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A New Coloring Matter.

M. Verdeil announces the discovery of a new green coloring matter in the flowers of plants, quite distinct from the green of the leaves. It is well known that the extremities of the petals of a flower, by which they adhere to the chaly are white; in buds they are whiter still, particularly in the flower of the thistle. If the white part be boiled in water and then subjected to pressure, the juice obtained will be perfectly colorless; but if a few drops of a solution of carbonate of soda be added, the whole when shaken will become a dark green. Alum, acetate of lead and deutoxyd of tin precipitate fine green lakes of different shades, which can be separated by filtration and dried, as they do not lose their their color by exposure to light. The protoxyd of tin gives a yellow precipitate, and also changes the lakes to yellow. Concentrated sulphuric acid dissolves the coloring principle, and gives it a brilliant red color. M. Verdeil concludes by saying that our thistles and artichokes are not sufficiently rich in this coloring principle to admit of its use as a dye on a large scale, but those growing nearer the equator may contain this substance in larger quantities.

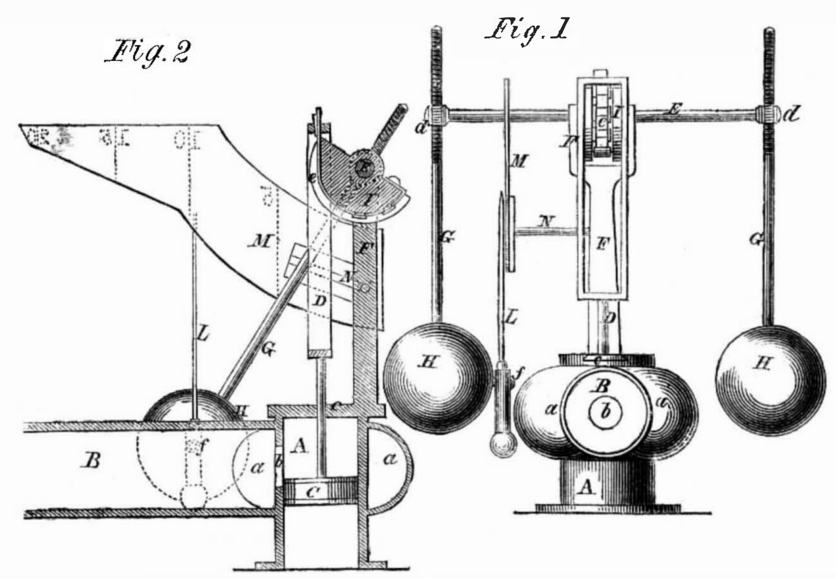
New Valve and Pressure Gage.

This invention is a combination of parts to prevent accidents arising from too great a pressure of steam, and at the same time to indicate what that pressure is. Our illustrations show the device fully, Fig. 1 being a front view, and Fig. 2 a central cross section taken at right angles to Fig. 1.

The pipe, A, is placed on and in communication with the boiler, and is surrounded by a semi-circular chamber, *a*, having passages, *b*, between it and the pipe, A, from this chamber, A, extends the pipe, B. The safety valve is a piston, C, fitting into the tube, A, its rod passing through a guide, *c*, and being connected to another rod, D. D is connected by a strap, *e*, to a grooved sector, I, placed securely on a shaft, E, through the threaded ends, *d*, of which pass rods, G, carrying equal weights, H, or if not the rod, G, can be screwed to the proper distance in *d*, so that each acts upon I with the same relative weight. To one of these weights, H, is attached by a pin, *f*, on which it swings loosely, an index, L, that marks on a graduated scale, M, attached to the central standard, F, by N, the pressure of the steam on the piston. This index is constructed of a fine light pointer and a heavy counterpoise, so that at whatever angle the balls, H, may be placed, the index swinging on *f* will always retain its perpendicular.

The operation is simple in the extreme. The steam from the boiler presses on the under surface of the piston, and of course elevates it, the rod, D, being elevated pulls the band, *e*, that is placed around the sector, I,

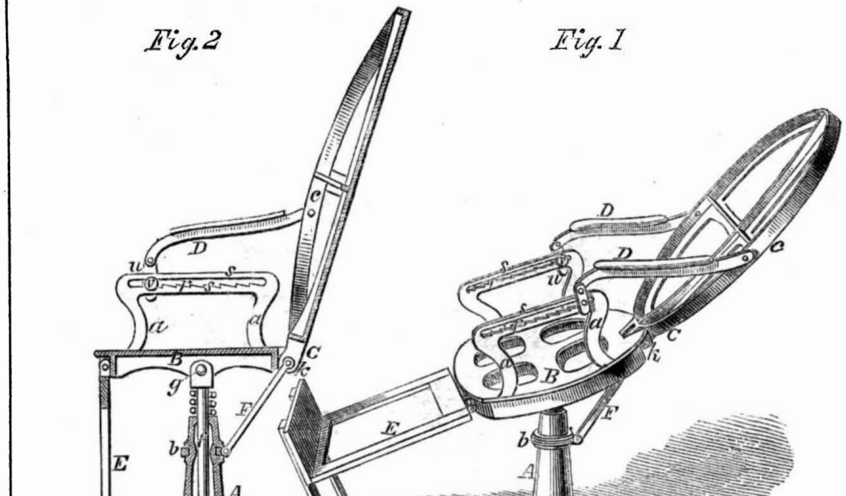
WINN'S SAFETY VALVE AND PRESSURE GAGE.



and this pulls the balls, H, from a perpendicular state into an inclined one. The relation of the weight, A, to the area of the piston can be regulated by lengthening or shortening the arm, G, by screwing it in the nut, *d*, so that the motion may be more or less, and the balls, H, arrive at a horizontal position at any desired pressure at which it may be advisable to let off the steam. As the steam raises in pressure, it elevates still further the piston until it passes beyond the holes or passages, *b*, and brings the weights, H, into an horizontal position, when it can escape through the pipe, B, into the open air, thus preventing explosion. The path which the balls describe is that of an arc, and the room taken up is small, while the action of the device is much more sure and steady than a a spring, and the construction is so simple that it cannot get out of order, and all its parts are easily come at for repair in case of accident. The index, L, being attached to H opposite its center will give the same indication on the dial, M, for the same pressure of steam as far as it is capable of moving, whatever may be the distance of the weights from the center of E, thus permitting of the adjustment of the weights without altering the accuracy of the index.

This valve is the invention of Jas H. Winn, of Portage City, Wis., and was patented by him August 31, 1858. The inventor will be happy to furnish any further information upon being addressed as above.

HARTMAN'S CAR SEAT.



The newspapers are daily informing us of some fresh railway that has made such modifications in the car-seats as to render them more comfortable for night travelers, we therefore take every opportunity to illustrate in our columns the best that have been invented, in order that the public shall be familiar with them, and also to introduce the different ones to the notice of the railway companies. The subject of our present engraving is of chair form, each seat holding one person; they are of course reversible, and we have shown the framing without the cushions, in order that its construction may be plainly seen.

Fig. 1 shows the seat arranged in a couch, and Fig. 2 is a vertical section arranged as a chair.

A is the stationary pedestal, B the seat, C the back, D D the sliding arms, and E the foot-rest. A is made to receive the stem, *f* (Fig. 2), which is jointed to the seat, B, at *g*, so as to allow the seat, B, to swivel around upon A, and also to permit of adjustment to a horizontal or inclined position as required. The foot rest, E, is hinged to the front of the seat, B, and forms a substantial support for the seat when in horizontal position. The brace, F, is jointed to the seat at *k*, and to the pedestal, A, by a collar, *b*; and forms an efficient support to the back of the seat, either in a horizontal or inclined position of seat, B. Upon the seat, B, the arms, *a a* are rigidly attached, having serrated slots, *r*, made through their horizontal parts, *s*. The part, *v*, of the pieces, *u*, are fitted in the slots, to slide over or to catch in the serrated part of said slot. The back, C, is hinged to seat, B, at *k*; and, by the sliding arms, D D, pieces *u u* and arms, *a a*, is firmly held when adjusted to a vertical or inclined position.

The couch seat is firmly maintained in the position shown in Fig. 1 by the foot-rest, E, and brace, F, when the foot-rest, E, is made to take that position by raising the front of the seat, B, sufficiently to allow E to swing under it, the said seat (turning upon the point, *g*, and sliding by the stem, *f*, in the pedestal, A) settling down upon it. The back, C, is then brought to the desired position, by taking hold of the pieces, *u u*, and holding them so that they move freely along the slot, *r*, when letting go of pieces, *u u*, they catch in the notch, and hold the back firmly in that position.

The couch is formed by pulling forward the lower end of the foot-rest, E, which causes the seat to settle down by stem, *f* until it is arrested by the pedestal, A. The brace, F, being unchangeable in both, the seat, B, necessarily becomes inclined forward in the same plane as the foot-rest, E. The back, C, is brought to nearly the same plane, by precisely the same operation before described, forming a couch upon which the occupant can sleep as comfortably as the motion of the car will permit.

It is the invention of J. Hartman, Jr., corner of Broad and Lombard streets, Philadelphia, Pa., and was patented by him Sept. 7, 1858, and he will be happy to furnish any additional particulars.

Scarletina and Measles.

Mr. Witt, member of the Royal College of Surgeons, has published a pamphlet in which he states that bicarbonate of ammonia is a specific for the cure of scarlet fever and measles. He cites Dr. Peart, of Liverpool, and other practitioners, who have never lost a case out of hundreds since adopting this remedy. Two drachms of the bicarbonate of ammonia are dissolved in five ounces of water, and two tablespoonfuls of the solution given every two, three, or four hours, according to the urgency of the symptoms. No acid drink must be taken, but only water, or toast and water: The system is to be moved by a dose of calomel if necessary. The room must be well ventilated, but the patient protected from the slightest cold or draft. Gargles should also be employed for clearing the throat. The ammonia seems to counteract the poison which causes scarletina, and also acts on the system by diminishing the frequency and at the same time increasing the strength of the pulse. As so many children die from these diseases in this country, this remedy ought to receive a fair trial from the profession.

COAL IN NEW YORK.—We are informed by a correspondent that coal has been found in a hill near Thornby, Steuben county, N. Y., and that although the quantity is not large, it is excellent in quality.

Issued from the United States Patent Office

FOR THE WEEK ENDING NOVEMBER 9, 1858.

[*Reported officially for the Scientific American.*]

*** Circulars giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

KNITTING MACHINES—Walter Aiken, of Franklin, N. H.: I claim the peculiar shaped cam groove, constructed and operating substantially as described.

I also claim the selvage fingers, substantially as described.

REVOLVING FIREARM—Ethan Allen, of Worcester, Mass.: I claim, first, Forming the stud or pin to support the tumbler and hammer solid with the case or frame, when the hammer is placed outside the case, and constructed and operating substantially as described.

Second, The cam surfaces of the tumbler and piece, L, or their equivalents, to rotate the cylinder, by means of the piece, M, substantially in the manner and for the purposes set forth.

FLOUR COOLERS—Horace B. Allis, of Little Rock, Ark.: I claim the combination with a cooler hung so as to revolve upon a nearly horizontal shaft as described, of nearly radial screens, as stated and shown, and also the combination therewith, as an auxiliary to accomplish the desired result, of the solid flanges, g, for checking the motion of the meal till the screens have arrived at the proper angle to properly distribute the meal, as set forth.

SEWING MACHINES—Otis Avery and Zelotes W. Avery, of Bethany, Pa.: We claim the combination of the rocker or yoke, K, pivoted as described, and the presser, S, operated as set forth, for the purpose of firmly holding the cloth whilst it is being fed up or moved as represented.

We also claim, in combination with the beam, H, and its cam, q, the bar, o, and its cam, r, when said parts effect the purposes described, and in the manner set forth.

HOISTING MACHINES—Daniel W. Barr, of Lancaster, Pa.: I claim the central pulley, J, beveled cog wheels and drums, C, side wheels, H I, double pulley hoisting tackle, K, slide door, T, drum and crank, P, with cord, N, with the whole combined and arranged substantially as described, for the purposes set forth.

APPARATUS FOR WETTING PAPER—Moses S. Beach, of Brooklyn, N. Y.: I claim the employment of the cloth, arranged and operated substantially as and for the purposes described.

PRINTING PRESSES—Moses S. Beach, of Brooklyn, N. Y.: I claim producing intermittent blasts of air by means of the revolving hollow core, A, having openings, d d, and the stationary box, B, having openings, e e, arranged and operating substantially as shown and described.

FEEDING OUT PAPER FROM PRINTING PRESSES—Moses S. Beach, of Brooklyn, N. Y.: I claim, first, The stationary guides, M S, and the arrangement of the rollers, E R G, or their equivalents, by which sheets coming from different directions are conducted into a single set of guide tapes or strings, in the manner substantially as shown and described.

