vary the bevel or thickness of the saw-plate, or to compensate for the wearing away of the stone, whilst acting on said plate, or both, substantially as described.

BLOW-PIPES—Stewart B. Palmer, of Tully, N. Y.: I do not claim, separately, the pump nor the mode of operating the same.

Nor do I claim the arrangement of the nozzle, for these have been used in similar or analogous devices.

But I claim, the two wind-chests, E F, connected by the pipe, G, provided with the faucet, H, when said chests, thus connected, are arranged and used in connection with the pump, I, reservoir M, wick-tubes, N N, and nozzle, P, connected with the pipe, O, substantially as described, for the purpose specified.

LUBRICATOR—Norman W. Pomeroy, of Meriden, Conn.: I claim, so constructing and connecting the disk which forms the bottom of the oil vessel, that by reason of its curved or waving shape, the central part may be readily pressed inward by the thumb or finger, while its shape will cause it to return to its original position, immediately on removing the pressure, when constructed, connected and made to operate, substantially as described

HAY RAKES—Isaac J. Robbins, of Penn's Manor, Pa.: I do not claim, exclusively, the use of independent teeth for horse-rakes; the same having been described in the patent granted to Calvin Delano, Feb. 7th, 1849.

Neither do I claim the exclusive use of revolving teeth for horse-rakes.

But I claim, the hinged arms, D D, with their revolving teeth, E E, in combination with the sliding-blocks, a a, the whole being constructed substantially in the manner and for the purpose specified.

HYDRAULIC BRICK PRESS—Ethan Rogers, of Cleveland, Ohio: I claim, the employment or use of two pumps with the mechanism for working the same under different pressures, when arranged to operate in relation to each other and mold C, for the purpose of pressing and removing the brick, in the manner described.

SELF-REGULATING DRAUGHT FOR CHIMNEY-TOPS—Josiah A. Royce, of Lee, Mass.: I claim, the application to the top of a chimney, or draft flue of a frame having one or more turning slats or dampers, hung in it—said frame being provided with a rudder, so as to be always turned to the proper position, by the action of the wind; and the dampers being combined with a spring-mast, with sail on top, so as to be closed more or less by the action of the wind, and automatically opened during a calm, substantially as and for the purpose set forth.

HOOP MACHINE—Jos. Sawyer, and Sylvester Sawyer, of Fitchburgh, Mass.: We claim, the methods described of hanging the knife and connecting it with the feeding-rolls, for the purpose of retaining it midway between the rolls, and parallel with the direction of the hoop-pole.

CARDING ENGINES—A. D. Shattuck, of Grafton, Mass.: I claim, the application to the main cylinder of carding-engines, of two or more variable cylinders, in combination with a doffer, operating in the manner and for the purpose, substantially as set forth.

GRAIN SEPARATORS—Hamilton E. Smith, of Philadelphia, Pa.: I claim, the arrangement of the vertically vibrating shakers, and horizontally vibrating screens, for the purpose of separating grain or other material—the whole being operated by a combination of mechanism, substantially such as described.

THRASHING MACHINE—Isaac S. Spencer, of Guilford, Conn.: I do not confine myself to any precise angle of the ribs or flanches, c, nor to the precise form, as they may be either curved or straight.

I claim, the cylinders F G H, provided with ribs or flanches, c, placed obliquely or angularly with their axes, substantially as described, for the purpose specified.

CHURNS—Franklin Thorpe, of Shelbyville, Ill.: I claim, the described arrangement and combination of the fast and loose buckets—the latter being slackened from the former, in the act of opening, and tightened to it in the act of closing, by the screw upon the spindle, or equivalent devices, for the purposes explained.

TOOL FOR FORMING GROOVES AROUND THE ORIFICE OF BOTTLES—Amasa Stone, of Philadelphia, Pa.: I claim, in the described tool for forming the orifices of bottles or other vessels, made from plastic substances, with a groove around the orifice, the revolving flange, F, constructed and arranged to form a groove in the end of the bottle-nose, or other vessel, substantially as described.

FEATHER-EDGE GAUGES—G. G. Townsend, of Rochester, N. Y.: I claim, the combination of the knife, K, and feather-guard, F, for the purpose set forth—they being constructed and arranged, substantially as described.

LANTERNS—Sinclair Shannon, of Buffalo, N. Y.: I claim, connecting the lamp-pot to the main body of the lantern, by the bail, substantially as set forth.

LOCK FOR FREIGHT CARS—Thomas Slaight, of Newark, N. J.: I claim, the hasp G, fitted over the socket F, of the lock, and secured thereon by the plug, or bolt, H, which passes through the hasp and socket into the lock, substantially as described.

CARDING ENGINES—A. D. Shattuck, of Grafton, Mass.: I claim, the stripper B, in combination with the doffer C, and with the main cylinder of a carding-engine, operating in the manner, substantially as set forth.

DEVICES IN SAWING MACHINES—Wm. P. Wood & S. De Vaughn, of Washington, D. C.: We claim, first, the arrangement of the driving-beam, H, in combination with the rocking-beams, E, in the manner substantially as and for the purposes set forth.

Second We claim the arrangement of the fluted feed-rolls, O and P, in combination with a reciprocating wedge shaped saw-blade, substantially as and for the purposes described.

Third. We claim, the wedge-shaped saw-blade, M, when constructed and operated in the manner, and for the purposes set forth.

WARM AIR FURNACES—Wm. M. Wrigth, of Pittsburgh, Pa.: I do not claim radiating or projecting surfaces, which are cast with the fire-pot or upper section of the furnace, as used in James Miller's patent of Oct. 16, 1838.

But I claim, first, the manner of increasing the radiating surface by the use of the movable plates, all in the manner and for the purpose set forth.

Second. The manner of constructing the ash-box, with its rim, m, to receive the fire-pot, and projecting arms or supports, o o o o, substantially in the manner and for the purpose specified.

MACHINES FOR SAWING MARBLE—Alonzo Webster & D. K. Bennett, of Montpelier, Vt.: We do not claim, giving to the saws a lateral motion, by means of horizontal shafts, having right and left-hand screws thereon.

But, we claim, the combination and arrangement of the movable stirrups, D, cross-bars, H, and the arbors, I, in the reciprocating frame B, as set forth.

BOAT OARS—Rufus Rode, of Manchester Township, Pa. (assignor to John Denig, of York, Pa.): I claim, the combination of the oscillating plate and double-jointed arms, forming a double-jointed boat oar, operating on an oar or rower-box, as described, or in any manner substantially the same, for the purpose of enabling the oarsman to row forward with his face fronting the bow of the boat.

BELT PUNCH—Augustus Simpson, of Worcester, Mass., (assignor to Samuel H. F. Bingham, of Weston, Mass.): I am aware that punches and dies for various purposes have been used, wherein the one enters the other, but mine differs from all those heretofore used, in causing the cut to open as the cutter passes through, as shown in fig. 2, making an entirely different principle of cutting, from those which is the principle of action that I claim, or, in other words—

I claim, the combination and arrangement of the tit, D, and the cutter, A, when constructed and operating as described, whereby the conical form is given to the article punched, the cutting facilitated, and performed with the edge of the cutter free, as set forth and described.

REAPING AND MOWING MACHINES—Wm. P. Wood, of Washington, D. C., (assignor to Samuel DeVaughn & W. P. Wood, of same place): I do not claim a balance frame supported and turning upon an axis of motion, independent of the axis of motion of the driving-wheel, of itself.

But I claim a balance-frame, A, supported and turning upon an axis of motion back of the axis of the driving wheel, when used in connection with angular or oval-shaped gearing, or its equivalent, and the bifurcated stanchion-brace, Q, in combination with a main frame, H, rigidly supported at its forward end upon a truck carriage, I, or wheels; the whole being constructed, arranged and operated, in the manner substantially as described.

CAST-IRON PAVEMENTS—Geo. M. Ramsay, of New-York City: I am aware that cast-iron voussoirs have been made into an arch for bridges and other purposes, and that the bond of connection between has been effected by means of lugs on the voussoirs, and wrought-iron clips or bands, passing over the lugs of the adjoining voussoirs. I, therefore, wish to be distinctly understood, as not claiming broadly this mode of connection of cast-iron blocks by means of lugs and clips.

But I claim, the iron hexagonal paving-blocks, with legs or lugs below, as described, when united and secured by the iron clips or bands, so as to form the flexible pavement, as described.

DESIGNS.

PARLOR STOVES—Samuel F. Pratt, of Bosson, Mass., (assignor to W. & J. Treadwell, and Perry & Norton, of Albany. N. Y.)

OVEN STOVES—Samuel F. Pratt, of Boston, Mass., (assignor to W. & J. Treadwell, and Perry & Norton, of Albany, N. Y.)

Burning Water.

It is said that when this discovery was first made by Sir Humphrey Davy, the large laboratory of the Royal Institute could not contain the concourse of people who came daily to witness its effect. It caused more astonishment than any other substance which science has revealed, excepting, perhaps, phosphorus, which was exhibited in every court in Europe. It is only necessary to drop a piece of potassium into a basin of water, which, though quite cold, instantly bursts into a beautiful and brilliant flame wherever the metal is in contact with it, and continues to burn until the potassium is quite dissolved.

Shola.

This is a singular substance manufactured in India from the cellar pith-like stems of the plant *hedysarum lagenarium.* It resembles in appearance the Chinese rice-paper, and is well adapted for some purposes in the arts. It is made, in India, into life-buoys, boxes, bottle-cases, hats, and other articles. It has a loose celular texture, which makes it an excellent non-conductor of heat, and this with its great lightness admirably fits it for making hats, for which purpose it is much employed in that warm climate. It can be so manufactured as to present the appearance of ivory, and is thus also well adapted for making ornaments.

Plenty of Wheat.

The Cincinnati *Price Current* estimates the quantity of wheat raised in the United States this year to be 142,836,000 bushels. Pennsylvania is our greatest wheat State, raising 18,250,000 bushels; Ohio is the next, raising 16,800,000; New York next, raising 16,200,000; Illinois next, raising 14,600,000; and Virginia raises 12,500,000.

Economy of Fuel in Manufacturing Iron.

No less than two tuns of coal and about half a tun of limestone are used in making a tun of pig iron. The manufacture of 500,000 tuns of pig iron requires no less than the enormous quantity of a million tuns of coal and a quarter of a million tuns of lime. If the amount of coal thus required at present could be reduced to one half by some new improvement, a clean saving of at least three million of dollars would be the result to the country. It is believed by many metalurgists that such a saving will yet be effected. Who is the lucky man that will make the improvement?

Silver of California.

An editorial article in the Sacramento *Union* expresses the opinion that as fast as the mountains of that State are explored, silver ore will be found in large quantities, as rich as the mines of Guanajuato, in Mexico, or of Cerro Passo, in Peru, and that in a few years we may see this interest, under the guidance and direction of enterprising capitalists and practical miners, grow to be one of the most valuable mineral interests in the United States.