Second, Counting sheets into desired quantities by a counting table, consisting of an endless belt having an intermittent motion, arranged and operating substantially as shown and described.

BLACKSMITH'S TUYERE—Harvey S. Berry, of Rutland, Vt.: I claim a tuyere revolving in a wind box supplied with wind in any ordinary way, with apertures through it, so arranged as to bring more or less of them at pleasure to bear upon the fire, and thereby diminish the fire and circumscribe the space affected by the blast, or enlarge the space and increase the fire.

PLOWS—John M. Burke, of Dansville, N. Y.: I claim depressing and bending inward the rear and lower edge f, of the mold board as described, for the purpose set forth.

MACHINERY FOR PRESSING TOBACCO—William Cameron, of Petersburg, Va.: I claim, first, The construction of the ring which contains the tobacco boxes, viz., by segments held together by a band which can be tightened or loosed, and move independent of said segments, as set forth.

I also claim the forming of a press by means of one, two, or more of such rings, enclosing a series of tobacco boxes with plates above and below them, and screw rods furnished with hand wheels and nuts passing through said rings and plates, substantially as described.

RENDERING PAPER AND OTHER FABRICS INCORRODIBLE—Thomas G. Chase, of Philadelphia, Pa.: I am aware that other compositions of matter have been used to protect caustic alkali from the action of air and moisture, such as resin and beeswax—for which a patent was obtained by George Thompson, October 21st, 1856. I do not claim any of these, and am also aware that a patent has been granted in England to William Benson Stones, for the use of paraffine to render textile materials impervious to wet—Vol. 55, page 339, Mechanics' Magazine. I do not claim the use of it for this purpose.

But I claim the application of paraffine either alone or in combination with naphtha, for the purposes described, as set forth, so as to secure paper and other fabrics from the corrosive action of caustic alkali, in order that it may be put up securely in small parcels.

PROPELLER—George R. Comstock, of Little Falls, N Y.: I claim the series of spring blades, f f', hung and reversed substantially as set forth, in combination with the cutting edges of the vibrating frame, B', the operation being substantially as specified.

PEN FOUNTAIN—John S. Cutts, of Philadelphia, Pa.: I do not claim to be the original inventor of a fountain pen.

In fact, I do not claim a tapering case or fountain, through the apex of which the nibs of the pen may be projected and withdrawn.

But I claim the elastic tubular fountain, D, open at both ends, and so combined with the pen that the fountain may be filled with ink through its upper open end by dipping the pen, as set forth.

LACTEAL INSTRUMENTS—Charles H. Davidson, of Charlestown, Mass.: I claim constructing the article known and worn as "breast shell," and made of any size, form, or material suitable for the performance of the well-known functions or uses proper of such device, with a transfer pipe or tube forming an integral part of the shell, when said tube is arranged as described, and serves for the ready and advantageous attachment of a flexible pipe with nipple jointed to it, substantially as and for the purposes set forth.

AQUARIA—Elijah D. Davis, of Brooklyn, N. Y.: I claim, first, The mirror, D, extending above the level of the front plate, C, and arranged in relation thereto, and to the contents of the aquarium, substantially in the manner and for the purposes set forth.

Second, The sustaining of the earthy matter, H, in removable bottom, G, and protecting its upper surface by a hand coating, g, for the purposes as set forth.

CUSHIONS FOR BILLIARD TABLES—Levi Decker, of Bergen, N. J.: I claim the combination in a billiard table cushion of stretched and unstretched rubber, for the purpose described.

LIFE-PRESERVING VESTS—T. A. Delano, of New York City: I claim, as a new article of manufacture, a life-preserver having elastic fastenings or straps, e e, and an inflatable air chamber or float, A, extending from the breasts underneath the arm holes, as shown and described.

[A notice of this improvement will be found in another column.

OPERATING CHURNS—Joseph Forsyth, of Wheeling, Va.: I claim the combination of the carriage, D, with the movable platform, K, substantially as described, and for the purpose set forth.

METHOD OF OPENING AND CLOSING FARM GATES—William G. Hermance, of Geneva, N. Y.: I do not claim the construction of the gates, beams, braces, levers, arms, or pulley, separately.

But I claim the suspension of the gates by means of suspension bars of unequal length with pulleys and slat heads, arranged as set forth.

BURGLAR'S ALARM—N. Jensen, of Washington, D. C.: I do not confine myself to the alarm cannon or the precise mode of firing it as described, as other alarms, as the bell, may be used, and the mechanism by which they are sounded set in operation by the movement of the socket holding the taper: or instead of the flame of the taper lighting a fuse, a protecting point may extend from the socket, which, when the socket springs back, explodes a cap and fires a cannon.

I claim, first, Supporting the taper by a spring socket arranged substantially as described, so that by the movement of the socket when the holding catch is withdrawn, the taper is lighted.

Second, On releasing the spring socket holding the taper. I claim lighting the taper, and causing the alarm to be sounded by the movement of the socket, substantially as described.

Third, Arranging the alarm and the light in separate compartments in the box, for the purposes set forth.

Fourth, The fuse tube constructed and arranged as described, so that the gases escaping from the vent will pass over the flame, and not come in contact with and extinguish the light.

SLEEPING BERTHS FOR RAILROAD CARS—D. M. Lawrence, of Cincinnati, Ohio: I claim the arrangement of the strap hinge, h h, in combination with the ball and socket hinge, b b, for the purpose of securing adjustable platforms or sleeping berths for railroad cars at any desired elevation, and operating as described, or otherwise substantially the same, and for the purposes set forth.

ROTARY HARROWS—William H. Main, of Liverpool, Ohio: I claim the combination of the arm or center pin, B, draft bar or platform, D, with the seat, C, substantially as arranged, for the purpose of causing the harrow to rotate by the weight of the person on the seat.

PRINTING PRESSES—Charles Montague, of Hartford, Conn.: I claim communicating motion to the cylinder at the time of giving the impressions, by and through the motion of the bed, while the revolution of the cylinder shall be perfected by or through ordinary gearing, or other means entirely independent of the motion of the bed, thus alternating from one of these means of the other, to give a full revolution to the cylinder, in the manner substantially as set forth.

SHEARS FOR CUTTING SHEET METAL—Daniel Newton, of Southington, Conn.: I claim the application to circular shears of two rods with a revolving cutter on each rod, sliding either way, to adjust the size of the circle.

GALVANO-ELECTRIC MACHINE—Joseph R. Palmenberg, of New York City: I do not claim any of the parts, separately.

But I claim the arrangement and construction of a magneto-galvano electrical machine, in the manner substantially as described, having the helix and spring hammer, &c., situated in the inner part of the block or stand which supports all the other parts, and protected from any external danger through which the action of the apparatus might be deranged, substantially as specified.

BEE HIVES—Ebenezer W. Phelps, of Elizabeth, N. J.: I claim the small sectional adjustable frames, a, set in the main frames, A, by means of half round grooves and rod, g, operating as described and for the purposes set forth.

SECURING THE ENDS OF RAILROAD BARS—Augustus Plinta, of Albany, N. Y.: I claim the formation of a smooth joint where the ends of hollow rails meet, by inserting therein a plug of iron or dowel, movable by a pin, F, in combination with a transverse wedge, D, washers, C C', and wedge-shaped spikes, E E, combined and arranged substantially as described, when used without a chair.

HARVESTERS—Hosea W. Read, of West Windsor, Vt.: I claim in its arrangement and combination with the tilting frame and the machinery for operating the cutters applied thereto as described, a screw rod or mechanism for spreading the bars of the tilting frame asunder, so as to throw the pinions of the cutter mechanism out of engagement with the gears of the driving wheels, substantially in manner and for the purpose as specified.

FRAMES FOR UMBRELLAS AND PARASOLS—Frederick Reichhold, of New York City: I claim making the stretcher and rib of two wires each, forming the loops or eyes of the rib by coils of the exterior wire, and attaching the stretcher to the rib, the rib to the notcher, and the stretcher to the runner, by coils or hooks of the exterior wire, all in the manner and for the purpose substantially as described.

DROP FOR FORGING METALS—E. K. Root, of Hartford, Conn.: I claim the method of elevating the drop or hammer by means of a lifting strap having a vertical reciprocating motion, in combination with the retaining notches and pawls and the spring bolt, or their equivalents, substantially as described.

I also claim the method of disengaging the drop or hammer from the elevating strap by means of a wedge-shaped shoe on the strap, which strikes the end of the bolt, or its equivalents, and forces it clear of the strap, and into engagement with the retaining latch, substantially as specified.

I also claim the employment of an adjustable disengaging shoe, in combination with the series of retaining notches and pawls, essentially as described, whereby the hammer may be readily disengaged from the lifting straps, and retained at any desired hight from the base block.

I also claim the sliding ratchet bar, in combination with the retaining notches in the posts, and retaining pawls on the hammer, when arranged and operating substantially as described, for the purposes set forth.

And finally, I claim, in combination with the bolt which forms the connection with the elevating strap, and with the retaining latch which holds the slide when disengaged from the elevating strap, or their equivalents, the employment of the angular lever, or its equivalent, by which the hammer may be readily disengaged from the elevating strap by the operator at any required point in the ascent of the hammer.

CONNECTING METALLIC TILES, PLATES, BEAMS, &C.—Silas T. Savage, of Albany, N. Y.: I claim the application and use of hook and clasp-shaped terminals, formed and arranged as represented, at the ends or edges of malt kiln tiles and beams, or analogous structures, such as floors and beams of any kind, for the purpose of attaching them to each other, and supporting them firmly in a proper position, substantially as described, and for the purposes set forth in the specification.

MANUFACTURE OF WHITE LEAD—Benjamin F. Smith, of New York City: I claim preparing the metallic lead for the purposes of perfect corrosion, by exposure to the action of acids or other substances, in "spangles" of the size and configuration, substantially as described.

I also claim preparing the metallic lead for the purposes of perfect corrosion by exposure to the action of acids or other substances, by causing melted lead to drop in a finely divided stream or streams upon a corragated cylinder, or its equivalent, revolving or moving so as to throw off solid "spangles" of more or less the form and thickness described.

ELASTIC MATERIAL FOR MATTRESSES AND CUSHIONS—Thomas B. Smith, of Marietta, Ohio: I do not claim a shaving or coil consisting of a single piece.

But I claim the compound coil of spiral woody fibers described and represented, when prepared substantially as described, and used as a substitute for curled hair.

MACHINERY FOR MANUFACTURING SHIRRED GOODS—Richard Solis, of New Brunswick, N. J.: I claim, in combination with the rollers or equivalent means for cementing the two lamina of cloth, and the rollers or equivalent means for keeping the united lamina distended, and for moving them as described, the employment of a bar, or the equivalent thereof, over which the united lamina are drawn to form the turned or laped selvages, as described.

And I also claim, in combination with the selvage bar, or its equivalent, and the means described for moving and keeping the lamina distended, or equivalents therefor, the employment of pins for turning the edges in forming the turned or lapped selvages, as described.

SHIRT BOSOM FOLDERS—John Stevens, of New York City: I claim the combination of a series of tins made as described, with a series of pins arranged in a slot in the angle irons attached to the bed-plate, the pins being adjustable by means of which the plates can be made of any desired width without different sizes of tins, with the lifters for raising the tins from the pins, the whole being arranged as described for the purposes set forth.

MACHINE FOR FILING SAWS—C. Tabor and R. D. Tabor, of Ischua, N. Y.: We claim the use of the file carrier and pressure frame, as set forth, in connection with the carriage, clamping jaws, and revolving platform, when constructed and operated as specified.

FURNACE FOR TEMPERING STEEL—Joseph Thomas, of New York City: I claim arranging a plate, B, in an upright furnace with a central passage, a, in such a manner and in such relation to a tank, D, containing water or other suitable liquid, that a piece of steel wire or a strip of sheet steel may be heated and hardened without coming in immediate contact with the fire, by passing the same through the passage, a, and through the liquid contained in the tank, D, the whole being arranged substantially as specified.

And I also claim arranging the two furnaces, A and E, and the tank, D, in such relation to each other that a piece of sheet wire or a strip of sheet steel may be hardened and tempered by one operation by passing the same through the plate, B, in the furnace, A, and through the liquid contained in the tank, and from thence between the plates, F and G, which are heated by the fire, in the furnace, E, the whole being arranged and constructed substantially as described.

[For more information regarding this invention, see another column.]

FRINGE LOOMS—Samuel Walker, of Roxbury, Mass.: I claim, first, Riveting the thread carriers to a reciprocating frame, S, moving with the lathe, as set forth for the purpose specified.

Second, I claim the guard plates, i, attached to the knife and operating in the manner substantially as set forth.

Third, I claim depressing each loop of fringe as it is formed by means of the fingers, i, or their substantial equivalents, for the purpose of preventing them from being entangled and twisted up with the succeeding loops, as set forth.

Fourth, I also claim twisting the weft thread immediately before the loops of fringe are formed by pivoting its spool upon a revolving carriage, P', as set forth.

LATHE FOR TURNING WOOD—Albin Worth, of Stapleton, N. Y.: I do not claim a slide rest provided with cutting tools set in vibrating or sliding heads and actuated through the medium of certain mechanism by fixed patterns, for such device was formerly patented by me. Neither do I claim, broadly, and irrespective of arrangement the employment or use of eccentrics for operating the stuff or pattern.

But I claim, first, The eccentric, A', connected with the tool, v, and rotated through the medium of the gearing, q' r' s,' or q' t' r'' s,'' or their equivalents, from the mandrel, a, so as to turn or cut the work in oval or polygonal form, as described.

Second, I claim the combination of the patterns, S T, the eccentric, A,' and cutting tools, p u v, attached to the slide rest, G, and the feeding device formed of the screw, E and nut, i, when the whole are arranged to operate automatically as and for the purpose set forth.

[A full description of this invention will be found on another page.]

MACHINE FOR COILING METAL PIPE—P. D. Weimer, of Lebanon, Pa.: I do not claim any movable or springing arrangement for the purpose of keeping the movable die or groove in contact with the coiling mandrel during the operation of coiling the pipe.

But I claim, first, The coiling of hot or cold metal pipe on a plain cone or cylinder by means of a movable groove or die, as described and specified.

Second, I also claim feeding the movable groove or die forward, so as to form the coil by means of a pattern coil, or its equivalent as described and specified.

SEWING MACHINES—C. D. Wheeler, of New York City: I claim the combination of a sheave, whose groove is sharp or so constructed that the thread may jam therein by a partial passage around the sheave, with an adjustable friction brake to control the movement of the said sheave, substantially as described.

ROCK DRILLS—Lyman White and J. T. Bumgarner, of Davenport, Iowa: We claim, first, The combination of the cam, D, swinging adjustable frame, B, slide bar, E, and screw rod, G, containing the drill rod, K, arranged substantially as and for the purpose set forth.

Second, The combination of the adjustable plate, J, attached to the frame, B, arm, I, nut, H, with collar, K, and pawl, j, attached, the whole being arranged substantially as described.

Third, We claim the spring, u, interposed between the lower collar, t, on the drill rod and the lower end of the screw rod, G, for the purpose specified.

Fourth, We claim placing the screw rod, G, on the drill rod, K, between two adjustable collars, t t, substantially as shown and described, so that when the screw rod has been fed or moved down the distance of its length, it may by loosening or detaching the collars be raised on the drill rod and secured upon it higher up in order to continue the work.

[A notice of this improvement will be found in another column.]

GRUBBING MACHINE—T. C. Wood, of Charleston, Mich.: I claim the arrangement of the lever, C, the hinged supporter, D, the cord, a, the elliptical block, E, and hooks, c c, all being secured in the carriage substantially in the manner and for the purpose specified.

LOCKS—Linus Yale, Jr., of Philadelphia, Pa.: I make no claim to the particular form of tumblers or other parts of the lock, as my improvement can be adapted and applied to any of the old forms of locks, however simple or however complex and costly.

But I claim providing a main bolt or bolts with two or more systems or sets of stops or tumblers, or their equivalents, whether alike in form and construction or dissimilar—commanded by or obedient to one and the same key, or its equivalent, or by separate and distinct keys, or their equivalents, so placed and arranged, whether near or distant, that when its key is applied to either one set, that set shall release the bolt irrespective and independent of either of the other sets, substantially as and for the purpose described.

RAILROAD CAR WHEELS—Thomas C. Ball (assignor to himself, L. Bisco, A. S. Davis, K. Crossfield, E. Edwards and Jacob Green), of Keene, N. H.: I do not claim as my invention to make a car wheel in two parts, neither do I claim interposing rubber or other elastic material between the two parts for any of the purposes described.

But I claim (for a car wheel, with an an insertion of rubber or other elastic substances between the two parts), the making of the rim or tire and its flanch, M, in one piece, for the purpose of strengthening each other.

Second, I claim the mode of confining the two parts, A and B, together, by means of the hook, or pivot bolts, substantially as described or their equivalents, to prevent the wear and chafing of any stationary confinement, also to be at liberty to make each bolt do its share of labor assigned, for castings are most invariably too uneven to get any equality of confinement in other modes.

SEWING MACHINES—Samuel Comfort, Jr., of Morrisville, Pa., assignor to himself and F. H. Jackson, of Philadelphia: I claim the guard, i, in combination with a bent needle, the inner edge of the said guard being in juxtaposition with the needle and forming the segment of a circle, of which the center of vibration of the needle arm is the center for the purpose specified.

I also claim causing the needle thread to maintain the needle in proximity to the guard, i, and at the same time so guiding the thread to coincide with the groove of the needle by means of the projection, 2, arranged on the said guard, substantially as set forth.

SKELETON HOOP SKIRTS—R. J. Mann (assignor to L. A. Osborn and J J. Vincent), of Brooklyn, N. Y.: I claim, in the construction of ladies' skeleton skirts, the combination of a series of horizontal hoops, adjustable in diameter, substantially as described, with bands or cards crossing and connecting them, substantially as described.

DREDGING CRANE—George Wood and John King (assignors to themselves and Wm. Lawrence), of Philadelphia, Pa.: Without claiming, broadly, the elevating jib, E, as hinged to the post of the crane, such a device having been heretofore used in connection with hoisting apparatus, we claim, first, The post, D, with its pulley, G and H, and the barrel with its clutch, M, when arranged for joint action on the deck of the vessel, substantially as and for the purpose set forth.

Second, The carrier, F, with its pulley, G, and its hollow stem, as arranged to turn in the socket in the end of the jib, in the manner and for the purpose specified.

RE-ISSUES.

FURNACE FOR BURNING BAGASSE—Elizabeth Ann Harris (late Stillman), of New York City, administratrix of Alfred Stillman, deceased. Patented May 1, 1855: What is claimed as the invention of the said Alfred Stillman is, first, The employment in connection with the boilers or other vessels of a sugar plantation which require heat, and with the mill for expressing the juice from the cane of a furnace constructed substantially in the manner set forth, capable of burning wet bagasse without the aid of other fuel than the bagasse itself, and capable also of utilizing thereby said begasse as a generator of heat for said vessels, as described.

Second, Combining the cane mill with a furnace constructed as described by means of the endless carrier, in the manner and for the purposes substantially as described.

TREATMENT OF CAOUTCHOUC—A. G. Day, of Seymour, Conn.: I claim running the heat for vulcanizing flexible and elastic hard gum compounds, through the range of temperature, and the comparatively great length of time, substantially as set forth—that is to say, commencing the heat at about 275°, and carrying the same to 300° and upwards, substantially as described.

I also claim making, as described, the flexible and elastic hard gum composition of two parts, by weight, of rubber or other vulcanizable gum and one part of sulphur, when such composition is preparatory to the running of the heat as described in the specification.

I also claim equalizing the temperature in the heating apparatus by mechanical means, substantially as set forth.

AUTOMATIC STEAM WHISTLES IN LOCOMOTIVES—Jas. Harrison, Jr., of New York City, formerly of Milwaukie, Wis. Patented April 1, 1856: I claim, first, Giving audible indications of the approach of the train of cars to persons at the stations or other points on the route, by an arrangement of means interposed between the truck wheels and whistle, and which are actuated by the truck wheels, substantially as set forth.

Second, Combining with the means of giving audible indications, other means for giving visible indications to persons charged with the care of the train, both sets of means being actuated by the truck wheels, as described.

Third, Varying and modifying the tones or sounds of the whistle by the form and surface of the lifters and their arrangement and position upon the cylimder, as set forth.

STOVES—Joseph C. Henderson, of Albany, N. Y. Patented May 18, 1858: What I claim is the new radiating combustion chamber with a conducted orifice or throat producing a plenum in said chamber in combination with a fire box or pot, and with an exterior chamber surrounding said combustion chamber, and from which exterior chamber the heat is taken by radiation or conductor, substantially as set forth.

DESIGNS.

STATUETTES OF HENRY CLAY—T. Ball, of Boston, Mass., assignor to G. W. Nichols, of New York City.

STOVES—L. D. Thomas, of North Dighton, Mass., assignor to the Dighton Furnace Company.

Notes on the Progress of the Paddle and Screw.

We have been furnished with a rare collection of notes, in a condensed form, on this subject, by John Macgregor, Esq., barrister at law, London, who has just returned home from a pleasure trip among the "western folk." He is the author of several valuable works, and these notes were read by him before the London Society of Arts, after he had been collecting information and abridging specifications of British patents on the subject of propulsion, at the request of the Royal Commissioners of Patents.

We are having a number of illustrations prepared, to show some of the curious forms of propellers that have been devised at various times, and we believe that this information will be found generally useful, and prove valuable as a code which can be referred to as perfectly reliable. In Volume V. we published a history of propellers, but that was more a discussion of principles, while this is simply a collection of facts.

Propellers are of two kinds, the paddle wheel and screw; the former propels the vessel in a line perpendicular to its shaft, and the latter in a line parallel to the shaft. We shall begin with the paddle-wheel, as that is the oldest invention. Mr. Macgregor says:—

"Several modern writers state that the paddle-wheel was used by the ancient Egyptians, but there is no proper evidence to warrant this assertion.

Pancirollus, who wrote in 1587, says he saw an old bas-relief representing an Illyrian galley propelled by three wheels on each side turned by oxen. The same author, and several others, refer to Vitruvius for a notice of the paddle-wheel, but I find, in five editions of Vitruvius, the drawings represent merely a wheel turned by the water, and used as a log to measure the speed.

Again, Claudius Codex is said to have employed paddle-wheels in the invasion of Sicily in the third century before Christ, and some MSS. in the King of France's library (which I have not been able as yet to inspect), are referred to for this statement, but after diligent inquiry, I can find no confirmation of it in any accredited authority. An old work on China contains a sketch of a vessel moved by four paddle-wheels, and used, perhaps, in the seventh century; but the earliest distinct notice of this means of propulsion appears to be by Robertus Valturius, in A. D. 1472, who gives several wood cuts representing paddle-wheels.

Some months ago, I inspected two letters, written in A. D. 1543, by Blasco de Garay, and now preserved in the national archives at Simancas, in Spain. These give the particulars of experiments at Malaga and Barcelona, with large vessels propelled by paddle-wheels, turned by forty men. By many authors, and for a long time, it has been positively affirmed that Blasco de Garay used a steam engine for marine propulsion, but, after careful and minute investigations at Simancas, Madrid, and Barcelona, I cannot find one particle of reliable evidence for this assertion.

After the various notices referred to, we find paddle-wheels mentioned by many early writers, such as Julius Scaliger, in 1558, Bourne in 1578, Ramelli in 1588, and Roger Bacon, 1597.

Before we consider the application of the steam engine to turn paddle-wheels, it is well to notice briefly some of the other agencies employed.

The muscular power of men, of horses, and of other animals, was often used and frequently patented, even to the year 1848, by Miller, and 1856, by Moses. The Marquis of Worcester, in 1661, patented the application of a current to turn paddle-wheels on a vessel, which they propelled by winding up a rope. Chabert (1710), Drouet (1722), Pitot (1729), and Boulogne (1729), used a similar plan. Papin, in 1690, proposed to work the wheels by gunpowder, exploded under pistons; Conrad (1709) used the force of the wind; Maillard (1733) and Goutaret (1853) applied clockwork; Harriott (1797) used falling water; weights were employed by Tremeere (1801); Congreve (1827) used the capillary attraction of a wheel of sponge or glass plates; Dundonald (1833) applied the oscillations of mercury; and Jacobi (1838) employed an electro-magnet to work the paddle-wheels of a vessel on the Neva. The whole number of English patents relating to marine propulsion is 803, from the earliest, granted to Ramsey in 1618, to those of June, 1857. The patentees are described by the following avocations:—Engineers, 274; gentlemen, 251; tradesmen, 74; naval commanders, 14; medical, 11; shipbuilders, 11; peers, 8; shipowners, 8; mariners, 5; machinists, 5; farmers, 4; architects, 4. A less number to each of 21 other professions. There are two female patentees, and the callings of 160 are not mentioned. 80 of the patents are dated in January, 46 in August, and the other months have intermediate numbers.

Brick-drying Tunnels.

Messrs. Editors—Your readers may remember my article on page 131, Vol. XIII., Scientific American, on drying bricks by artificial heat. The experiment had then just been made on a small scale with gratifying results; but whether a like success would attend a more extensive operation was yet to be shown. This is, however, no longer a matter of doubt. Brick works have been erected this summer on Moon Island, in Boston Bay, for Charles A. Green, of Squantum, Mass., working two of my large steam machines, and connected with them my tunnels for drying brick, which I will briefly describe.