To Destroy Cockroaches, Rats and Mice.

The following is stated to be a sure method of destroying the above-named varmints.—Take a stale loaf of bread, reduce it to crumbs, and throw them into a vessel of water containing two tea-spoonfuls of cayenne pepper and pulverized annis seed, half a drachm of saltpeter, the same of white lead, and a wine-glass full of the extract of hops. All these ingredients are well stirred and steeped together at a moderate heat for six hours, when they are strained through a cloth, and 30 drops of the tincture of quassia added to the clear liquor, which is bottled up for use. Some lumps of loaf sugar saturated in this liquor will destroy cockroaches when laid down for them, and some bread saturated in it will destroy rats and mice.

We have found that loaf sugar steeped in a solution of sugar of lead, and laid in the haunts of cockroaches, soon destroys them—the lead is poison. It is our opinion that an old rat is too knowing to be taken in by the above bait.

Another Steamboat Burned.

The steamboat *Niagara* was consumed by fire on Lake Michigan, near Port Washington, on the evening of the 24th ult., and no less than 60 lives are reported as lost. The fire is stated to have originated in the boiler-room, and in a very few minutes the boat was in a sheet of flame. The burning of a steamboat is a terrible accident. We insist upon it that all steamers should be constructed with fire-proof boiler-rooms. It seems to us, owing to the great number of steamboat explosions and burnings which have occurred this year, that the Inspectors have become more careless and inefficient.

Coal Smoke on Railways.

Common bituminous coal has been used for some time on the North British Railway, but the engines make such a smoke that the company has been threatened with a suit unless they use coke or burn their smoke. If they do not burn their smoke they deserve to be sued.

Picture-frames, and other like articles of art, are now manufactured in England from a cement composed of brick dust and coal tar. The articles are compressed in molds and dried.

We see paragraphs every week, in some of our cotemporaries, describing the successful manufacture of gas from wood. Why, this is nothing new nor wonderful; it is half a century old; but can such gas be manufactured as cheap as that from coal? It cannot; nor as cheap as that from resin or resin oil, and why continually harp upon a comparatively worthless invention.

An iron bridge is nearly completed, connecting Goat Island with the main land at Niagara Falls. It has five spans supported on stone piers.

[For the Scientific American.]

The Hughes Telegraph.

[Concluded from page 19.]

We will now examine the virtues of said instrument in order to ascertain if they meet the expectations, which have been caused by the many stories and puffs of the newspapers.

The instrument is described as a printing press and a telegraph combined, able to print 20,000 to 25,000 Roman letters per hour. In order to print a message from a revolving type-wheel, a great number of letters on the wheel have to be overleaped as useless. On an average only four or five letters by each rotation, can be used for the composition of words. For instance, to print the word "police," requires five rotations of the type-wheel, and the rest of the letters, 129 in number, are useless.

Suppose that each instrument will print the above number of letters (333 to 416 per minute) the type-wheel of each instrument has to make 5000 to 6000 revolutions per hour, and each spring oscillates 135,000 to 162,000 times up and down (37 to 45 times per second) and the time allowed the crank for one revolution in order to print one letter (including the whole operation) will be reduced to 1-74 or 1-90 of a second. This proves that a very great power must be applied to the clock-work in order to revolve said crank with the required velocity. Besides, the crank is hindered, at first, by the inertia, though it may sometimes operate and stop in regular intervals of 1-74 to 1-90 of a second for a series of times, as for instance, in spelling the word "Stuvesant," where the letters s—t—u—v, succeed each other in regular alphabetical order.

It is apparent that there may be great difficulty in regulating the movements of Hughes' telegraph. To make two clocks of the same kind, in one and the same locality under equal temperature and surveillance, move stroke for stroke in perfect unison for any length of time, is a matter of great difficulty. And the obstacles will of course, increase in proportion to the quickness of the oscillating pendulum, still more if located at a distance apart, by the variations of the temperature and gravity consequent upon their different places of situation. If the number of clocks are increased, these difficulties will be intensified. Now the Hughes telegraph instruments are also clock-works, and undergo the same vicissitudes. It will require a skillful person to keep them in unison. The vibrating spring of one instrument, if it oscillates 0 005 of a second in discord with springs of other instruments will create a disturbance, and a difference of 0·011 of a second will render every operation totally useless, because the contact spring of the transmitting as well as the receiving instrument will meet a similar cog wheel and a current will circulate without the will of the operator. Both instruments will thus operate at the same instant of time, and after that the springs of both will rest upon the cylinder cog wheel again, which will suspend the operation entirely.

If the reader compares the foregoing data with the statement issued by the friends of Hughes' telegraph, that "messages may be sent at the same instant of time over the same wire in opposite direction with perfect ease, regularity and certainty," he will see how groundless and foolish in point of fact, such a statement is. I venture to assert that the most favorable result that can be attained by the Hughes telegraph, provided the several clock-works are in unison, would amount to the printing of 5000 to 6000 alphabets, in their regular turn, per hour, without the aid of any operator. Should their harmony of the Hughes instrument be disturbed, one type-wheel will move in advance of the other, and cause the print of B instead of A, and so on.

Among other advantages paraded to the public relative to Hughes' machine, it was stated: "An operator will be surprised by returning to his office, to find a printed message upon his desk manufactured by his instrument during his absence." I would ask if the operator would not be just as likely to find a strip of paper full of letters all mixed up and jumbled together, and perfectly unintelligible. Certainly he would. Perhaps it is in this manner, without an operator, that the glorious feat of printing of 25,000 letters per hour is to be performed. But if we consider that the operator must always press down a key for each desired letter, the absurdity of expecting to work the instrument any faster than Morse's or House's, is clear. The conditions for speed are nearly the same in each. Hughes' may have a slight advantage derived from exchanging messages alternately upon the same wire in opposite directions, but this will hardly balance the disadvantages heretofore described.

It is further stated that Hughes' instrument "will work perfectly in very long circuits in all states of the atmosphere,—neither mist, rain, nor snow having any perceptible effect." This improvement is not alluded to in the specification; why is it not claimed? Is it kept secret? What is the reason that the operation differs from all other telegraphs? Is no conducting wire required, which would be exposed to atmospheric influences?

It has been already mentioned that the mechanism of telegraphs is just as much influenced by the change of the atmosphere of the locality, as other mechanism, but in particular they are disturbed in their operation by the indirect influence of the external atmosphere through which the telegraph line on posts is extended. This either prevents the accumulation of electric power, or prevents it from reaching the place of destination, also sometimes causing electric currents that are not wanted. Whenever an electric current has a chance to escape from a wire, it will do so, and as the electro-magnet, by which the instrument is called into action, is connected with the wire which conducts all currents, the instrument will be subject to all influences that affect the wire. Therefore it follows that Hughes' machine is just as much subject to interruption from the state of the atmosphere, as any other. It involves, indeed, a great deal of ignorance and arrogance to expect, that an enlightened reader possessed of sufficient knowledge on the subject, will believe such nonsense. Atmospheric influences cannot be frightened away by a mechanical monster, like the birds by a scarecrow.

It is further stated:—"Therefore, at seasons when the Morse and House instruments are utterly powerless, even in circuits of 50 miles, there is every reason to believe that Hughe's instrument will work reliably in circuits of 1000 or 2000 miles." The less electric force an instrument requires for its operation, the more the conducting wire can increase in length by application of the same power.

The electro-magnetic power required by Morse's receiving magnet needs not to be stronger than to attract the armature together with its vertical lever (scarcely a distance of the thickness of paper,) and to overcome the power of a very feeble withdrawing spring.

The whole power required to operate House's combined axial magnet, amounts to what is necessary to force the spring of the magnet a small distance out of its equilibrium, and to overcome the friction of the air chamber valve.

The power required to operate Hughes' combined electro permanent magnet would be such, at least, as to annihilate the magnetism of the iron cores heretofore alluded to, in withdrawing by ordinary mechanism, the detent which obstructs the motion of the crank. The resistance and friction opposed to the removal of this detent from the crank is in proportion to the power required for the quick motion of the crank.

Which of these instruments alluded to, if placed in one circuit, and the electric power decreasing gradually, will be exhausted first, and become entirely powerless, I leave for the intelligent reader to judge. To me it is clear that Hughes' would give out much the soonest.

It is further stated, "The simplicity and durability of Hughes' machine will compare favorably with the Morse, and is vastly superior in these respects to the House instrument."

Compared with Morse's instrument, which consists only of a simple clock-work with about six wheels, two rollers, two electro-magnets with their armature, lever, and a finger key, the Hughes' machine shows a very great disadvantage in point of simplicity, durability and practicability. While, by a comparison with House's instrument, after taking from it the contrivances for applying the manual power, the air-pump and the contrivance for applying the air, all the rest will be found in the Hughes' machine, viz.: finger-key board with the keys and springs, cylinder and break wheel, magnet, escapement action, type-wheel, detent, crank, connecting rod, printing press, feed-wheel, &c. The new instrument has an average of two clock-works like Morse's, a horse-shoe magnet, a break-wheel, 54 levers, 27 connecting rods, the bolt, mechanism, &c. These are a few of the proofs of its astonishing simplicity and durability!

In conclusion I would state that in thus reviewing the Hughes Telegraph, I have been influenced by no desire to ridicule the invention, but simply to correct some of the false statements that have been palmed upon the public respecting its capabilities and operation. Neither do I wish to injure the reputation of the inventor, because every inventor, even if he should fail in his attempt, deserves acknowledgment for sacrificing his health, time, labor, and money, for the benefit of the public, without knowing whether any reward will be given him.

Some of the parts of Hughes' machine display great ingenuity in their construction, and are highly creditable to the inventor. But as a telegraphic instrument, it is, in my opinion, without that practical merit which has been claimed for it.

CHAS. KIRCHHOF.

New York, September, 1856.

Silvering Metal.

MESSRS. EDITORS—I noticed in No. 2, an account of a supposed new method of silvering metal, which has lately been patented in France by B. Adville. In 1842 I silvered copper and brass for daguerreotype plates by nitrate of silver dissolved in soft water; the solution was applied by a brush or cloth, and while wet I rubbed the surface with fine powder whitening on a cloth. At times I put the whitening in the solution of the nitrate of silver, but found the first method the best. The operation is repeated to get a thicker coat on the surface. The surface of the metal to be silvered must be very clean, polished bright, and free from the perspiration of the hand. By this method I silvered my own daguerreotype plates while operating in the city of Newark in 1842. ALFRED SPEER.

Passaic, N. J., Sept. 1856.

A Cheap Ice House.