Imagine two tunnels, side by side, each 80 feet long, 4½ feet wide, and 6½ feet high, fitted with railroad and train of cars each, on which the bricks are discharged as they come from the machine. Near the entrance is a chimney forty feet high, and at the other end, a furnace; this causes a constant current of hot air through the tunnel. The car being loaded is passed into the tunnel, each car pushing the other along. If subjected suddenly to heat, the bricks would be apt to crack; but instead of this, they first meet a current of temperate air, which takes up the moisture, and carries it up the chimney; then as they approach the fire—being partially dried—they are able to bear more heat. It requires three hours to go through the first tunnel, on emerging from which, the bricks are edged up and passed into the second tunnel. The hot air now encircles them on both sides, which prevents warping. In four hours they come from this perfectly dry, and are wheeled off to the kiln.

Bricks which had been left in the first tunnel all night, were, at the outlet, found to be quite dry; and even the last car-load, which entered at sunset, and remained near the mouth, was found almost dry enough for the kiln. Much to my surprise, all these brick were sound, and not the least warped, although they were not edged up; this is owing to some peculiarity of the clay—very few clays would admit of this. By this improvement, the whole operation is carried on under cover, and at all seasons when the clay is not frozen. A lot 300 feet square is sufficient for buildings, tunnels, sheds, and kilns for an extensive business. Measures have been taken to secure a patent.

Francis H. Smith.

Baltimore, Md., November, 1858.

Telegraphing Simplified and Cheapened.

The want of a complete cypher-table for telegraphing has long been felt by the business community. We are pleased to learn that this want is now about to be supplied, and that the inventor is a citizen of Vicksburg. The improvement will be a great desideratum to those who do much telegraphing, by cheapening the process, and it has the advantage of being in cypher, and may be known only to the merchant and his correspondent, the purport of which even the operator himself would be ignorant of. We have had the process explained to us by the Rev. Dr. Marshall, who has produced the improvement, and regard it as not only eminently practicable, but simple in its details, and worthy of the consideration of those interested.

By this process the Atlantic cable could, if in working order, do ten times as much work in one minute, as is now done by any existing process.

[We have also examined the cypher-table referred to in the above extract from the Vicksburg *Whig*, and can endorse the statement of our cotemporary. Cypher-tables are now used by companies and associations who frequently require the use of the telegraph. The one of Dr. Marshall is superior, for brevity, to that of the Associated Press. By telegraphing four letters—H T B J—the message, "16,000 bales of cotton sold and buoyant," is conveyed; by the cypher-table of the Associated Press, the word *sovereignty* is employed to convey a similar message. Whenever we have an ocean telegraph in successful operation, the most improved cypher-tables, will be required to facilitate the business.]

Horses and Stables.

Blindness is very common among horses in our cities. This is caused in a great measure by keeping them in dark confined stables, and shading their eyes with harness blinders. Dark, ill-ventilated cellar stables are quite common; this stupid practice should be abolished, because such stables are very detrimental to the health of these noble animals. All stables should be dry, roomy structures, provided with windows to afford abundant light, and should also be frequently whitewashed. The horse is a native of dry, sunny regions, and requires to be kept dry and warm in order to attain to the greatest perfection.

Close and confined stables, just like those which are so common, are the frequent cause of that violent disease called *glanders*. A few years since, great ravages were committed among the cavalry horses of France by this disease, but it is now almost unknown in that country. This result has been brought about by simply making larger stables, doubling the size of the stalls, and securing good ventilation. In proportion to their bulk, horses need more fresh air than men, in order to perform the function of respiration, yet they are commonly cooped up in narrow stalls, which are not large enough to keep a dormouse's lungs at work.

As the season is now approaching when, owing to inclement weather, horses will be more confined indoors, those who possess such animals should now devote some attention to provide them with stables suitable to their nature and wants, and by so doing they will greatly increase their health and longevity.

Rifle Balls for Smooth-Bored Muskets.

The *New York Daily Times* of the 2d inst. quotes an extract from the Paris *Constitutionnel* regarding an improvement in balls, which gives them rifle qualities in smooth-bored muskets. It says:—"M. A. Muller, a non-commissioned officer in the French military service, has devised a means of rendering ordinary smooth-bore arms equal in precision to rifle guns, while abolishing all the inconveniences attendant upon rifling. The result depends upon the shape of the projectile, which is that of a helix. The directive peculiarity of the missile is situated posteriorly, and consists of six vanes or wings arranged helically round a central point. The helices receive the blast of powder, and cause the missile to revolve while yet in the barrel. According to the experiments of M. Muller, at Nancy, with his new projectile, discharged from an ordinary smooth arm musket, it was susceptible of great accuracy, up to 800 meters."

[This is not a French invention but an American one, and whatever its merits may be, let us give its true inventor the honor which is his due. On page 245, volume X., Scientific American, we described a bullet possessing the same peculiarities and designed to effect the same objects which was invented by J. W. Cochran, of this city, who afterwards went to Europe, and exhibited it in several places. Officer Muller may not have heard of his experiments in England in 1855, but they received considerable publicity at the time from several newspapers of that country. Experiments were previously made at Washington, but they do not seem to have been approved of by the Ordinance Board.

American Contractors and Russian Railways.

In No. 9 of the present volume of the Scientific American, we gave a paragraph from an English paper entitled "Brother Jonathan at his Tricks," accusing the American contractors of something akin to dishonesty in reference to a Russian railway, and we added the emphatic and indignant denial of its truth by Mr. Winans, one of the gentlemen interested. This we thought was sufficient, but we have since received a letter from Mr. Joseph Harrison, Jr., of Philadelphia, who is also largely concerned in the matter enclosing a long printed letter on this subject. Having already given a decisive denial to the statements contained in the former paragraph, we do not conceive it necessary that any more space need be given to it. There is, however, one point in Mr. Harrison's letter which deserves notice as proving the untruth of the London *Daily News*' assertion, and it is that the American company never had any contract for building the road, or for constructing any part of the tracks, with the exception of laying the first sixteen miles of superstructure, their contracts from December, 1843, still existing, being exclusively for the construction and repair of the rolling stock. Nor have the company ever had anything to do with working the rolling stock of the road, and further the approximate length of the road had been fixed and determined before the first American engineer of the company, the late Major G. W. Whistler, had arrived in Russia, and under whose superintendence the St. Petersburg and Moscow Railroad was built. The well known character of the parties concerned in this affair must convince the public that the story of fraud is without foundation.

American Railways in England.

It is a fact! John Bull has awoke from his occasional dozy state—has rubbed his eyes—yawned—and being now thoroughly awakened by a book called "The Permanent Way and Coal-burning Locomotives of European Railways," by Zerah Colburn and Alexander Holley, of New York, is prepared to give it his attention. The combined British press have read it, and are now all commenting on it with somewhat of surprise. They find that our railway system, although bad enough, is not so terrific as they have pictured it, and the English newspapers are able to see many faults in their own system when they look at it with American spectacles. It has long been a prevalent idea in the "old country" that an American railway was a trap to catch passengers, and when it got them they were generally landed, not at the place whither they had paid to go, (except by accident,) but in a coffin. It was a common notion, that to "run off the track" was the rule; to keep on it the exception. Our great works had been heard of, but by the privileged few; so now that our works, system, expenses, &c., are explained and compared with European ones, the old gentleman is astounded that we stand comparison so well. We shall be able to put forth a much better account shortly, for our railways are improving daily, and then we shall propose another comparing of notes, when we hope we shall astonish John a little more. It's very odd, but we are always *astonishing* the old gentleman. He does not comprehend the Yankees, and we doubt if he ever will.

New Inventions.

Improved Rock Drill.

L. White and J. T. Bumgarner, of Davenport, Iowa, have invented, and patented this week, a new rock drill, which is operated by giving it its driving power by means of a ratchet and screw. The working parts are connected with a swinging or adjustable frame, so that the drill is operated by a positive movement, the feed motion rendered capable of being graduated as desired, and the drill allowed to be placed at different degrees of inclination according to the work to be performed.

Improved Turning Lathe.

This is an improvement in that class of turning lathes which are designed for turning by automatic mechanism beaded or ornamental work, chiefly in wood, such as stair and other balusters, newels, bedstead posts and the like. The invention is more especially applicable, and in fact is, an improvement on a turning lathe for which Letters Patent were granted to this inventor, Oct. 10, 1854. In the patented lathe the work produced is perfectly circular or cylindrical, that is to say, the beaded configurations can be cut or formed on cylindrical sticks only, numerous sections of which are all circles concentric with one another. The object of this invention is to produce the same character of ornamented work as the patented lathe above alluded to, but on sticks of oval or polygonal as well as those of cylindrical sections. The inventor is Albin Worth, of Stapleton, N. Y., and a patent was granted for the improvement this week. The claim will be seen in another column. Messrs. Carpenter & Plass, 475 First avenue, this city, will furnish the lathe.

New Corn and Cob Mill.

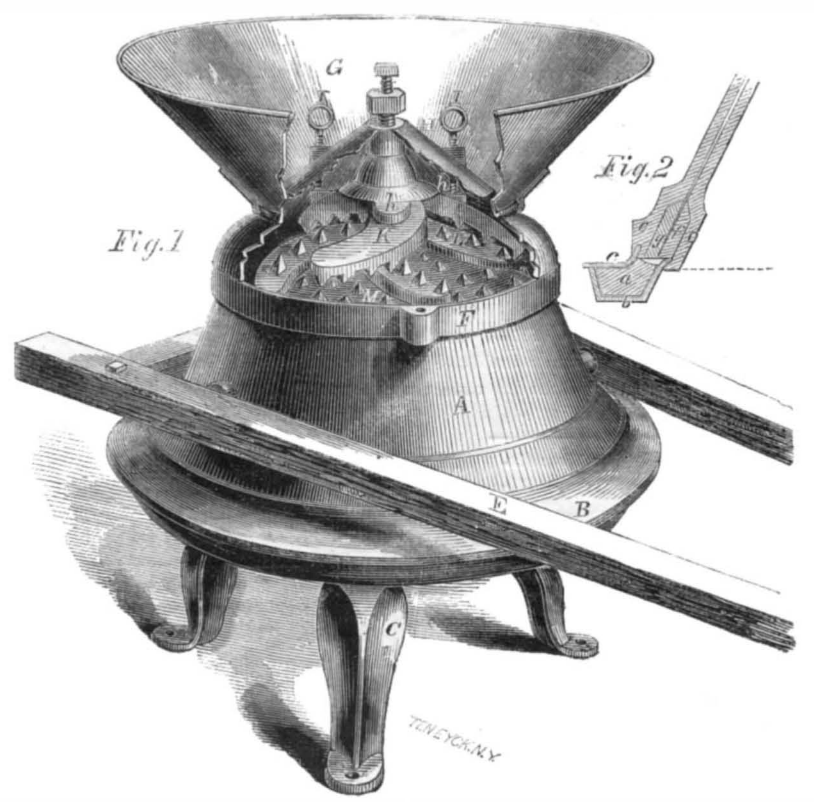
This mill is constructed of iron, and combines in itself many improvements, the parts being connected together in the simplest possible way, and all are kept thoroughly lubricated. The crushing action takes place near the center, so that much power is saved, and an adjustable feed plate is added to regulate the amount of small grain supplied to the mill, and prevent its choking or clogging.

In our engravings, Fig. 1 represents a perspective view of the mill with part broken away to show some of the working parts. A is the shell of cast iron on a stand, B, and supported at a proper hight from the ground by the legs, C. E are the shafts to which the animal is attached that is to rotate the shell and to operate the mill. F is a cap plate also of cast iron, to which is attached the hopper, G. H is the adjustable feed plate, which can be raised or lowered to admit more or less small grain by the screws, I, that pass through nuts or threaded perforations in H, and rest on small projections, *h*, on the top cutter. If the ears of corn to be ground have the corn and cobs together, the plate H is removed, and they are filled into the hopper, G. The shell, A, is then rotated, and the ears are crushed by the cutters, K L M, near the center of the mill, the ears in consequence of the rotation of the hopper being kept in constant agitation. The crushed ears pass down between the shell and the crushing surface, M, and are further ground by passing between the detachable grinding surfaces, *f g*, seen in the section, Fig. 2.

The shell, A, and arms, K, can be raised or lowered to grind finer or coarser feed or flour while the mill is in motion by turning a handle on the central shaft, and the hub seen just behind *h* forms an oil cup that keeps the parts thoroughly lubricated. When small corn is to be ground, the plate, H, is placed on the central axis, and supported at the proper hight by the screws, I, so that there will be a sufficient space between it and the hopper to admit a proper amount of corn into the mill, and prevent it getting clogged.