Any person, in the country, where timber is cheap, can erect an ice house at but little expense. All that is required is to put up a strong frame for the size of house required, and board it up close, inside and outside, with a space between, all around. This space is stuffed close with straw, or dry saw dust.—The roof is made in the same manner, and the house is then complete. Straw and saw dust are cheap and good non-conductors. The house should be situated on a dry spot, and should have a drain under the floor. It should also be convenient, to be filled easily. The walls of stone and brick ice houses should be double, as well as those of wood. Great care should be exercised in packing ice; all the blocks should be clear and solid, and about the same thickness, so that they may be packed close together, and frozen into a solid mass. In favorable situations good ice houses may be excavated, like caves, in the face of a hill.

Case of Green Color of the Hair.

M. Stanislas Martin has published in the *Bulletin de Therapeutique*, Paris, the curious case of a worker in metals who has wrought in copper only for five months, and whose hair, which was lately white, is now of so decided a green, that the poor man cannot appear in the street without immediately becoming the object of general curiosity. He is perfectly well, his hair alone is affected by the copper, notwithstanding the precaution he takes to protect it from the action of the metal.

Chemical analysis has proved that his hair contains a notable quantity of acetate of copper, and that it is to this circumstance that it owes its beautiful green color, which is most singular and remarkable.

Beauties of the Deep.

If mere beauty of appearance, says the *British Quarterly Review*, is in the question, the waters need not yield the palm of loveliness to the land. The deep has its butterflies as well as the air. Fire-flies flit through its billows, as their terrestrial representatives dance and gleam amidst the foliage of a tropical forest. Little living lamps are hung in the waves, and pour out their silvery radiance from vital urns which are replenished as fast as exhausted. The transparency of some of the inhabitants of the waters gives them an appearance of fairy workmanship which is perfectly enchanting. The Globe Beroe (*Cydlippe plius*) resembles a little sphere of the purest ice, about the size of a nutmeg. It is furnished with two long, slender, curving tentacles, each of which bears a number of filaments, twisted in a spiral form along one of its sides. Eight bands are seen to traverse the surface of this animated orb, running from pole to pole, like lines of longitude on a terrestrial globe. To these bands are attached a number of little plates, which serve the purpose of paddles, for the creature can work them so as to propel itself through the waters, and either proceed in a straight line, or, like a steamboat, turn in any direction, or, unlike that vessel, whirl round on its axis and shoot downwards with infinite grace and facility. But, not to dwell upon the mechanism, is there not something fascinating in the idea of crystalline creatures? Suppose we had transparent horses, or diaphanous dogs, or cats with a glass exterior which would permit the circulation of the blood and the working of organs to be distinctly seen."

[A glass steam engine in full operation, if exhibited at some of our mechanical fairs would be an interesting curiosity.

Curious Dwarf Deer.

The Baltimore *American* says:—"We yesterday saw two of these animals, mother and young, that were brought from the island of Java, on board the United States frigate *Macedonian*, and are probably the only ones ever seen in the United States. When full-grown they are about the size of the ordinary rabbit of our forests, and shaped like the American deer. The limbs are very delicate, and the hoof, which is cloven, is almost transparent. In color they are reddish brown, with white breast and stomach. From the nose, and extending back to the ears, is a tan-colored stripe on each side, and under the lower jaw a white stripe, forming a trident. They feed like cattle, and chew the cud, like that species of the animal creation. They are easily domesticated. The eye is large and projecting, but the ears are short and oblong. They are said to be very swift, and their appearance would indicate it, as they are formed precisely like the red deer of this country."

Jute, or Indian Hemp.

A new factory has been started in Brooklyn, N. Y., for manufacturing cord and small ropes from Jute. This fibrous material consists of the fibers of two plants of the genus *Corchorus*, which is extensively cultivated in Bengal. It is not so strong as hemp, and never can take its place for the rigging of vessels, &c., but being very cheap it can be employed economically for many purposes, and will, no doubt, come into extensive use. The machinery in this factory is of a peculiar character, specially adapted to the nature of the material. It was imported from Dundee, Scotland, the principal seat of Jute manufactures in the world; but new machines required after this, will, no doubt, be constructed at home. Jute is now employed in the manufacture of many fabrics in Dundee. It is mixed with cotton warps of cheap broadcloths; it is also mixed with silk, and from its luster can scarcely be detected, and it is also woven into cheap carpets.

It has been employed on our rope walks for a number of years, spinning it on the hand jennies, and it makes a very beautiful cord, but hitherto it has been difficult to spin it with steam power machines. The machines in the new factory are driven with a steam-engine.

Four and a half millions of raw silk are exported annually from China. As much silk, we think, could be raised in our own country.

New Inventions.

Can a Patent be Attached?

A correspondent from Richmond, Va., inquires of us if a patent can be attached by the Sheriff, and sold to satisfy a judgment against the patentee. He says it is contended by some persons that as a patent is granted to a certain person specified in the instrument, and for his exclusive use and benefit, no court nor power of government can deprive him of it, unless he assigns it, and without his assignment the mere possession of the patent is only as so much waste paper, and no machine could be made or sold by the party holding it.

He states that a brother mechanic has asked the advice of two lawyers on this point: one said a patent could be attached and sold, the other said it could not, and in this dilemma our correspondent has written to us for exact information.

By a proper process of law a patent can be attached and sold like other property. Curtis, in Section 189, says:—"The interest in a patent may also be assigned by operation of law in case of the bankruptcy of the patentee, as well as by his *voluntary* assignment. There is no question that a patent already obtained passes to assignees in bankruptcy."

The Telegraph on Railroads.

We have seen an account in the daily papers of this and other cities, that Sir Robert Lowe, of the English Board of Trade, and Capt. Galton, now in this country, have been deputed officially to examine the working of our railroad system, have examined the New York and Erie Railroad, and expressed admiration at the perfection of its working; these papers say: "The feature in the operating system of the Erie which struck them as of the greatest value and excellence was the working of all trains by telegraph. Sir Robt. Lowe expressed an intention to procure the passage, by Parliament of an act compelling British roads to work their lines by telegraph. He has taken full notes of the system of operating the Erie, with copies of blanks, &c. Every State in the Union should pass a similar act."

This is something which we really do not understand. We have been led to believe that the English system was far superior to that of our best managed railroads, and this is a common opinion. We also thought that all the English railroads employed the telegraph, and that the idea of its use was borrowed from them. It is at least true, that before we had a line of telegraph in operation, there was one on the Great Western Railroad in Eng laad. Dr. Lardner, while delivering a course of lectures in Niblo's Saloon, in this city, in December, 1841, described the said telegraph, and said he had witnessed its operations. Is Sir Robert Lowe ignorant of this fact?

Tin Folding Machine.

Our engraving illustrated an invention for the above purpose, for which a patent was granted to Mr. O. W. Stowe, of Plantsville, Conn., June 12th, 1855. In the ordinary machines, the two jaws which bend the edge of the tin are operated separately; but in this improvement both jaws are moved by one pressure of a lever.

B is the first folding bar, having bearings at each end, one of which terminates in a boss, A, to which the lever, A′, is attached. The second folding bar, C, is hinged at F to K, which slides on the base of the machine, L. D is a gauge attached to C, and adjusted by the set screw, H. J is a folding plate attached to the stationary holder, E. The edge of the tin sheet is folded by being bent around the edge of J. For this purpose the ends of C are furnished with friction rollers, C′, which ride upon the cam surfaces, B′. When B is turned up by the application of pressure upon A′, the cams, B′, will cause C also to rise, and the sheet of tin being placed beneath the edge of J will be thus bent or folded. The width of the fold is regulated by the position of gauge D, against which the edge of the tin is placed. The size of the fold may be instantly changed by turning screw H. The closeness of the fold is readily adjusted by the screws, G, which bear against K, and push the front edge of C towards J, or allow it to recede from J.

The prime object sought and gained by this invention is the simultaneous action of the two folding bars, by which the fold or lock is formed. By accomplishing this object the following important advantages are secured: First, the folding plate is relieved of a varying and unequal strain on its opposite sides, and will, therefore, last longer, and keep perfectly true and straight.

Second, since both folding bars rise together they hold the sheet metal on which the lock is formed from being drawn in at either end, so that if any number of locks are formed with the gauge in the same place they will be of an exactly uniform width. The gauge also is put on in a superior manner, and is less likely to be moved while using the machine than formerly.

Third, the working of both folding bars by means of one lever saves time, so that the amount of work that can be done by this machine in a day is nearly twice that which can be turned off by the machine commonly used.

Fourth, this machine is more durable than the old style of machines. It does more work, does it better, and costs only a fraction more.

Two sizes of these machines for tinsmith's use are made, No. 1, for 20-inch tin, $20; No. 2, for 17-inch tin, $15. The machine is on exhibition at the Great Fair of the American Institute, Crystal Palace, N. Y. For further information address the Stowe Manufacturing Co., Plantsville, Conn.

MACHINE FOR FOLDING TIN.

Fig. 1

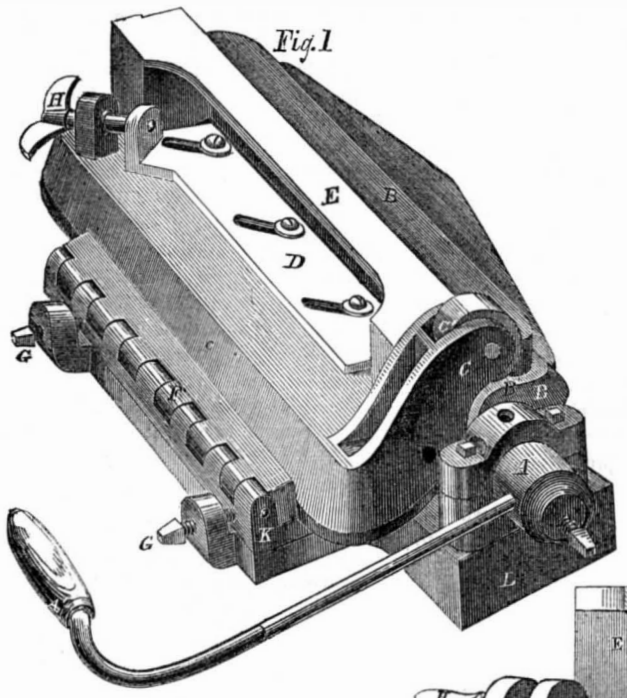
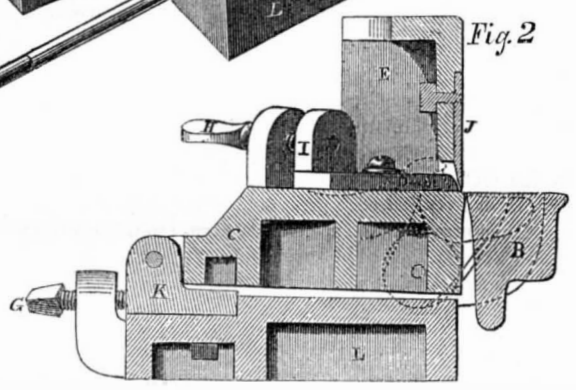
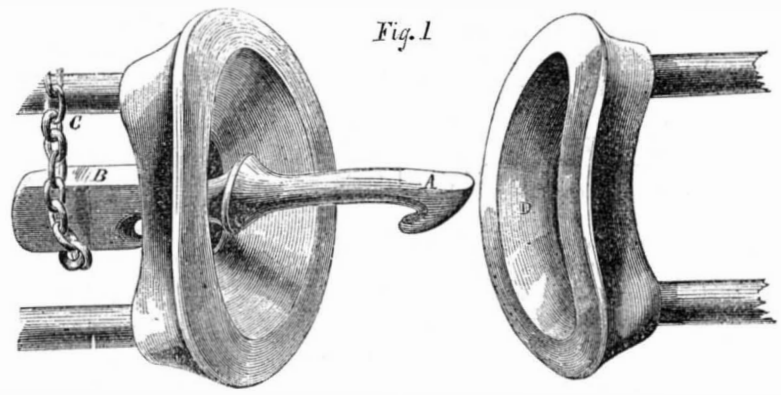


Fig. 2



SELF-ACTING CAR COUPLING.

Fig. 1



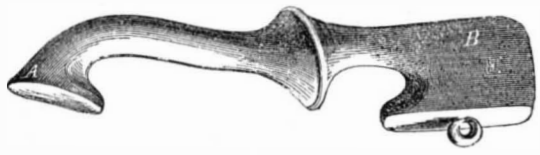
Self-Acting Car Coupling.

Our engraving illustrates a simple and ingenious method of coupling cars together, for which letters patent were granted to John Ryan, of Wilmington, Del., July 17, 1855. The connection is formed by means of a hook bar, A, placed in one of the buffer heads in the manner shown in fig. 1. The hook is shown in fig. 2. The back end of the hook bar, at B, is weighted, so that the hook part will naturally hang down, and keep the cars coupled together. The weight also serves to maintain hook A in a horizontal position, so that it will readily couple with any other buffer. When it is desired to uncouple them the chain, C, is pulled, and the hook turned up on its side; the buffers will then disconnect.

In figure 1, the two buffers are supposed to be approaching each other the act of being coupled. The front extremity of hook A is beveled off so as to form a screw-shaped surface; the mouth of the buffer, D, is made flaring, so that when the beveled end of the hook, A, strikes upon it, the hook immediately turns upon its side, passes through the aperture in the buffer, and then revolves back to its first position, leaving the two buffers connected.

This coupling is extremely simple, always self-acting, and not liable to get out of order. Its first cost is about the same as the common link and pin coupling, but it is much more economical in use than that kind, as there are none of the parts that can be lost, mislaid, or readily stolen. As a preventive of accident this improvement is highly desirable, since it requires no person to enter between the cars to render assistance. The coupling is done by merely pushing the cars together, so that their buffers will touch or nearly touch.

Figure 2.



This coupling will act successfully on any curve where a locomotive can run, and on cars whose hight is variable. Should an axle heat, the end of the car will be held up. Mounting and other dangerous results are also prevented.

The invention has been in use on the Philadelphia, Wilmington and Baltimore Railroad for more than a year past, and is highly spoken of by the officers of that corporation. It has also been used with great satisfaction on the Philadelphia and West Chester road. It is now on exhibition at the Crystal Palace, New York. For further information address John Ryan and John A. Griffin, Wilmington, Del.

Preventing Incrustations in Boilers and Iron Pipes.

A few years since we published the receipt named "Sibbald's Metaline Compound," for preventing scale in boilers, and inquiries having recently been made of us respecting it, by new correspondents, we publish it again.—We have evidence that it has been found useful in some cases.

It is composed of 1 lb. of melted tallow, 1 lb. of fine black lead, one-eighth of a pound of pulverized charcoal, and one gill of oil, for water pipes, or the same amount of coal-tar for boilers. These ingredients are thoroughly incorporated together, and applied while in a heated state with a brush, like paint. It forms a good protection for timber placed underground, for coating water pipes, and also for coating the interior of steam boilers in which *hard* water is employed. It must be frequently renewed in such boilers to effect the object stated. This compound might be applied to the interior of iron water pipes with a brush on the end of a long rod. Maintaining the proportions of the materials described, any quantity of it may be manufactured.

Important Litigation.

For some time past the tax-payers of the towns of Genoa and Venice, N. Y., have taken measures, under the advice of eminent lawyers, to resist the payment of the interest upon the bonds issued by these towns for the benefit of the Lake Ontario, Auburn and New York Railroad. Last week the question was brought before the Supreme Court of this District, at Rochester, upon an application for a *mandamus* to compel the payment of the interest due upon eight bonds of one thousand dollars each, issued by the town of Genoa.

The questions involved are important, and may cause a protracted litigation, the decision of which is important to the tax payers of all towns interested.

A Great Pianoforte Factory Burned.

The great pianoforte factory of Messrs Braidwood, in London, has been consumed by fire. No less than 420 workmen were employed in it. 1000 pianos in various stages were burned, and the total loss of property was £100,000—about half a million of dollars. We believe this was the largest manufactory of the kind in the world.

SPLENDID PRIZES.—PAID IN CASH.

The Proprietors of the Scientific American will pay, in *Cash*, the following splendid Prizes for the largest Lists of Subscribers sent in between the present time and the first of January, 1857, to wit

For the largest List,	$200
For the 2nd largest List,	175
For the 3rd largest List,	150
For the 4th largest List,	125
For the 5th largest List,	100
For the 6th largest List,	75
For the 7th largest List,	50
For the 8th largest List,	40
For the 9th largest List,	30
For the 10th largest List.	25
For the 11th largest List,	20
For the 12th largest List,	10

Names can be sent in at different times and from different Post Offices. The cash will be paid to the order of the successful competitor, immediately after the 1st of January, 1857.

☞ See Prospectus on last page.

Scientific American.

NEW YORK, OCTOBER, 4, 1856.

Mechanics, the Agents of Power.

Nations are powerful in proportion to their productive capacity of things useful and necessary; but so far as the mere physical power of men are concerned, there is but little difference between those of different countries. The barbarian can endure as much toil and fatigue as the civilized man, and yet the productive powers of our country, in comparison with those of China, for example, with her 226,000,000 of inhabitants, is beyond calculation. How can we account for this? The Chinese are an industrious and patient people, and they have every variety of soil and climate, and yet they are weak and powerless in comparison with a nation having nine times less inhabitants.

There is one thing very evident to us as the ruling element of national power in modern times,—we mean mechanical genius, in the production of useful machinery. As a nation multiplies its machines, so does it multiply its power. The great and powerful nations of the present day, are those which have the greatest number of machines. For example, in China, the work which we do with machinery they perform with manual labor. With one steam engine of 100 horse power, we are able to do as much work as can be done there by a thousand men, and a thousand steam engines of an hundred horse power each, are equal to the labor of a million men. With all other kinds of machines, the same comparisons are equally applicable. This is the way we increase productive labor; this is the way we economise labor. In China there are few machines, and these are but rude; there are no steam engines, steamboats, railroads, power looms, wood planing machines, thrashing machines, reapers—none of those machines, countless in number, by which we economize labor, and render our country great in power and comfortable in its varied abundance. Every new machine invented to economize labor, therefore, is a public benefit, and every inventor a public benefactor. Oh, how much we owe to inventors: without them we have no reason for supposing we would be more comfortable, greater, or more civilized than the Chinese, or even ruder nations. But with all our machines, countless in number though they be, much is yet before our inventors to accomplish; their task will not be done until they have relieved man from an incalculable amount of drudgery, which he yet performs; not until they have placed him in a still more favorable position for his intellectual and moral developement.

Improvements in machinery, by increasing productive labor, give man more leisure, and thus increase his pleasures. A friend recently from France, who had visited a great number of flour mills in that country, spoke in sorrow of the continual drudgery caused by rude and inefficient machinery—enlightened and refined though that country is, and full of ingenious artisans. Day and night, from year's end to year's end, Sabbath days and all, the clatter of the hopper never ceased—the operatives were perfect slaves to the machines. With our improved machinery they could accomplish four times as much work, and thus find leisure to improve their minds, and rest their toil-worn frames.

In our last number a correspondent gave us pleasing information regarding his success in thrashing by a portable steam engine; this application of steam power, more universally adopted, will save a vast amount of labor. Plowing by steam is another application which, when fully successful, as it no doubt will be, will also effect an immense saving.

It is not possible for us to point out all the objects to which inventors can yet devote their energies and talents in making new conquests of mind over matter, but they are still as numerous as the sands on the sea shore. An inventor should have this thought ever present with him, "how can I best economize labor of any kind." Every person gains by improvements in machinery, and none so much as those mechanics who combine their own labors, with machinery, in the business in which they are particularly engaged. The manufacturer who makes the cheapest and best article, by having the most improved machines to economize labor, soon obtains a superior custom for his products, and thus while he benefits his country by adding to its productive powers, he also benefits himself. At every Exhibition of Industry,—such as the Fair of the American Institute now open in the Crystal Palace, this city, inventors and mechanics should scrutinize *every* machine and article exhibited, search out their defects, and study how to improve them. This is one excellent way to benefit themselves and their fellow men by improving and increasing the Agents of Power, and probably would result in profit in a pecuniary point of view to many.

Great Exhibition of the American Institute at the Crystal Palace, New York.

SECOND WEEK.

The day announced for the commencement of the Exhibition was September 22nd. On the 25th the Hon. Henry Meigs, Secretary, delivered his usual Annual Address. We noticed, however, a slight variation in its wording. Last year he expressed a belief that steam power was perhaps about to be superseded by a new motor then on exhibition. He alluded to Dr. Drake's exploding gas engine. This year, although he sticks to the annihilation of steam, he leaves out the gas machine, and substitutes electro-magnetism. His mind doubtless rests on the new electric engine, of Mr. E. C. Shepard, now first exhibited, and of which we shall hereafter speak.

At the conclusion of his Address Mr. Meigs announced that the exhibition was formally opened. But there was nothing of any account to see, and therefore nothing to open upon. The managers had made known in their circulars, that articles could be sent in for competition until Oct. 4. The result is that the largest proportion of the exhibitors have delayed until the present week, to send in their contributions, and it is only now that the Exhibition has reached an organized or complete state. Better late, however, than never. The exhibition will be a splendid one, and promises to surpass all others, of a purely American character, that has ever been held in this country. At the time this report was written the contributions for exhibition were still pouring in rapidly.

Motive Power.