There is an addition to the mill, not shown in Fig. 1, but seen in Fig. 2, in section, of an annular conducting trough or spout which will discharge the meal in a vessel prepared for it, and hinder it from being blown away by the wind. *a* represents the bucket, *b* the annular trough or spout, *c* the lid on which the buckets are cast, and which rotate with the shell. D is the cone, *e* is the shell, and *f* and *g* are the detachable grinding surfaces.

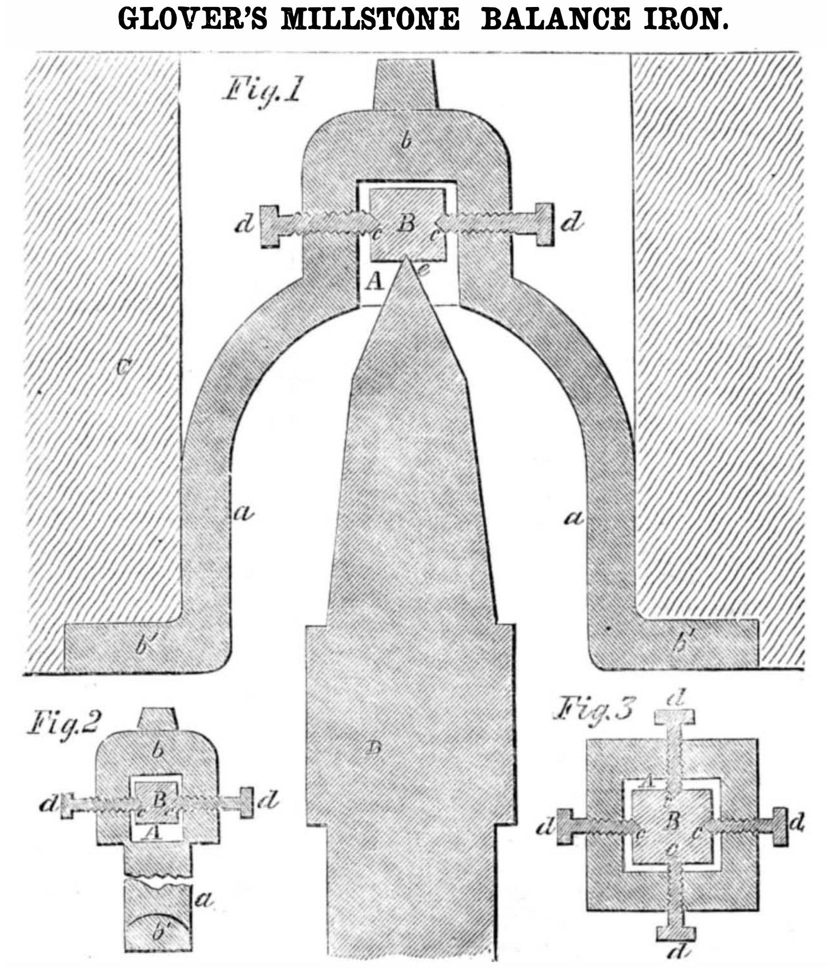
SCARLETT'S CORN AND COB MILL.



There is an opening in the trough through which the meal falls into the vessel, and the buckets are about six inches apart, the whole forming an excellent discharge spout.

This is a truly good, portable mill, cheap, convenient and strong, and is the invention of Wm. Scarlett, of Aurora, Ill. It was patented June 29, 1828, and the inventor will be happy to afford any further information on being addressed as above.

GLOVER'S MILLSTONE BALANCE IRON.



The ordinary or common bail used as a bearing for millstones is permanently secured in the eye of the stone, and when a new center hole is required, the balance iron has to be detached from the stone at considerable expense and trouble, and then replaced in the stone, and balanced by adding weights on the light side, an operation that is extremely troublesome. By the improvement which we are about to describe this inconvenience is entirely removed, and the stone being more perfectly balanced the quality of the flour is much improved.

Figs. 1 and 2 are vertical sections of the improvement taken at right angles to each other, and Fig. 3 is a detached view of the adjustable block. C is the running stone, and D the spindle on which it is supported. The balance iron is formed with two or four legs, *a a*, connected at their upper ends by a cross-bar, *b*, which forms the box, A, seen in Figs. 1 and 2. The balance iron may be made of wrought or cast iron, the former being preferable. The lower ends of the legs are turned outwards as at *b′*, and on the projections thus formed the stone rests, they are rounded at their upper surface (Fig. 2), so that the stone lays as it were upon their centers, and at the same time be on a plane with the point of the spindle, D.

Within the box, A, a block, B, of steel or other metal is placed, and it is somewhat smaller than the box. A groove, *c*, is made horizontally around it, and through each side of the box, A, set screws, *d*, pass, their ends fitting into the groove, *c*, in B, and keep B in its place. The lower surface of B has a center hole, *e*, made in it to receive the point of the spindle.

It will be seen from this description that by adjusting B laterally by means of the screws, *d*, the stone may be kept properly balanced without disturbing or loosening the iron, *a b b′*, that is made fast in the stone.

This improvement is the invention of J. H. Glover, of Temple Hill, Ky., and was patented by him Dec. 1, 1857. The inventor will, on being addressed as above, be happy to to afford any further information relating to rights or other matters.

Improved Life-Preserving Vest.

Of the many devices intended to preserve life, in case of accident at sea, there is probably not one which is so likely to be generally adopted as Delano's life-preserving vest patented this week. Uninflated it is an ordinary vest, and can be made of any pattern or material the purchaser may like, and when inflated it will sustain the wearer in the water for any length of time. In ten seconds it can be sufficiently inflated to sustain two hundred and fifty pounds weight, and after extensive and severe practical tests, it has been found to fulfil the inventor's most sanguine expectations. The interior of the vest between the outside and lining contains an india-rubber float, which is so strongly and ingeniously made and fitted that the enclosed in them cannot escape except at the will of the operator. The invention has also been adapted to ladies' dresses. They are manufactured and sold by L. L. Moore & Co., 283 and 285 Canal street, this city.

Electricity in Surgical Operations.

It may be interesting to our readers to hear that some observations have been made during the last few days, by Mr. Marshall, at the University College Hospital, London, on the efficiency of the electric current in benumbing parts submitted to surgical operations by the knife—the idea involved in these trials being, of course, derived from its alleged advantages in tooth-drawing. As many as nine operations requiring incisions of various kinds, including cases of abscess, carbuncle, and the removal of an adipose tumour, have been performed between the 9th and 14th of September. Excepting where the current employed appeared to be too strong, the pain of the incisions appears on the whole to have been so modified as to be more bearable than is usually the case. In one instance, that of an adipose tumour, the cuts were very slightly painful. There was no instance, however, of complete anæsthesia; and it would be premature to flatter ourselves that, in regard to the effects of electricity in cutting operations, anything more than a modifying influence had yet been certainly obtained.—*The Lancet.*

To our Southern Subscribers.—E. L. Snow, who has for some years been connected with the New York *Albion* as its traveling agent, will receive subscriptions for the Scientific American throughout the Southern States. Mr. S. is a reliable gentleman, and is fully authorized by us to take subscriptions for our paper and to give receipts. We make an exception in favor of Mr. Snow, as it is understood that we do not employ agents in the above capacity.

Scientific American.

NEW YORK, NOVEMBER 20, 1858.

What we Breathe.

We would as naturally revolt at inhaling impure air as at drinking unclean water, if the former element were as observable to the senses as the latter. But although air cannot be viewed with the faculty of vision, modern science has thrown a flood of light upon the subject, for our guidance in its use. Carefully collected facts prove that more sickness results from breathing impure air than is generally supposed; and science explains the cause of this. A committee appointed by the legislature of New York, to enquire into the sanitary condition of this city, has recently elicited evidence from the most respectable physicians in respect to the evils arising from the absence of such rational sanitary regulations as should arrest the attention of our people.

A single fact in reference to the cities of London and New York will form a basis for careful thought on this subject. The population of the former city must be very nearly 2,500,000, while that of the latter cannot be over 800,000. In 1857 the number of deaths in London was 56,785; in New York, 23,196. The number of deaths in London would have been 72,487, if the ratio had equaled the number in New York. No city in the world is supplied with better water, and a more natural drainage than New York; while in London the water supplied to the inhabitants from the New River is poor, and that famous Thames—foul even in the days of Sir John Falstaff—is now at low tide little else than a pot of stench. Nature has probably done more for New York, in a sanitary point of view, than for almost any other populous city, and it is strange that the proportion of deaths should be so largely in excess of those in the great English metropolis with its apparent natural disadvantages. It is notorious that the streets of London are kept much cleaner than those of our own large cities; and the denizens of the former are not compelled to breathe the foul exhalations that rise from the decaying vegetable and animal matter so common in the lower streets of this city. Our authorities are to blame for this state of things; they seem to be afraid to enforce the law against those dirty people who are constantly violating its provisions with impunity.

The sanitary committee to which we refer has obtained much testimony upon a vitally important subject—ventilation. It is somewhat hackneyed, it is true; but in spite of this, we are exhibiting to the world a most pitiful spectacle of blindness and indifference to its importance, in the construction of our public and private buildings, counting-houses, workshops, railroad cars, and steamboats. We have it from undoubted authority that, in the construction of one of the most splendid church-edifices in the Fifth-avenue of this city, so little attention was paid to ventilation that, when its doors were closed, the building was hermetically sealed.

A great quantity of fresh air is continually demanded to maintain life in a healthy condition; thus, for instance, a man of large lungs inhales about 25 cubic inches at each respiration, and breaths eleven times every minute, thus requiring 9½ cubic feet every hour. People *can* live in an atmosphere considerably vitiated without being aware of the fact, so far as their sensations are concerned; and here lies the danger. When we enter a warm close room on a cold day, the atmosphere is at first repulsive and oppressive, but these sensations gradually wear off, and, in a short time, we breathe freely, and feel unconcerned about the quality of the air. Science reveals the fact that the system sinks in action to meet the conditions of a vitiated atmosphere, but it does this at the expense of having the functions of nutrition and secretion gradually depressed; and when this is continued for a considerable period, disease follows as a natural result. In Russia, where the houses are kept close and hot during winter, lingering fevers are common; and in our own country, during the same period of the year, scarlet and typhus fevers are frequent, but the great evil is pulmonary disease.

The air which we breathe is composed of 21 parts of oxygen and 79 of nitrogen, with a trace of carbonic acid; the nitrogen being merely a dilutent, while the oxygen alone enters chemically into the system. The lungs require pure air, or their delicate tissue will suffer injury. In mechanical construction they are divided into 600,000,000 minute cells, some of which are only the 1-200th part of an inch in diameter. The capillary blood vessels run between the air cells, thus exposing them to the air which is inhaled on two sides, like steam to cold water in some steam condensers. The air which is respired is kept for a brief space in the lungs; then the oxygen passes through the thin membrane into the blood, as through a sieve, and the carbonic acid gas is given out from the blood in exchange. This action should convince every person that an impure atmosphere drawn into the lungs must be injurious. The carbonic acid gas given out from the lungs vitiates the atmosphere, and when on equal proportions to the oxygen, it arrests life. The ancients were unacquainted with the chemistry of respiration; they supposed that the air cooled the interior of the body when drawn into the lungs. The function of respiration is a discovery of but recent date; and as we are so dependent upon *what we breathe* for the preservation of health and life, it is a subject of vast importance to all. As winter is approaching, when it is so common to exclude the cold atmosphere from houses, and to keep apartments close and suffocating, we exhort our people to look well to this question, and to provide such measures as will always ensure them a pure and unvitiated element of respiration.

The Potato Rot—Conflicting Opinions.

Want of time and space have alone prevented us from pursuing this topic, which we endeavored to elucidate on page 408, Volume XIII. of the SCIENTIFIC AMERICAN, at an earlier date, for as a consequence of that article we have been almost overwhelmed with correspondence on the subject. The many letters which we have received from all portions of the country, confirmatory of Mr. Henderson's observations, convince us that our advice, namely, that all should investigate for themselves, has been followed out to a great extent, and our own opinions have thereby been indorsed. We have, however, two objectors, who, with candor and talent, meet us in opposition to the fact—the one that an insect called the *Phytocoris Linealaris* is the culprit—the other that Mr. Henderson's remedies will not cure the rot, and denying that it is caused by any insect at all. The gentleman who first wrote to us on this subject was the Hon. Lyman Reed, of Baltimore. We stated that he had not suggested any cure, not considering that the one proposed in his patent of July 27, 1858—the claim of which will be found on page 379, Vol. XIII., SCIENTIFIC AMERICAN—was sufficiently practicable ever to be adopted; but as he wishes us, we will now give the gist of his recipe for the prevention of the disease, which is as follows:

The potatoes for seed must be carefully selected, and should be above the medium, and nearly all of an uniform size. These must then be spread thin upon shelves in a close chamber, where the temperature is kept from 80° to 100° Fah., by solar or artificial heat for three weeks, and the potatoes turned daily, if possible. This process develops the insects. To kill the articulate destroyers, the potatoes are then to be soaked from 18 to 24 hours in a liquid composed of pot ashes, fish oil, and water. They are then dried two or three days, and are ready for planting. That this process will kill any insect we have no doubt, but Mr. Reed's plan involves nearly a month of extra labor, while Mr. Henderson's does not require any more labor and no more time than is ordinarily devoted to the cultivation of this esculent. We would ask which of the two processes is most likely to meet the approval and adoption of the farmer?