The display of working machinery, at this Exhibition, is unusually large, and the managers have made ample arrangements for the supply of motive power. The main line of shafting is driven by two horizontal steam engines, each of thirty horse power, as follows:—

Improved Steam Horizontal Engine.—By G. H. Reynolds, of Milford, Mass.—The improvements relate to a new cut-off arrangement, whereby the steam is used expansively, and results in a saving of fuel, the inventor informs us, of 25 per cent. It is alleged that the fact of this great economy has been fully demonstrated, in a number of instances, by the application of the invention to old engines. It may be applied at small expense. Another improvement consists in a peculiar construction of the pillar boxes of the main or crank shaft. The boxes are so arranged that they may be taken out and repaired without removing the shaft. In the ordinary engines, whenever the pillar boxes need examination or replacement, the shaft, fly-wheel, etc., must be removed. This necessitates the use of tackles, and the aid of a number of men, requires time, etc., the larger the machine the greater the trouble. The improvement above-mentioned obviates all this, and enables one man to do the whole. The boxes in which the shaft rotates, are divided vertically, instead of horizontally, and a strong strap covers the boxes and keeps them in place. By removing the strap, the fly-wheel having been first blocked up, the boxes can be taken out. A set screw in the side of the strap permits the horizontal tightening of the boxes laterally when desirable, which is the direction in which they wear the fastest. The common boxes can only be tightened vertically. The engine on exhibition operates extremely well, is beautifully finished, and reflects much credit on the inventor of the improvements, and on the manufacturers, Messrs. Hinkley & Equery, Bangor, Me. Price of engine $1000.

Improved Horizontal Steam Engine.—By William Burdon, Brooklyn, N. Y.—The power of this engine is thirty horses. Its construction embraces no special peculiarity. It runs beautifully, is elegantly finished, and looks strong and substantial. Mr. Burdon is well known as an extensive manufacturer of steam engines, and enjoys a high reputation for the excellent and durable character of the work which he produces. Besides the motor above noticed, he exhibits several other engines in the present Exhibition.

Telegraph Cables.

A case containing specimens of various submarine telegraph cables, is exhibited by the American, New York, Newfoundland, and London Telegraph Co.

England and Belgium.—The cable which extends from Dover, England, to Ostend, Belgium, is 70 miles in length. It consists of 6 small copper wires separately covered with gutta percha, and these again imbedded together in the same substance. The mass is covered by twelve large iron wires, which form a flexible shield of great strength. The cable complete is an inch and a half in diameter It was laid down in 1853.

England and France.—The cable which connects England and France extends from Dover to Calais, in France. Length 25 miles. Laid in 1851. Construction similar to the above.

Scotland and Ireland.—Extends from Port Patrick, Scotland, to Carrickfergus, Ireland. Length 29 miles. Laid in 1853. Same construction.

England and Ireland.—Extends from Dublin across St. George's Channel to Holyhead, Eng. Length, 69 miles.

Newfoundland and Nova Scotia.—Crosses the Gulf of St. Lawrence. Length, 85 miles.—Laid in 1856. This cable was laid by the New York, N. F., and London Telegraph Co. It is composed of 3 small copper wires, laid in gutta percha, and bound with strong iron wires.

Europe and Africa.—Crosses the Mediterranean Sea, and extends from Cagliari, the chief seaport of Sardinia, to Bona, the seaport of Algiers, Africa. Length 185 miles. Laid in 1856. Three copper wires, arranged as above.

Denmark and Sweden.—Extends from Elsinore to Helsingborg. Length, 12 miles. Laid in 1854.

England and Holland.—Extends from Oxfordness to the Hague. Four separate cables. Length, 108 miles. Laid 1854–55.

Varna to Balaklava, Black Sea.—Laid in 1854, and failed in 10 months. Composed of a single wire encased simply in gutta percha, the whole not larger than a quill.

The above comprise the principal submarine telegraph cables now existing.

Grate Damper.

This is a contrivance for use in connection with the ordinary parlor grates. It consists of a balance damper, which swings in the throat or opening from the grate to the chimney. Holes are made in the damper through which the gas and smoke escape, but the heat is really all thrown into the apartment. If an increased draft is wanted, as in lighting a fire, the damper is opened. It is alleged that the use of this invention in any grate will double the quantity of heat thrown into the apartment. If so, it is a great economizer of fuel. Price $3 and upwards, according to size. Can be readily applied to common grates. Exhibited by Jacob Cohen & Co., 45 Greene st., N. Y.

Solder-Iron Furnace.

This invention is intended to permit the use of anthracite coal for heating the solder-irons of tin-smiths. Charcoal is used at present, which is expensive. The apparatus exhibited at the Palace consists of a sort of stove, which is intended to be placed in the center of a large bench, for the convenience of the workmen. The sides of the stoves are perforated, and provided with tubes or sleeves, which extend into the center of the fire. The solder-irons are heated by being placed in the sleeves. This device insures the rapid heating of the irons, but prevents them from being burned or melted, or pasted up with dirt, saves the necessity of filing, &c. The saving of time by the removal of these objections is estimated at 12 per cent. for each working, while the cost for fuel is said to be six times less than that of charcoal used in the ordinary manner. The apparatus at the Palace heats 8 irons, and is intended for 4 workmen. Price $35, with cover for carrying off heat. Can be made of any desired size, with corresponding variation in cost. Patented by John Wilson, May 12th, 1856. Exhibited by the manufacturers, Wilson, Green & Wilson, Brandywine, Del.

Recent American Patents.

Hydraulic Brick Press.—By Ethan Rodgers, Cleveland, Ohio.—The followers which press the clay into the molds are operated by hydraulic pressure. A large and small pump are employed, and the parts are so arranged that the necessary pressure is obtained, and the machine worked with rapidity.

Chimney Register and Weathercock.—By J A. Royce, Lee, Mass.—On top of the chimney is placed a device similar to an ordinary slatted hot air register. This register has a vane and rudder, and is turned to the proper position by the action of the wind against the rudder, and its slats, after it is thus moved, are closed more or less by the action of the wind against a sail, which is on a mast projecting up from the slats. When the wind blows hard, the slats are operated so as to almost entirely close up the flue of the chimney and thus diminish the draft, and when it is calm they open the flue and thus increase the draft. The design of the improvement is to avoid a greater consumption of fuel during windy weather than there is when the weather is calm.

Fly Trap.—By Dr. Samuel Arnold, Green Hill, Tenn.—A hemispherical glass vessel filled with soap suds is provided, over which a hollow cylinder is placed. The cylinder communicates with the glass vessel, and is provided with grooves on its inner side to receive some condiment attractive to flies; it is also perforated, to allow the flies to enter, and pass to the condiment. The cylinder also has a piston. When a number of flies have entered the cylinder some one around the table revolves it, and thereby frightens the flies, which in a moment thereafter are precipitated into the soap suds by the automatic descent of the piston.

New Bomb Shell.—By A. M. George, of Nashua, N. H.—Consists in constructing a shell with a separate chamber or cavity in front of the chamber which contains the powder or compound by which the shell is exploded. The said chamber is filled with melted iron or other metal, which will be scattered by the explosion of the shell, inflicting great injury. It further consists in certain means of protecting the charge of powder or explosive compound from the heat of the melted metal in the front part of the shell during the placing of the shell in the piece of ordinance for discharge. The fuse is ignited in the same way as that of the common bomb-shell, and when the charge in the chamber becomes ignited, the said chamber and the whole of the shell explode at once, and the melted metal is scattered about, to the destruction of everything surrounding the spot where the explosion takes place.

Contrivance for Notching Barrel Hoops.—By Daniel Lamson, of East Weymouth, Mass.—Consists in the use of a reciprocating knife and inclined plate, whereby the ends of hoops may be properly notched, and with the greatest facility. The above invention is simple, performs the work in a rapid manner, and the cost of construction is trifling.

Machine for Painting Wheels for Vehicles.—By S. B. Fuller, of Worthington, Mass.—Consists in having a vibrating and rotating spindle pass through the bottom of a tub or reservoir in which the paint is placed. The wheels being placed one at a time upon the spindle, are immersed in the paint by depressing the spindle. They are then raised above the surface of the paint, and the spindle rotated so that the superfluous paint will be thrown from the wheel by centrifugal force. It is said that two men can perform as much work with a

machine of this kind in a given time as ten men can by painting in the usual way.

Stave Machine.—By A. H. Crozier, of Oswego, N. Y.—Consists of a wheel having cutters attached and used in connection with adjustable gauges, plates, and screws. The staves will be jointed with more or less bend or taper, according as the plates are adjusted higher or lower, which adjustment is obtained by operating the set screws. The above invention is exceedingly simple, and is said to operate well. It may be cheaply constructed, and there are no parts liable to get out of repair.

Blow Pipe.—By S. B. Palmer, of Tully, N. Y.—Two wind chests are employed, connected together by a small pipe, which is provided with a faucet. These parts are so arranged in connection with the pump and blow pipe that a jet of air of equal volume is forced in a regular manner from the nozzle of the blow pipe. The above improvement has been practically tested, and operates well. The whole affair is portable, economical to manufacture, and there are no parts liable to get out of repair.

Door Lock for Railroad Cars, &c.—By Thomas Slaight, of Newark, N. J.—Consists in having a hasp fitted over a socket of a lock, and securing said hasp on the socket by means of a plug, which passes through the hasp and socket into the lock. The plug is secured therein by means of elastic or yielding jaws, arranged relatively and combined with a turn plate and slotted tumblers. The above improvement is far preferable to the ordinary padlocks. It is, in reality, a tumbler lock, and may be made equally as secure against burglars or lock-pickers as bank safe locks. Sufficient play is allowed the hasp on the socket, so that the door may yield to a certain extent, in case heavy weights press against it.

Bleaching Cotton and Linen Fabrics.

The common process of bleaching the above named fabrics, is by boiling them first in lime water, or a caustic alkali, then steeping them in successive clear liquors of chloride of lime, treating them with dilute sulphuric acid, called *sours*, and then thoroughly washing them. Although these fabrics can be bleached perfectly white by strong liquors, in a few hours; the common practice is to use weak liquors, requiring several days to complete and much labor to execute.

Two patents have recently been taken out in foreign countries, for different methods of bleaching. The one by Pierre J. Davis, of Paris, is quite an original process; he employs for this purpose chloroform in a state of gas. The cotton fabrics are placed in a close wooden box to which steam is admitted from a boiler, at a pressure of 60 lbs. to the square inch; this box contains a liquor made of carbonate of soda (crystallized soda,) of a strength about 4° in the hydrometer, and the goods are steamed in this for about two hours, then allowed to cool. The box must have a safety valve on it, and an emission steam pipe. After this the goods are taken out, dripped, and placed in another close wooden box lined with lead, but communicating by a pipe with a chloroform generator. This consists of an earthenware vessel into which 3 lbs. of bleaching powder (chloride of lime,) 3 lbs. of slacked lime, a quarter of a pound of alcohol, and 9 lbs. of water, are placed together and stirred. About one pound of hydrochloric acid is then poured upon these materials, when the chloroform gas begins to generate, the cover is then put on the generator, and the gas conducted by a pipe into the leaden chamber which contains the fabrics. This gas half bleaches the goods in the course of an hour or so; when hydrogen gas is introduced into the box, to expel the chloroform. The goods are then submitted a second time for a few hours, to the action of chloroform gas, made of a like quantity of materials, but distilled from a zinc retort heated to 145° Fah. After this operation oxygen gas is admitted to the goods, which imparts to them a bluish shade. They are then taken out, washed, dried, and finished. This process may be very effectual, but it appears to be too complicated for common practice.

The other patent is that of H. Hodgkinson, of Belfast, Ireland, and consists of a steam-tight box half filled with bleaching liquor (chloride of lime) heated by steam, and having within this box a revolving wheel made with apartments containing the fabrics to be operated upon. Each apartment has a door to put in and take out the goods, also openings in the bottom, to allow the entrance of the liquor. As this wheel revolves, the goods are dashed, as it were, through the hot liquor in the box, and are thus bleached rapidly and evenly.

By the common method of bleaching, the liquors used are all cold, because the chlorine gas is expelled by a very moderate heat, but as the gas operates far more rapidly when hot than cold, it certainly can be saved, and the process accelerated, by bleaching in tight boxes heated by steam.

The Moon's Rotation Again.

This question has been violently discussed for the past six months in the London *Times* and London *Mechanic's Magazine*. It is the revival of an old controversy caused by a letter of Mr. J. Symons, Inspector of Schools, in the *Times* of April 9th. Mr. Symonds took the position that as the moon always presents the same face to the earth it cannot have a rotation on its axis, and that the prevailing opinion taught in astronomical works that it rotates on its axis once in 28 days exactly, to a second, is wrong. He has been supported in his controversy by Evan Hopkins, who, like himself, was educated at Cambridge, also David Muset, and lately a German mathematician, John Von Gumpach, has published a pamphlet supporting the same views, in which he asserts that Newton's proposition relative to the moon's rotation has been entirely misunderstood by his followers. Dr. Lardner has just come out in defence of the moon's rotation, and Dr. Whewell read a paper on the same side before the late meeting of the British Scientific Association. These names will show the interest which the question has excited among men eminent in science.

We have received an immense number of letters on this subject, but decline to publish them, being content to state the question, to let our readers know that such a controversy is still going on among eminent mathematicians in England.

After reading almost all that has been said on both sides, we must say that the controversy seems to be as near an end as when it began, and as satisfactory as if it were decided that both sides had gained the victory.—Mathematics, instead of making some men correct thinkers, leads them to be speculative and vague reasoners.

If the moon does rotate on its axis in 28 days exactly—during the period of her revolution around the earth—a working model can be constructed to show these two motions, conjointly with the earth's motion; this is the test we have demanded of those who advocate this side of the question. There is no use of them spending so much ink and words in the controversy, let them demonstrate. This is the best advice we can give them, and until they comply with it we must hold them responsible for propagating opinions which they cannot support by actual demonstration.

Death of George Steers.

This eminent naval architect met with a sudden death on the 26th ult., and our country has been deprived of one, in the very vigor of manhood, being only thirty-seven years of age, who has rendered his name famous throughout the world. While proceeding in a wagon to Long Neck, L. I., to bring home his wife, his horse ran away, and having jumped out of the wagon with a view of stopping the animal, he was struck by the wagon and prostrated senseless on the middle of the road. In this situation he was discovered by some persons who knew him, and who were riding in a carriage; he was then instantly taken up and driven to his house in Cannon st., this city, where medical aid was quickly obtained, but was of no avail; the spirit departed at 10 o'clock in the eveuing.

In 1853 the name of George Steers became a national theme of praise, on account of the splendid triumph of the yacht *America*—of which he was the builder—in England. It then won the prize as the fastest yacht of all nations in a contest with the yachts of the Royal Club. Since then he has built the yacht *Julia*, which has carried off the prize in every regatta which she has entered. He was selected, from his known ability, to build the great steam frigate *Niagara*—the only one of the six new frigates constructed by private parties; he was also the naval architect of the *Adriatic*—the new Collin's steamer. Both of these great steamers are splendid specimens of his skill, but he has not been permitted to witness their full completion; death has closed his eyes before they have been able to make their trial trips, which are expected to come off this month.

Although cut off so suddenly he has lived long enough to leave his mark on the pages of history—a nobler one than that of many distinguished statesmen—he was the builder of the yacht *America*.

A Miller's Patent Case.

From our worthy cotemporary, *Newton's London Journal*, we learn that a very important patent case, relating to grinding flour, was tried at Queen's Bench, before Lord Chief Justice Campbell, and a special Jury, on the 4th and 5th of July last. The plaintiff was G. H. Bovill, the defendants, Keyworth & Seeley, millers, at Lincoln, Eng. The suit was for damages for infringing the patent of plaintiff, granted 1849, for combining an exhaust with a blast in grinding flour, to prevent the dispersion of *stive* or fine flour through the mill, and thus, as was facetiously observed, "enable the miller to wear a black coat." The defence set up was, that the plaintiff was not the first inventor; that the improvement was suggested by a workman under his employ; also that it had been used by Mr. Muir, of Glasgow, prior to the date of the plaintiff's patent.

In 1846, the plaintiff obtained a patent for introducing a current of air between the mill stones, which cooled the grinding surfaces, and prevented clogging of the flour. It was a good improvement, as it enabled a run of stones which were only able to grind four bushels per hour, to grind double that amount, but owing to the flour and blast being carried together through the spout, a prodigious dust was created in the mill chamber below. A cloud of *stive* prevented the millers from doing as much work as formerly, and it was also injurious to their health. This was an evil which the plaintiff saw when he first put up his apparatus, in a mill at Battersea, and he at once instituted experiments to remove it. This he at last successfully accomplished, by enclosing the stones completely, and combining an exhausting apparatus with the cooling blast: the former to withdraw the *stive* from the upper part of the mill stone, and lead it away into a receiving chamber, while the flour passed down into the spout in a contrary direction. The *stive* was thus all saved; the moisture was extracted from the flour, which went below dry and cool; the dust in the mill was avoided, and "the miller could wear a black coat like a parson." The patent, as has been stated, was obtained in 1849, and came into use immediately, for the flour so manufactured was found to be a superior article. The defendants in this case took out a license from the plaintiff, in 1851, agreeing to pay £1700 (about $8,500) annually. This sum was paid for two years, when it was refused, in 1853, the grounds for such refusal being those we have stated, as their defence.

The evidence of the workman, whose invention it was stated to be, was introduced; but it was proven that he was employed and paid to make the experiments instituted by the patentee,—that he merely did the work suggested and planned for him. The evidence of Mr. Muir was also taken; and he indeed stated that he had combined—prior to 1849—an exhaust with a blast,—and that he had drawn sketches of his apparatus, and had sent them to England, and these were also produced in evidence. It was from being informed of these things, that the defendants refused to pay Mr. Bovill his license any longer; hence came this law suit.

All the testimony given in defence failed to convince the jury, or the Judge, that the plaintiff was not the first inventor, for it was also proved that Mr. Muir had discontinued the use of his apparatus, and consulted at one time with Mr. Bovill, for a licen e, hence it was concluded—and reasonably we think that Muir had never perfected his plan, and that Mr. Bovill was the first who had rendered the invention useful—a success.

The amount of damages claimed, was £1239 11s. 6d., for the use of the patent for nine months less one week, this being the term since the plaintiff had entered a disclaimer, in May, 1855, to the day the action was brought in January last. The Jury found the verdict for the plaintiff to this amount, thus establishing his entire claims.

The Lost and New Arts.

In the opening annual address delivered last week before the American Institute by Hon. H. Meigs, allusions were made to arts supposed to be lost, and to a great discovery about to be made; these deserve some notice at our hands. He said:—"In truth it is justly believed that many inventions greater in value than any we have now, have been lost for want of such an opportunity for fame and profit. (The opportunity referred to is Industrial Exhibitions.) It is believed we have lost malleable glass; we can no longer make cutting instruments out of copper, as was done 3000 years ago; nor have we the art of making the steel of Damascus, nor the sword blades of old Seville."

We do not believe that a single useful ancient art is unknown at the present day. If by malleable glass it is meant that the ancients made glass which could be forged and welded like iron, we must say that there is not a shadow of good evidence that such glass was ever known. There is no manufacture whatever in which the moderns so much excel the ancients as in that of glass of every kind. The old cutting instruments were made of bronze, and such can be manufactured at the present day; but neither the old nor new bronze cutting tools are equal to those made of steel. The sword blades of old Seville were no better than those now manufactured in our country; in Damascus, sword blades are still forged, and with all their ancient excellence, but the steel for them is imported from India. The reputation of Damascus swords is deserved, but the French cutler's sword blades of the present day rival them in appearance and quality.

Industrial Fairs are very ancient institutions. Such fairs were annually held in Greece, and merchants from all parts of the known world went there to exhibit their wares; and it was an established law of the land that even during a state of war between the different States the merchants were protected, and allowed to travel to and from them without annoyance. These fairs passed from Greece to Europe, and have come down to us from generation to generation. They have been the means of extending a knowledge of the arts, and exciting inventors to improvements, and their influence is extending broader and deeper every year. Mr. Meigs did not magnify their importance too highly in his address; what he said respecting their utility was perfectly correct, but if any old art has been lost it has not been owing to the want of them, even in the middle ages.

In this address the idea was presented that we were on the eve of some great discovery which is to supersede steam everywhere; this discovery was stated to be electro-magnetism; and Dr. Lardner and Newton's *London Journal* were quoted as authority in favor of such views. We would like to know the basis for announcing such opinions, for the laws of electro-magnetism are now very well known, and they do not afford any grounds for leading us to adopt the opinion that electro-magnetism can ever take the place of steam as a general motive agent. Electro-magnetism can operate machinery like steam, or water, or wind, but it is a far more expensive agent. About twenty years ago there was considerable excitement respecting electro-magnetism superseding steam power, and a number of such engines were then constructed, therefore it is not by any means a new power. We therefore cannot conceive how we can be "on the eve" of such a new discovery as an electro-magnetic motor, to supersede steam power, according to the opinions expressed in Mr. Meig's address.

NOTE.—In reply to invitations lately received from societies in various parts of the country, to lecture before them the coming winter, on the subject of mechanical science, we would state that home duties prevent our undertaking such engagements. We expect to remain at our office, 128 Fulton street, the entire winter, and our lectures shall go to all subscribers to the SCIENTIFIC AMERICAN in weekly installments.

Subscribers and correspondents who expect to receive answers to their letters, must furnish us with their proper address, otherwise they will receive no attention. We have a right to know who our correspondents are.

J. F. T., of S. C.—There can be no doubt but the raising of the water to flow the rice fields by the propeller wheel is new, and can be patented, if you establish its usefulness; but we think that two large pumps can be worked more economically, and will throw more water.

J. M. W., of Md.—A cast-iron shaft is one that is made of molten iron, being molded and cast into form, no matter whether it is heated and hammered afterwards or not. A wrought-iron shaft is one that is forged into form. The metal of the former is crystalline, that of the latter is fibrous.