We are not willing to enter upon an entomological discussion as to the identity of the insect, whether it be really an *Aphis* as Mr. Reed maintains, or a *Phytocoris*, as Mr. Henderson asserts, having given our opinion in the former article, and a continuance of the subject would, we are afraid, keep much matter more generally interesting from our columns; but this we can say, that, in the Letters Patent of Mr. Reed, the terms, "order, class, genus, and species" are used with a convertible meaning wholly unauthorized by any system of comparative physiology with which we are acquainted. In dismissing with Mr. Reed's objections to our article, we can only apologize for not having previously published his remedy; but having now done so, we suppose that we may cry quits!

Our other objector, writing to us from Chicago, Ill., meets us on broader and other grounds. He confesses that he cannot understand the tastes or habits of the pest, nor comprehend how an insect born underground in a dark and close vicinity should suddenly become a denizen of air, upon the plant above the soil. Perhaps the chrysalis and butterfly may suggest some of the wonders of insect life to our correspondent, or the development from the aquatic *larvæ* of the gorgeous dragon fly. He traces the potato rot to atmospheric causes *entirely*, in which he is most assuredly wrong, although in connection therewith he makes some valuable suggestions. The most important are, that the seed and saleable crop should be cultivated separately; they should be planted early, and these as dry varieties as possible, and upon the driest land. To sum up, not having space to enter more fully upon the subject, we can only say that with the exception of the two gentlemen whom we have mentioned above, every letter we have received has tended to confirm us in the correctness of our position, and to convince us more strongly than ever of the general accuracy of Mr. Henderson's observations.

Clay and its Uses.

There are few substances more useful than humble clay. It is employed to construct our houses, in the form of bricks; and, under the names of china and stone-ware, it assumes the most varied and beautiful configurations in vessels and articles employed in every household. When we reflect on the varied uses of clay, it becomes an exalted material in our estimation, because it is indispensable to the supply of so many wants. Yet although it has been employed in the arts from time immemorial, its composition and qualities are not very generally known. Clay is the product of several kinds of rocks; its character being determined by that from which it is derived. It is generally found as a sedimentary deposit, having been disintegrated from rocks by the action of water and the atmosphere. Common blue clay is the product of slaty rocks, and is a mixture of the oxyd of the metal aluminum and impalpable silica or sand. It is the aluminous oxyd which renders it unctuous and plastic when moist, and capable, in that state, of being molded into any form. The common clay used in making bricks contains a little oxyd of iron; this, when burned, imparts to them their peculiar red color.

The manufacture of bricks in our country is carried on very extensively, involving the investment of an immense aggregate capital, and the employment of many thousand operatives. Within the past fifteen years, machines have superseded hand-molding in brick-making, in large yards. All articles made of clay, when exposed to a very high temperature, such as burning in a kiln, acquire the hardness of the rocks of which their materials once formed a part. Clays which contain an alkali and iron, readily fuse at a high temperature, whereas neither alumina nor silica fuse, when unmixed with other substances. Burnt bricks are simple cubes of clay submitted to pressure in molds, and gradually dried, to evaporate the moisture slowly; then they are exposed to a high heat in the burning process. As clay shrinks greatly when it is being dried and burned, articles made of it must be *fired* very carefully, or they will break in pieces or become distorted in form. For this reason, bricks, when molded, are first dried slowly in the sun, before they are burned; during wet weather, therefore, this business cannot be carried on in our country in the common way. On another page of the present number of the SCIENTIFIC AMERICAN there is a communication from Mr. F. H. Smith, of Baltimore, in which a new method of drying brick is described, which will render manufacturers independent of atmospheric irregularities.

Potter's clay for stone-ware contains 43·5 parts of silica; alumina, 32·2; lime, 0·35; iron, 1; water, 18. This clay is infusible in a porcelain kiln; it only indurates in firing. The glazed face of stone-ware is made by a fusible composition put on the surface.

Kaolin or porcelain clays are generally found in beds or seams among granitic rocks, from which they have been disintegrated. They contain no iron—feldspar is their base. Most of the stone-ware and fine porcelain which come into our country from abroad are manufactured in Staffordshire, England, where $10,000,000 worth of articles are made annually, three-fourths of which are exported—mostly to America. English porcelain is cheaper, but it is inferior to the French. As the gilding and ornamenting of china-ware greatly enhance its value, and, of course, increase the tariff dues on it, much plain porcelain is now imported into, and afterwards decorated in, this city.

Fire clay is composed of alumina and silica; and bricks made of it are very refractory. Those used for our household stoves are exhorbitant in price, and are generally inferior in quality, as they are liable to fuse in burning what is called "red ash" anthracite coal, which contains a little iron. A stove can be lined in a more durable manner with potter's clay than with fire-brick, at one-third the cost. It is applied by plastering it on the metal, and allowing it to dry slowly afterwards. This information may be useful to many of our readers, who can readily obtain such clay.

Doing Good.

We have received a report from Mr. Wiegand, superintendent of the Newsboys' Lodging-house, from which we find the number of lodgers during the year, were 15,308, and the total receipts for the year have been $1,029 47. It is a pleasure to contemplate this real good, as it not only gives the boys a supper, clean bed, and instruction, but also keeps them from vices and places where nothing save filth and wickedness can be got. The Childrens' Aid Society take it under their wing, and we do not think that a better and more practical method of following out the precepts of the Great Teacher has ever been devised.

A Peculiar Place.

In a recent address, by the Hon. T. L. Clingman, before the North Carolina State Fair, he described a district beyond the Tryon mountain in that State, in which neither dew nor frost is ever known. It is several miles in extent; the atmosphere is exceedingly dry, and the people who reside there are very healthy. It produces grapes of great excellence, and they may be found hanging in clusters in the open air, as late as December.

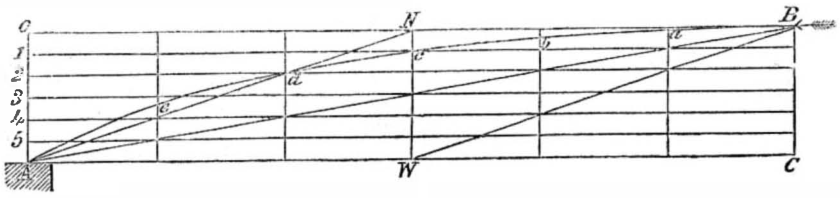
We were happy to receive a call on Saturday last, from the Hon. Charles Mason, Ex-Commissioner of Patents. He is looking remarkably well, his health having improved since his release from the arduous labors of official duty.

Iron Girders.—No. 4.

MESSRS. EDITORS—The curve of equilibrium resulting from the pressure of a load uniformly distributed, is the same in beams and girders as in arches similarly loaded. This curve is said to be that of the common parabola, and that the straight line, N A, representing the resultant of all the forces, must be tangent to the curve at A, their point of concurrence.

That the curve of equilibrium in beams, girders, and arches is the same, is, undoubtedly, true; but that it is parabolic, and that the resultant, N A, is tangent to the curve, may well be doubted; for this curve and straight resultant bear similar relations to the component forces, and therefore both require similar central positions. It should, in fact, be the same as near as the curve can be made to coincide with the straight resultant. The reasons for this will appear more clear by constructing a rectangular parallelogram on the diagonal, A B,—A the bearing under the end of the beam, and B the middle of its upper side.

Suppose this diagram to represent a half length of a girder sixty feet long and five feet deep. Then suppose the beam or girder to be uniformly loaded with 1,000 pounds to each foot of its length; the load on this half length will be 30,000 pounds, and this is sustained by the bearing at A; and supposing this pressure to be represented by the length of the vertical, A O, then as the load is uniformly distributed between O and B, its center of gravity must be at N; therefore the vertical, N W, which is the same length as A O, may be taken to represent the pressure or load of 30,000 pounds. Then on N W construct the parallelogram, A N B W, and the side, N B, will represent the horizontal pressure at B, and A N, the resultant of all the forces, will represent by its length their magnitude, and by its position the direction of their action at A; then, as N W represents by its length a vertical force of 30,000 pounds, N B by the same scale will represent 90,000 pounds, and A N about 95,000 pounds. But these straight sides of the parallelogram represent the intensity and direction of the forces or strains at these angles only, but not at intermediate points. Still, with such clear and well defined data, the further consideration of this question becomes comparatively simple;



for, considering that the pressures at B and A are produced by the vertical action of the entire load distributed between O and B, it is only necessary to suppose B a material point, and urged in the direction towards O by a force equal to a constant energy of 90,000 pounds, that while moving in this direction it shall encounter the vertical forces due to the load, which shall accumulate at the rate of 1,000 pounds to each foot of horizontal distance overcome, it will be gradually so diverted from a horizontal direction as to reach the opposite end of the parallelogram at A. The course through which the point, B, will thus move, will, without doubt, form an equilibriated curve, and may be found by dividing the parallelogram, O A C B, vertically and horizontally, into any number of equal parts, say six, and considering each horizontal division as O 1 1 B, as a distinct rectangular parallelogram; then proceed to resolve the vertical and horizontal components of each into resultants that shall represent the axis of all the forces in their true relation to each other. The position of the first point in the curve, as *a*, may be found by drawing a diagonal through the first parallelogram from B to 1, and the portion of the diagonal between *a* and B may be regarded as the resultant of the horizontal component, B, and of the vertical action of the one-sixth part of the load situated between B and the first vertical division, and where the diagonal crosses this division, as at *a*, there will be the first point in the curve, and the point, B, thus augmented, may now be supposed to be situated at this point, and acting in the direction of the diagonal, B 1. Then draw another diagonal from this point, *a*, to 2 in the second parallelogram, and at its intersection of the next vertical division at *b*, will be the second point in curve, where the point, B, will act in the direction of the last diagonal, with its energy still further augmented by the vertical action of the portion of the load situated in the space between *a* and *b*; and continuing the operation in this way, the points, *c d e* and A, may be successively found. At this point, the horizontal component will still be equal to 90,000 pounds, as A W, while the vertical component has become equal to A O=30,000 pounds, and the resultant is equal to A N= to about 95,000 pounds, acting in the direction of its length, while the axis of the forces at intermediate points between A and B, will pass through *a b c d e*, and a line drawn through these points will form the curve of equilibrium, and as the horizontal thrust or tension at A is known to be precisely equal to tho pressure at B, the intensity and direction of the action of the forces at A must be the same whether conducted to this point through a curved or straight line. This being the case, the question arises, can the forces acting through any curve to which the resultant, A N, may be tangent, have the same effect at A as they would have if acting through N A? Or should the curve, in order to be truly equilibriated, pass through the resultant as at *d*, and again return to it at A, as in the diagram? Now, if the action of all the forces were really concentrated in the material point B, at the moment it is supposed to reach A, then the direction of their action at the same instant might be represented by a straight line that is tangent to the curve at this point. But this is not so in a beam or arch; for while this point is supposed to act at A with an energy equal to about 95,000 pounds, this action can be maintained only by a constant corresponding and nearly uniform action at every other point within the length of the curve, all of which must be held in equilibrio at the same time. The curve, therefore, in order that it may be truly equilibriated, must be such that a straight line or axis passing through the center of gravity of all the forces held within its length shall coincide with the resultant A N. Then, and then only, will their action at A be the same in all respects, whether conducted to this point through the curve or through the straight lines. Therefore, the resultant N A, which must be in a central position as regards the forces, cannot be tangent to the curve in which the forces are held in equilibrio, but must come within it, as represented in the diagram. Such a curve certainly has a more equilibriated appearance than the tangent and parabolic form, and possesses withal several important practical advantages. First, It admits of the upper chord formed on this curve being united with the lower chord over the bearing under the ends, as it should be, and will yet leave sufficient vertical depth near the ends of the structure, where the parabolic form is universally admitted to be deficient. Then its formation is so exceedingly simple that it may be done by any good practical mechanic; all the points required for its formation come within the parallelogram. It is only necessary to divide it vertically and horizontally into any number of equal parts, the more the better, and then draw a straight line from B to 1, and its intersection with the first vertical division, as at *a*, there will be the first point in the curve. Then from *b* draw a line to 3, and so on through all the divisions. Then place pins in all the points, A *e d c b a* B, and bend a flexible strip around these pins, and mark along the inside of the strip, and the curve will be complete. This curve should be the axis or center of the upper chord of a beam or girder.