L. W. A., of Mass.—The same kind of oil as that obtained from the distillation of coal was employed quite a number of years ago for lubricating purposes. India rubber, as you seem to be aware, dissolved in various kinds of oil, has been employed as a lubricator, and its office in coal or any other oil is the same. We do not consider that it makes any difference what the kind of oil is in which it is employed. The oil is not new, and the india rubber in oil is not new for lubrication. What then is new? India rubber lubricating oils were used to our knowledge seven years ago

N. R. M., of N. Y.—We would advise you to get earthenware in place of iron pipe, because the wood acid will not act upon it. Copper pipe would be more durable, and ultimately more profitable for your purpose than iron pipe.

J. L. G., of C. W.—A turbine wheel is the cheapest and seventy-five per cent. of the water power is as much as can be expected from an overshot or breast-wheel. Any of those who have advertised their wheels in the SCI. AM.. will guarantee you this amount of power.

J. B., of C. W.—There is no work published containing an account of the statistics of cotton and woolen factories in the United States. The United States statistics will not give you full and correct information.

C. F. A., of Boston.—We would advise you to get a copy of Septimus Piesse's work on perfumery and scented soaps; it is published by Lindsay & Blakiston, Philadelphia. You will find something useful in it to make for your purpose. All inks corrode steel pens. We did not get the match mentioned in your letter.

W. S., of Md.—The principle of generating steam enough for each stroke of the engine by bringing the proper quantity of water into contact with a heated surface is a very old one, and created much interest some years ago, particularly in England. From experiments made it was found not to work well. There is, we believe, some novelty in your arrangement, and this might make it successful. The difficulty in generating steam in this way is that it assumes the globular or spheroidal form.

A. H. W., of C. W.—We send but two copies of our paper to your place. Before we can alter their address we shall require an order to that effect from the subscribers. A British subject can purchase a patent right from an American citizen, and freely enjoy the same under protection of U. S. law the same as a citizen would.

W. W. L., of Miss.—Your application was filed in the Patent Office on the 18th of August, and as soon as the case is acted on we will advise you by mail. A rule of our office precludes our entering the names you sent upon our subscription books until the amount of subscription is paid. We thank you, nevertheless, for your kindness in trying to get us names.

A. M. R., of N. Y.—By the term stationary steam chest we supposed you to mean a steam chest attached firmly to the cylinder, like that of a stationary cylinder. There are many oscillating engines with such steam chests containing common slide valves; among them two patented by Wm. Stephens, Pittston, Pa. All of these engines have an arrangement of pipe substantially like yours. We see nothing in your arrangements that would infringe on any patent known to us.

M. B., of Brooklyn.—If we understand your invention properly, and we believe we do, the engine cannot work at all, for almost as soon as the piston upon which the steam has first acted begins to be returned, by the action of the steam on the second, the further escape of steam from the first to the second cylinder is prevented by the piston of the first cylinder passing the escape port.

P. R., of N. Y.—You write well considering the disadvantages under which you have labored. One of our rules have not been complied with by you. You certainly are liable to the charges we made. It is wrong to make positive assertions upon simple suppositions. An explosion with hydrogen and oxygen can only take place with the combining proportions that form water; therefore there can be no such gas as auzune. Ozone is a term derived from the Greek, expressive of its characteristics.

F L Zemp, Camden, S. C.—Wishes to purchase the best hulling machine for removing bran from wheat before grinding. He also wishes to correspond with the owner of Robbins' patent for distilling resin, etc. We hope some of our numerous readers can furnish the information wanted by Mr. Zemp.

J. M., of Mass.—We often receive models without the names of their inventors attached to them. This is a very great annoyance to us. Models sent in this careless manner are liable to be lost sight of after a few weeks. If you will send us a sketch and description of yours we will endeavor to look it up.

T. B. J., of Mass.—There are, as you say, several papers that appropriate our articles without any credit. This is wrong. You can procure the pamphlet you speak of, on iron buildings, by addressing James Bogardus, New York City.

J. N., of N. B.—The circular valve has long been used in oscillating engines. We do not discover any novelty in your arrangement or mode of operating it. We can not advise an application for a patent.

A. B. C., of Boston.—We do not know of any one who can supply you with a buckwheat hulling machine. We should think that such a machine could be most readily procured at some of the agricultural warehouses in your city.

J. N. P., of N. Y.—On page 241, of Morfitt's work on soap and candles, published by Parry & McMillan, Philadelphia, the Belgian soap for scouring fine woolen textures is described, also in Kurten's work, published by Lindsay & Blakiston, Philadelphia, but you cannot get the colza or palm oil. If you use common brown soap and add a little ammonia you will obtain a good scouring soap. Common soft soap is the cheapest you can use for fulling purposes. If we were in your place we would make experiments with the cheapest materials in the neighborhood. Use a caustic lye of 2 lbs. of soda to 1 of quick-lime (or use potash in place of soda) and try some of the cheapest oils and tallow you can obtain.

N. H. H., of N. Y.—It is impossible for any person to tell you how many cubic feet of hay in a *mow* are required to make a tun. Every part of the mow, from top to bottom differ in weight—the heaviest per cubic foot at the bottom. The best wheel you can use is a good turbine.

H. S. S., of Ohio.—A cylinder planer to run true should be perfectly balanced when suspended at the center. If it is not, it is very difficult to make it run true. We are not acquainted with any other method than that described by you for setting the journals of cylinders perfectly horizontal.

J. L. of La,.—There is no work which treats of the Mississippi high pressure engine published. Hodge on the Steam Engine is a good work; it is sold by Appleton & Co., this city.

J. C. B., of La.—The sparkling beer to which you refer must be old bottled lager beer.

J. W. R., of Pa.—We are not in possession of any more information on anastatic printing than has been published in our columns. A small work was published a few years since on the subject by Dr. Cowell, of Ipswich, Eng., but we have not a copy of it. The art has not yet become practical.

H. Z., of Pa.—The most economical method of preparing chips and shavings for manure is to place them in a heap, pack them very close, and moisten them, to induce rapid decomposition. Spent tan bark must be mixed with quick-lime, in heaps, to fit it for manure. Leather and offal mixed with the sulphate of iron (copperas) will make manure.

T. R., of N. J.—Ralph Reeder's instrument has a chronometer on it, which has a revolving index. Some of its parts are like yours, but he received a patent some years since, and invented it more than 20 years ago. We have examined his instrument.

C. A. C., of Md.—Water will flow from a syphon when its outer end is lower than the surface of the water inside. The velocity of discharge is just in proportion to the difference between the surface of the water and the discharge end. A half inch pipe, with its discharge end 2 feet below the water level, will discharge 26 cubic inches per second, less the resistance of friction, which depends on the length and character of the pipe. Very little, if any, would pass through your pipe of 1,200 ft. long.

L. B., of Va.—We do not engage in the sale of Patent Rights. Our other engagements will not allow us to attempt this branch of business.

J. E. S., of Pa.—G. W. Beardslee, of Albany, N. Y., commenced the manufacture of paper from wood. It is certainly the cheapest material we know of for the purpose. What the result of this enterprise may be, time must determine. This or any other diversion from the ordinary method of making paper, will tend to lessen the price of rags, we should think.

F. D. W., of Cal.—Round matches are cut by a machine; they are dipped in stearine and, therefore, do not require sulphur. The igniting materials are four parts of phosphorus, 10 of sulphur, a little glue and a little smalt. These are made into a paste, and the ends of the matches dipped into it.

B. M., of Boston.—Scores of paddle-wheels have been brought before the public, but none have superseded the old-fashioned one. If any person offers a reward for the invention of a new one, we should be happy to give the notice a wide circulation.

E. M., of Pa.—The motions of the gyroscope do not depend on the resistance of the atmosphere; it is not a new motive power. Centrifugal force is inertia; but the term is applied so as to explain the direction of the acting force.

J. S., of Mass.—Your explanation of the gyroscope is no doubt correct; the philosophy of it is explained in all works on mechanical philosophy, describing rotary motion.

J. W. C., of Ind.—There are clocks which run while being wound up; they are very old.

Money received at the SCIENTIFIC AMERICAN Office, on account of Patent Office business for the week ending Saturday, Sept. 27, 1856:—

E. P. & J. A. C., of N. Y., $25; P. F, E., of Ill,, $30; T. & C., of Vt., $30; C. H., of N. Y., $20; R. T., of N. Y., $30; C. Van V., of Ill., $50; T. S., of Conn., $25; E. L. E., of R. I., $20; D. & R., of N. Y., $30; G. C. 2d, of Conn., $30; J. C. F. S., of Md., $100; A. B. C., of L. I., $25; T. H., of N. Y., $35; G. O., of N. Y., $30; C. S., of Ky., $25; W. B., of L. I., $57; F. & C., of N. Y., $25; W. D. W., of O., $13; G. D. L., of N. Y., $27; J. S. S., of N. J., $20; S. S., of Ind., $10; A. W. & Son, of N. Y., $75; A. O. W. & Co., of N. Y., $25; W. H. S., of R. I., $25; C. M., of N. Y., $25; P. B., of N. Y., $65; C. M., of N. Y., $10; W. & J. C., of N. J., $20; J. P., of N. Y., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Sept. 27th:—

W. & J. C. C., of N. J.; T. S., of Conn.; A. B. C., of L. I.; J. P., of N. Y.; W. G. B., of Ala.; W. H. B., of N. Y.; J. D. S., of Mass.; C. S., of Ky.; B. C., of N. Y.; C. M., of N. Y.; A. W., of N. Y.; A. & A. S. W., of N. Y.; A. O. N. & Co., of N. Y.; W. H. S., of R. I.; C. M., of N. Y.; E. P. & J. A. C., of N. Y.; P. B., of N. Y., (2 cases).

Terms of Advertising.

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

☞ All advertisements must be paid for before inserting.

Science and Art.

The New Process of Manufacturing Iron.

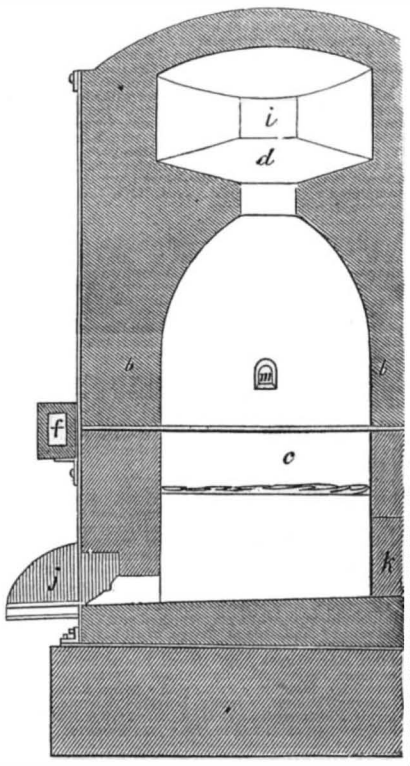
In the three preceding numbers of this volume, we have described the new process for producing a very improved character of iron from common crude pig iron, by submitting the latter, while in a molten state, to the action of air or steam under pressure. This invention has been claimed by and for Henry Bessemer, of London; he read a paper on the subject before the late meeting of the British Association in England; has secured a patent for it, and the British Press generally has accorded him the entire praise and credit o the discovery. In our last number we stated that Bessemer was not the inventor of the process, but J. G. Martien, of Newark, N. J., who secured a patent for it in England three months prior to the date of Bessemer's, and we will now proceed to present more important information relating to it.