BENJAMIN SEVERSON.
Baltimore, Md., October, 1858.

New Weapon of Defense.

The London *Daily News*, in speaking of a new weapon of defense, says:—Seeing that we cannot rifle our cannon, because of the mass of metal we have to deal with, Sir Charles Shaw proposes to divide our cannon itself as well as the shot. He replaces the field piece, cannon or howitzer, by a row of rifle barrels, twenty-five in number. These are accurately placed on the same level, each barrel diverging slightly from the central one, so that the volley of rifle bullets discharged by the barrels will cover five yards at a distance of 800 yards. Sir Charles Shaw's rifle battery is a reproduction of Fieschi's infernal machine, placed on wheels, and made lighter than a light brass nine pounder gun.

Conceive a battery of horse-artillery with four of Sir C. Shaw's infernal machines substituted for their guns. What battery of field artillery, what troop of horse, what battalion of infantry could withstand their deadly shower of Minie balls? The cannon or howitzer requires nine men at least to serve it, and it must be dragged by four or six horses; the rifle battery requires but two men to load it, and one to fire.

[The above is not an improvement in weapons of war, but the very reverse, and the dignity of Sir Charles Shaw does not save it from futility. It does not, as stated in the above extract from the London *Daily News*, take the place of a howitzer or light field piece, because it has not the power of discharging such heavy balls, and it is not so efficient for actual service as a single-barrelled breech-loading or revolving rifle, which can be carried by one man. A single-barreled breech-loading rifle can be loaded and fired as rapidly by one man as the 25-barrelled battery of Sir Charles Shaw, which is placed on wheels, therefore 24 of its barrels and its wheels are useless—a mere incumbrance to an army. And we must also add that there is little that is new in this so-called "new weapon of defense." Our own government has learned something by experience in this line. About twelve years since, a number of musket batteries, upon the same principle nearly, were constructed for government use, but they were soon condemned, and we saw them afterwards sold for old iron.

Chinese Vegetable Cheese.

As food for man and beast, beans and peas are highly nutritious, from the quantity of casein which they contain—which is about one-fourth of their weight. The Chinese make cheese from the casein of peas. The peas are boiled, and coagulated by a solution of gypsum. The cheese gradually acquires the taste and smell of milk-cheese. It is sold in the streets of the large cities, and forms a considerable article of the food of the people.

There is a large white pea used in China for obtaining oil, and in which an enormous trade is carried on at Shanghae and the Northern Chinese ports. These peas are ground in a mill, and then pressed in a somewhat complicated, though most efficient press, by means of wedges driven under the outer parts of the framework with mallets. The oil is used both for eating and burning (more for the latter purpose however); and the cake, like small grindstones, is distributed about China in every direction, as food for pigs and buffaloes.

Sevastopol—A New Pump Wanted.

Two American companies entered into engagements with the Russian government to raise the ships which were sunk in the harbor of Sevastopol during the Crimean war. One of these companies, from Boston, gave up the enterprise last year, and returned, having made a failure of the business. The other company, from Philadelphia, has continued steadily at work, and success has attended its efforts. A very intelligent correspondent of the New York *Tribune*, writing from that city on the 1st of September, states that they have raised the *Empress Catherine*, 120 guns; *Chesma*, 84 guns; a frigate of 60 guns; the *Lemelia*, a gun brig, and a beautiful steamer which was once the Sultan of Turkey's yacht. The company's share of the profits will be a very large one, and their pay prompt and sure. Although many of the sunk vessels will be recovered, yet he says that "millions worth of property lies buried here which can never be recovered unless some Yankee will invent a windmill pump of sufficient power to empty the Black Sea. As you are given at home to magnificent enterprises, to Pacific railroads, canals, and Atlantic telegraph cables, I shall expect to see in some future number of the SCIENTIFIC AMERICAN a diagram of such a pump. The only requisite is that it shall empty the Black Sea and carry off the water." The correspondent of the *Tribune* is not far wrong in having such strong faith in Yankee pluck and genius. The manner of raising the sunken ships at Sevastopol is very simple and effectual. Two chains of great size are passed under the bottom of a sunken vessel by divers; these are attached to a pair of floating caissons at each side, the valves of which are then opened, and they are sunk to within two feet of the deck. The valves are then closed, and the caissons pumped empty. As the water is pumped out of them, they begin to ascend and lift the sunken vessel with them by their power of floatage. The reports which have been circulated that the hulls of these sunken vessels have been destroyed by the teredo or ship-worm are not correct. The bottom of the harbor is filled with deep soft mud; this covers nearly the entire hulls, leaving only the spars and upper works exposed to the teredo, which does not operate under the mud. The machinery of the steamers which have been raised was very little injured.

Steel Tempering Furnace.

Joseph Thomas, of this city, has invented and patented this week an improved furnace for tempering steel springs. He passes the steel wire or strip of sheet steel which is intended to be tempered, through an opening in a plate of fire clay or cast iron which is exposed to a well-regulated fire on both sides in an upright furnace. This furnace is placed over a small tank containing water or oil or any other hardening liquid, this tank being placed in such relation to an additional fire, that heats two plates of cast iron that the steel spring may be passed from the tank between and be brought to the proper temper without coming in immediate contact with the fires. The claims will be found on another page.

Croup.

At a recent meeting of the Paris Academy of Sciences, the disease of croup—so common among children—formed the subject of very important remarks. Dr. Jodin stated that it was a parasitic affection, and of all simple remedies, capable of removing these parasitical growths, the perchloride of iron is by far the best. It penetrates through the fungus, modifies the hæmorragic state which always exists in the affected parts, and in their neighborhood, and, lastly, obliges the patient to expectorate, by which means the false membrane is expelled, and an immediate cure effected.

In San Francisco, the average number of clear days per annum is 235.

Notes & Queries

*. PERSONS who write to us, expecting replies through this column, and those who may desire to make contributions to it of brief interesting facts, must always observe the strict rule, viz., to furnish their names, otherwise we cannot place confidence in their communications.

JOSEPH W. LELAND, Grafton.—Please to inform us n what State you reside, so that we may address to you a letter. There are eleven Graftons in the United States.

H. S., of R. I.—Soluble glass is advertised in No. 9 of the present volume of the SCIENTIFIC AMERICAN.

RECIPES of various kinds are floating about through the newspapers which the public should be very cautious about using. To be able to detect their character requires a knowledge of chemistry as applied to the arts. Most of the recipes that appear in the SCI. AM, are well known to us, and upon the "Operations in Dyeing" our information is derived from practical experience in the business.

W. B., of Conn.—If you communicate with C. W. Copeland, Esq., C. E., No. 66 Broadway, this city, he will give you the necessary information regarding examinations of engineers for the navy.

J. P. B., of Iowa.—We are glad to hear from you. Get us all the subscribers you can. Your water wheel being ten feet in diameter should have a velocity at the circumference of three feet four inches. If you increase the velocity to five feet, there will be some loss of power, but if you require an increase of speed and can use a little more water, we would advise you to do so.

J. McC., of Pa.—The way to test the actual power of a water wheel is by the dynamometer, an apparatus designed for the purpose, and illustrated on page 384, Vol. VI. SCI. AM.

HOUSEHOLD IMPLEMENTS, &c—Any of our friends who have good patents on household articles, or have good improvements which they would like to get patented, will find a customer in I. S. Clough, dealer in anything, from a cooking-range to a diaper-pin, No. 231 Pearl street, this city.

J. H. C., of Ala.—Metallic crossties have been used for railroads.

J. R. M., of N. Y.—The plow to which you refer was patented in 1848. You are correct in regard to stamping the date upon patented articles. It is contrary to law to omit this, and also to stamp the word "patent" when the article is not so secured.

C. G., of N. H.—The best way known to us for cleaning flour bolts from damp flour is to give them a good stiff brushing. The specks which you find on your bolts, we think, must be mildew. The brush is only a partial remedy which is recommended for this.

H. O., of Ind.—You ask us, "If a gun loaded with a charge of powder—just sufficient to send the ball one mile in a second of time—is placed on a car running eastward at the rate of one mile in a second and is fired westward, will the ball go any distance or not?" This is simply answered: Before the gun is fired, it is carrying the ball eastward at the rate of one mile in a second, and it may be considered as moving at that rate in the same direction as the gun, being a separate body. Now, if the powder be exploded and the explosion has just sufficient force to send the ball in the opposite direction (were it at rest), one mile in a second, then as it is already moving *against* the force of the powder with that same force, the force of the powder will simply enable the ball to stop, and it will drop out of the gun, and not go any distance westward at all. The ball will be found just that distance from the muzzle which the gun itself has moved during the time it took the ball to reach the ground, and no greater. If you can conceive firing the gun from the ball, instead of the ball from the gun, it will enable you better to comprehend the case. To sum up; the force of the powder being exactly equal to the motion already imparted to the body, but acting in an opposite direction, the forces are, therefore, balanced, and rest is the result. If the ball be fired in the same direction as the gun, the moment at which it reaches the ground will be determined by the hight of the cannon from the ground. Thus, supposing the gun to be four feet from the ground, the motion of the gun and force of the powder would give the ball a velocity of two miles a second, and it would reach the ground in just one-quarter of a second, during which the gun would have moved one-quarter of a mile, making the distance between the gun and ball, at the moment of dropping, a quarter of a mile.

THE tobacco crop is a great and growing interest in the Connecticut River valley, 1,500 pounds being the average yield per acre, and it brings 10 or 12 cents a pound.

J. R., of Ohio.—The Patent Office is in the habit of receiving full sized guns and rifles as models on applications for patents. The Office has a fine collection of firearms contributed in this way by their inventors.

S. E. B., of C. W.—If you put some molasses into your steam boiler from time to time, it will prevent scale. Slippery elm bark will also effect the same object. You should also blow off your boiler every night about an hour after it has stopped working, in order to discharge the sediment before it hardens on the metal.

J. M., of Pa.—An invention does not necessarily become public property after its rejection by the Patent Office. The applicant has a right to prosecute in a rejected case on appeal. If the application is withdrawn, then the invention becomes public property in the sense that all claim to its exclusive use is abandoned by the inventor. You will bear in mind, however, that the exclusive right to make, use and sell, is only conferred upon the inventor when the Letters Patent are actually issued.

S. O. M., of N. Y.—We would like to obtain some further information regarding the remedy for diurnal disturbance of the magnetic needle.

G. B., of Ala.—As you remark, the study of alchemy is truly interesting, as illustrating to us the childhood of modern chemistry. The ancients only knew seven metals which they called after the heavenly bodies, and which were supposed to have some intimate connection with their individual properties; thus, gold was called the Sun; silver, the Moon; mercury, Mercury; copper, Venus; iron, Mars; tin, Jupiter; and lead, Saturn.

T. C., of Ky.—Your ideas in reference to an improved arrangement for propelling canal boats seem to be excellent, but bear in mind that in order to secure patents, you must put these ideas into some form or contrivance. We send you one of our circulars of advice.

J. J. N., of R. I.—Your sketch represents a water tank from which water falls upon a wheel, and from the shaft of the latter a belt runs, which works a chain pump that takes up water from the "tail race," and keeps the tank full, using the same water over and over again, and obtaining, according to your assertions, perpetual motion. You also state that a greater amount of power is obtained from the chain pump than the wheel which drives it, as you have pumped the well dry. This is impossible. There will be a loss of power instead of a gain by such an arrangement; and no patent could be secured for it.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, November 13, 1858:—

G. F. G., of Mich., $10; J. S., of Ind., $25; O. & K. of Mass., $30; A. K., of N. Y., $25; J. E. A., of Conn., $25; J. B., of N. Y., $250; J. W. M., of N. Y.. $60; W. D., of L. I., $30; T. & B., of N. Y., $250; J. C. Jr., of N. H., $13; T. B., of N. Y., $25; E. K., of N. J., $25; E. P., of N. Y., $37; J. B S., of Conn,. $35; J. O'H., of Pa., $40; G. D. H., of Mass., $30; P. & C. D. A., of Ala., $60; W. G., of Mass., $30; B. & R., of Pa., $30; H. H., of Iowa, $30; E. K., of Mass., $35; W. S., of N. J., $30; E. M. W., of Pa., $30; T. R. Van G., of Pa., $25; L. & M., of Ill., $25; M. & P., of Ind., $25; D. & S., of Ind., $30; T. & S., of N. Y., $30; G. L. J., of R. I., $32; D. W. H., of Mo., $25; O. S., of N. Y., $60; L. T., of Vt., $30; C. L. R., of Conn., $25; A. J. B., of Va., $30; H. G. D., of N. Y., $30; J. V., of Ill., $35; T. R., of N. Y., $45; G. F. J., of L. I., $25; A. B., 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, Nov. 13, 1858:—

W. W. H., of Ohio; S. K. B., of Ill.; J. S., of Ind.; T. R., of N. Y.; T. B., of N. Y.; M. & P., of Ind.; J. B. S., of Conn.; L. & M., of Ill.; O. E. W., of Pa.; G. F. G., of L. I.; E. K., of N. J.; G. L. J., of R. I.; W. G., of Mass.; J. H. I., of Ill.; O. W. S., of Conn.; J. E. A., of Conn.; A. B., of N. Y.; J. C. Jr., of N. H.; L. B., of N. J.; J. T. H., of Ky.; H. H., of Iowa; B. & R., of Pa.; C. L. R., of Conn.; J. V., of Ill., E. P., of N. Y.; P. S., of N. Y.