Figures 1 and 2 of the accompanying engravings are vertical sections, in elevation, of Bessemer's Furnace, copied from the *London Illustrated News* of the 6th inst.; *a* is the plate metal casing of the apparatus or cylindrical vessel in which the blast is made to operate on the molten pig iron, to purify and convert it into malleable iron or steel; *b* is the internal lining of fire brick; *c* is the lower chamber containing the fluid iron. *d* is an upper chamber for remelting scrap iron; *f* is an annular air passage communicating with the tuyere pipes, *g*. *h* is the main blast pipe leading to the blowing engine; *i* is an opening for the escape of flame, gaseous products and slag, when the metal is boiling; *j* is the tapping hole for the discharge of the metal when it is refined or purified. *k* is a manhole for cleaning out and repairing the interior of the chamber; *m* (fig. 1) is the opening through which the molten crude iron is run in from the smelting furnace to the refining chamber, *c*. *n* is a fire-clay tuyere. Several tuyeres are fitted in, at separate distances apart, around the bottom of the chamber, and the arrows represent the blast of air passing through the hot molten metal, and up through one of the escape openings, *i*. The two succeeding figures, 3 and 4, represent the apparatus for refining the metal taken from his patent sealed on the 7th June last. These figures represent a molder's large ladle,—one of an egg shape. *a* (fig. 3) is an outer casing of plate iron: *b* is an internal lining of fire-clay. *c* is a supporting iron frame; *f* is a perforated fire-tile cover laid loosely over the mouth of the vessel, to allow the impurities and flame to pass out; and also to form a support to the air or blast pipe, *g*.

This figure being a vertical section does not show the axis, nor the usual handles or levers on each side for carrying and pouring out the metal. Fig. 4 is another form of a kindred ladle; its case is plate metal. *h*, lined with fire-clay; *j* is its supporting frame, and *k* is the handle for carrying it and tipping it to pour out the metal when refined; it has a conducting spout opening to receive the molten metal passing from the smelting furnace down the conducting tube, *r*. *l* is the opening to allow the slag and gases to flow out. When a charge of molten iron was run into the vessel (fig. 3,) the cover was put on, the pipe, *g*, inserted, and the air blast applied as shown.

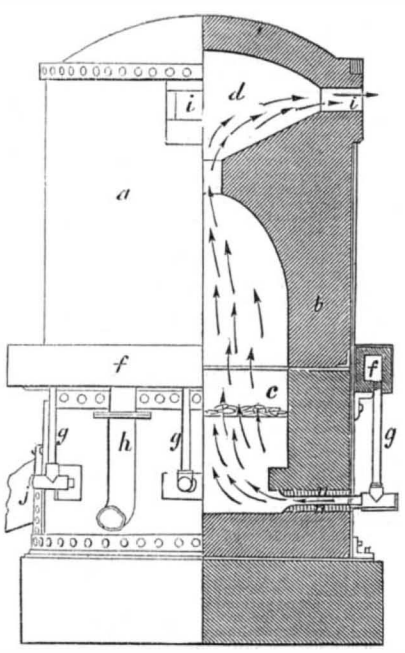
Respecting fig. 4, the specification says:—"This vessel should be placed near the discharge hole of the blast furnace, and at such a level that the fluid iron may be run direct into it. The vessel should be of such dimensions as to be nearly filled with a single charge from the furnace. As soon as the iron is let in, I pass a pipe through the spout, into the vessel, and allow the end to dip into the metal. A current of atmospheric air, or both air and steam mixed together, is then to be forced into the metal and allowed to bubble up through it. I prefer to use hot blast, and that the air should be heated as high as practicable; or cold air may be used, it desired; in either case it will be found that the oxygen will thus be introduced into the metal and will rapidly combine with and carry off a large portion of the carbon and the impurities. When the workman judges the process has been carried far enough (which the lessened fluidity of the iron will indicate,) he will turn the vessel on its axis and discharge the contents of it into a suitable mold, having compartments of such dimensions as will form ingots suitable for the puddling process."

Fig. 1.



The process, no doubt, embraces a great improvement in the manufacture of iron, and the nature of that process is, distinctly, the forcing of jets of air or steam and air combined, through molten pig metal, after it is run from the smelting furnace; the air or steam performing the office of refining the metal by carrying off its impurities—this is the invention. Who is the inventor of this process? We say, J. G. Martien, of Newark, N. J. He obtained a patent for it in England before Bessemer obtained his,—the one from which we quote, and from whose sheet of drawings figs. 3 and 4 are taken. To prevent any mistake respecting who was the first inventor, let it be remembered, that the above is taken from his full and perfect specification of the 7th of June last; he cannot go beyond that, and at that time he describes it as a preparatory process for refining iron for puddling. Let us now turn to J. G. Martien's process, patented 11th Sept., 1855, specified and sealed in London March 11th, 1856—three months before Bessemer's. The specification says, "I pre-

Fig. 2.

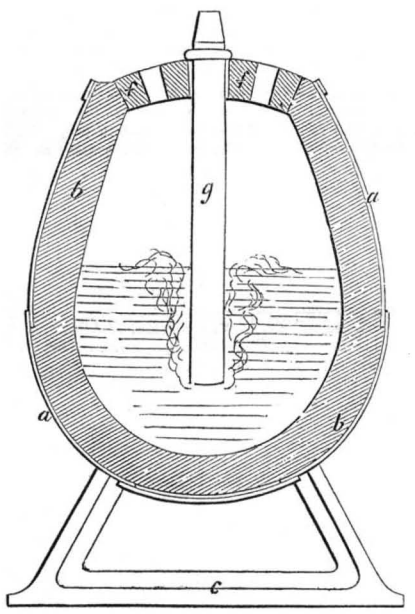


fer, in carrying out my invention, that the ordinary process of refining iron by the use of a refinery furnace, should be dispensed with, and that the purifying of the iron should be accomplished, by subjecting the melted iron from a blast furnace, before it is allowed to congeal, to the action of streams of air, or of steam, passed up through and amongst the melted metal." This proves conclusively that Mr. Martien is a prior inventor to Mr. Bessemer; and he claimed the process, not a specific apparatus, although he describes how the process can be conducted by an apparatus (as is required by law,) but does not claim the specific apparatus. In short, it appears to us that Mr. Bessemer's patent is nothing more than an extended description of J. G. Martien's, to whose invention he never alluded in his paper read before the British Association, although he must have been well aware of its existence.

We claim this invention as that of an American citizen, and we have proven it to be such from copies of the patents in our possession.

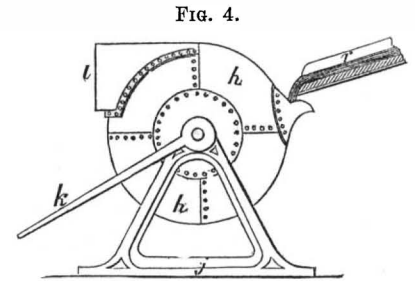
James Nasmyth, inventor of the steam hammer, in a letter to the London *Times*, respecting this invention, alludes to one of his own, which he states, Mr. Bessemer spoke favorably of, as being the means which led him to this invention. This was the use of a jet or jets of steam forced through the molten metal while still in the smelting or puddling furnace. Mr. Martien alludes to this in his patent, and disclaims it; it is not the same process; it is simply a method of agitating the molten metal in the furnace in which it is smelted or puddled, and is no doubt an improvement also. The same effect was accomplished previously by H. W. Woodruff, of Watertown, N. Y., and a patent was granted to him on the 9th October, 1853. Our Patent Office, in its zeal—not for assisting, but throwing obstacles in the path of some inventors—helped him to curtail his claim. The principle of his invention is the agitation of the molten metal, by generating jets of steam at the bottom of the molten metal in the cupola furnace, which jets passed up through the metal.

Fig. 3.



In the refining furnace of Mr. Bessemer, represented by figs. 1 and 2, we recognize a very good apparatus for carrying out the process of refining iron, invented by Mr. Martien but nothing more—the process is not the invention of Bessemer, and even in this furnace there is but little that is new; nothing but what would readily suggest itself to an iron smelter, because it is so similar in its construction to the common blast furnace.

Fig. 4.



"It may be said that Mr. Bessemer first perceived that the air of the blast united with the carbon of the molten metal, and thus it decarbonized itself. This amounts to saying, that he only saw more of the advantages of Martien's invention, that its author. This often happens with inventors. Blanchard, when he patented his gun-stock machine, did not see all the varied and useful purposes to which it might be applied, but that did not render it one whit less his invention. But we have been assured by Mr. Martien that he made a successful experiment in refining 2000 lbs. of crude iron by his process long before Mr. Bessemer made his later expriments, which have been so highly praised; and that some of Mr. M.'s refined metal was rendered malleable—decarbonized. This could not happen unless the air which he employed in his blast, combined with some of the carbon of the crude molten metal, and carried it off. It was therefore a practical demonstration, that his process accomplished the very thing which Mr. Bessemer claims for his, and being a prior invention, reduces his (Bessemer's invention) into that of Joseph Gilbert Martien, of Newark, N. J., now residing in London.

A correspondent of the *London Mechanics Magazine*, September 6th, questions Mr. Bessemer's title to the invention. He asserts that Mr. Martien's patent has, for its object "precisely that which Bessemer does, and he is at a loss how the invention can be Bessemer's." He also asserts that he does not see "how any one can deprive him (Martien) of the *sole* right to the use of a blast of air or steam rising up through and penetrating every part of the molten metal as it comes from the furnace." When the public comes to understand fully who is the real inventor of this process. Mr. Bessemer, will find his plumes, considerably ruffled.

Literary Notices.

The North British Review.—The present number of this Quarterly,—esteemed by many to be the ablest of all the Reviews—contains eight excellent essays, one on "Christian Missions," is totally different from the one in the Westminster Review—is more thorough and trustworthy, and deserves to be widely read; another on "Holland and its Martyrs and Heroes," pays a high and deserved compliment to our countryman, Motley. for his History of Holland. No man can be intelligent respecting foreign affairs at least, who does not read the Quarterlies published by Leonard Scott & Co., No. 54 Gold street, this city.

Reigart's Life of Robert Fulton.—This work, briefly reviewed by us two weeks since, is a handsome volume neatly printed on fine paper, and finely illustrated. It is published by C. G. Henderson & Co., Philadelphia, and can be obtained, we suppose, of all the booksellers.