Literary Notices.

EVERY WOMAN HER OWN LAWYER. By Geo. Bishop. New York: Dick & Fitzgerald. This is at once a sensible and much needed book. It contains the gist of every law that in any way affects the "softer sex," and informs the ladies how to proceed properly in every legal position in which they may be placed. It informs them how to get a divorce or bind a husband to his duty, and when widows how to act to secure the valuables. It is a great contribution towards female freedom, as it will enable every woman to understand her position should she have the misfortune to be called to a court of law.

AFTER DARK. By Wilkie Collins. Dick & Fitzgerald, No. 18 Ann street, New York. This is a collection of short stories which have been published in *Household Words*, re-arranged as a novel.

A WORD TO OUR PATRONS.

RECEIPTS—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of the receipt of their funds. The Post Office law does not allow publishers to enclose receipts in the paper.

BACK NUMBERS.—It has been our custom in years past to send the back numbers of our paper to all who subscribe during the first quarter of the volume. This system has given satisfaction heretofore, and we shall continue it on this volume, unless the party subscribing orders to the contrary when he remits. Those who do no not care for the back numbers, to render their volumes complete, can have their subscriptions commence at the time of remitting by signifying such a desire.

TERMS OF ADVERTISING.

Twenty-five cents per 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.

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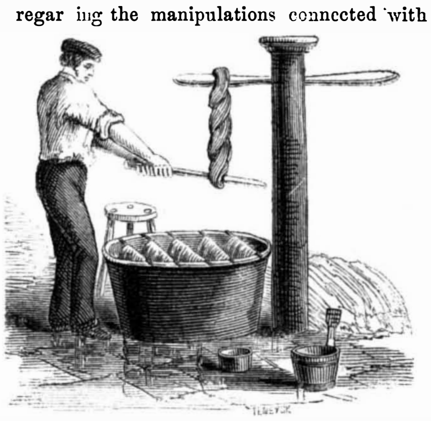
Science and Art.

Operations of Dyeing.

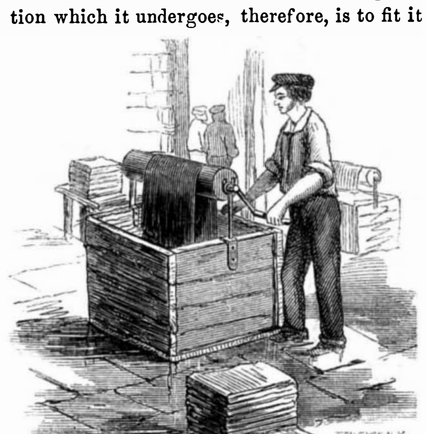
A law of taste, which pervades all classes in every condition of life, urges both sexes to wear garments of various colors. Nature does not furnish the cotton of the fields, nor the wool of the finest fleece, with such hues as harmonize with the laws of coloring; hence, means have been employed from time immemorial to obtain, by art, that which has been denied by nature. Since the publication of a series of articles in Vol. X, Scientific American, on this subject, inquiries have been made several times for information regarding the manipulations connected with



the processes. The accompanying figures represent two different operations. Fig. 1 illustrates the manipulation of yarn or *skein* dyeing; Fig. 2, that of dyeing cotton or woolen cloth in the piece. The operative, in Fig. 1, should stand square before the arm of the post, but this position would have covered the tub.

The art of coloring textile fabrics consists in impregnating them with certain substances which reflect the rays of light, and which adhere so tenaciously to the fiber as to be almost part of their natural composition. This adhesion is called "chemical affinity," and as it regards fugitive and permanent colors, some writers use the terms "solubility" and "insolubility."

Cotton, after it is carded and spun into yarn, is made up into hanks, but will not absorb water, in consequence of being filled with numerous minute air cells. The first operation which it undergoes, therefore, is to fit it



for absorbing water rapidly, so as to take up the dye liquors. The hanks are tied up loosely, and made up into bundles of five and ten pounds, and then put into a large boiler or "keer," and boiled among soft water for four hours. The hot water expels the air from the cells of the fibers, the bundles sink in the boiling water, and even when dried afterwards, they will absorb, and sink in water freely. The next operation, after the yarn is boiled, is to put the yarn on pins—ten pounds on six—wring it as shown in Fig. 1, to expel the water, and shake it out evenly on the pins, ready for dipping int the liquor. We will describe the process of manipulating ten pounds of yarn in coloring yellow. The tub under the arm of the post is first made up to about three-quarters full of warm water; and an ounce of the sugar (acetate) of lead, dissolved in a dipper, is put into the water and stirred thoroughly. The yarn on the six pins is now lifted in the operator's arms, and entered evenly in the liquor in the tub, where the hanks are turned over alternately from end to end over the pins, thus exposing one end intermittently to air and the other to the liquor, until five turns are given to each hank, one after the other, on the post arm; they are then wrung, spread evenly (by shaking) on the pins, and placed in a frame behind the operator, to be exposed for a few minutes to the air. Another tub containing clean warm water is now placed under the opposite post arm, and about one-third of an ounce of dissolved bi-chromate of potash is put into it and stirred. The yarn is handled in this tub as before described, and again wrung out in the same manner, when it is found to be a beautiful yellow, especially if the cotton has been bleached. After this, the yarn is again handled in the acetate of lead liquor, washed, and dried. One, two, three, or four dips are given, according to the intensity of color required. The manipulations for all colors are conducted in the same manner.

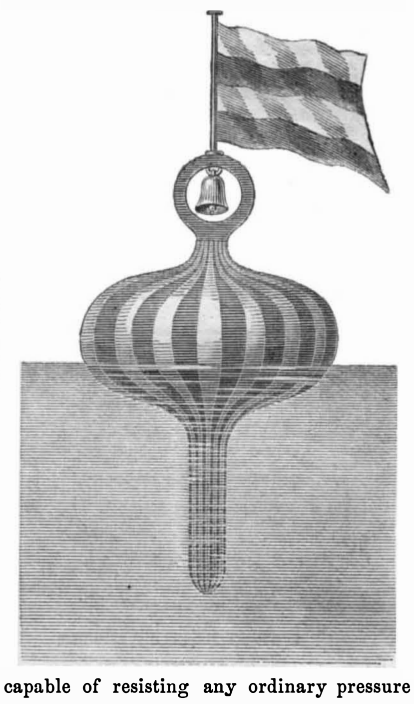
In coloring cotton cloth, it is sometimes *edged* between the hands in tubs, but more generally turned over a reel or skeleton roller, as represented in Fig. 2. Cotton and woolen cloth, in pieces, are operated in the same manner. The operation is represented as being performed in a wooden "dye-beck," heated by a steam pipe underneath; the steam passing freely into the liquor below a false bottom. We will suppose that the operator is dyeing a piece of woolen cloth a Franklin brown color—something of the Quaker shade. This color is dyed in one liquor, and requires no "mordant." If the piece weighs ten pounds, one pound of camwood, ten pounds of fustic, and one pound of logwood are put into a coarse bag, and boiled in the liquor for some minutes; or else the extracted liquor of these dye-woods are put into the dye-beck. The piece is now wound upon the reel, with one end hanging above the boiling liquor; the operator turns the reel, rapidly winding off the cloth into the vessel; and he pushes down the piece under the liquor with a stick which he holds in his left hand. When he has wound off to the end of the piece, he reverses the motion of the reel, and pushes down the cloth on the other side under the boiling liquor. These manipulations are carried on with the cloth for about an hour, when it is found to be impregnated with the dye-wood. The end of the piece is then lapped under a spoke on the reel, and the cloth wound up on it. A little dissolved sulphate of iron (about an ounce) is now added to the liquor; and the cloth is rapidly entered into the dye-beck again, and turned backwards and forwards, over the reel for about twenty minutes longer, when it is again wound upon the reel, which is lifted with the supports, and the cloth drawn off and exposed to the air. Before it received the sulphate of iron, the cloth was only a light brown color; but the iron darkens the shade, because it produces a black precipitate when it unites with the extract of camwood or logwood. The cloth is afterwards washed and dried.

Two different operations have been above described; also the methods of dyeing two colors. Most colors require a preparation-liquor called a "mordant," before the goods are impregnated with the extract of dye-woods. The colors in the goods are produced by the formation of compound salts in the pores of the goods. Cotton is more difficult to color than silk or wool, and its processes are more complicated. The method described for coloring Franklin brown may be carried out by any farmer who makes his own "homespun." He can use a potash kettle or a large cauldron instead of a wooden dye-beck. If he cannot obtain fustic, he may use chestnut burrs, some logwood, and hypernic, and he will produce the same color. Black is dyed on wool with a mordant of the bi-chromate of potash, and a dye liquor of logwood afterwards. Very beautiful brown colors and drabs of various shades on wool are colored with a mordant of the bi-chromate of potash, and with fustic and camwood in the dye bath.

A new mordant is now extensively employed by the dyers and calico-printers in Europe, namely, "stannate of soda," as a substitute for the muriate of tin. It is a most convenient preparation, and should come into extensive use, because it is portable, and sold in the dry state, whereas dyers and calico-printers have to purchase muriatic acid and tin, and make the common mordant themselves—a troublesome and disagreeable operation.

The Gresham Record Buoy.

The dreadful suspense in which the public have been kept in such instances as the *President*, the *Pacific*, the *City of Glasgow*, and many other ships, which, after sailing from a port, have never been heard of again, has inspired a humane gentleman—John Gresham, of Hull, England—to invent what he calls a "record buoy." He makes a present of his invention to the world, and to spread a knowledge of it, we copy the illustration from the London *Engineer*. Every sea-going ship of whatever description should carry one or more, with the ship's name, port, master, and registration number painted distinctly on them, so that when found it would be known to what ship it had belonged, even if there was no record within. They would be provided with a chamber and small spring valve in the upper part, opening outwards, and



capable of resisting any ordinary pressure Within this hollow space or chamber it is proposed to insert a slip of paper or card, or any other document, and even property, if made large enough, when all hope of safety and rescue shall fail, and at the final sinking or breaking up of the ship, the buoy would float off, with the probability of being picked up at some time.

The record buoy is intended to be made of strong copper, of sufficient size to be applicable to the purpose, painted as indicated in the illustration, in bright red and white stripes, and fitted with a small bell and flag on the upper part.

There are several advantages to be derived from the use of this buoy, and amongst others, three of importance, viz: firstly, the mournful satisfaction to surviving friends and relations of being informed of what has befallen the ship and crew. Secondly, satisfaction to insurance companies and the insured, that the ship and cargo are really and for ever lost. And, thirdly, the light which may be thrown on science, as such records would probably explain the cause of accidents, and the circumstances attending them—for instance, whether owing to the build and want of strength in the ship, failure in machinery (in case of a steam vessel), or having struck on an iceberg or stranded on a rock.

In case also of imminent danger to a ship, these or similar buoys might be set afloat with the chance of being picked up, containing a description of their situation and danger, thereby giving a chance of relief. They would replace glass bottles, so often used, in case of accident, and have more chance of being picked up, and be less liable to injury, To induce a ship to pick it up when seen, a reward should be given for every one brought into any port. A similar buoy was brought into our office by an inventor four years ago. He proposed to place the mails and valuables inside, and when the ship became in great danger, the buoy might be thrown overboard, and thus its contents would be saved. The Board of Underwriters, however, frowned on the inventor, and the idea dropped through, to be adopted and put in practical operation on the other side of the Atlantic.

Physicians in America.

In New York there is one physician to every 610 inhabitants; in Massachusetts, one to every 605; in Pennsylvania, one to every 561; in North Carolina, one to every 802; in Ohio, one to every 465; in Maine, one to every 884; and in California, one to every 147. We can envy Maine, and pity California, for some must swallow physic at a frightful rate in the Golden State. The whole number of physicians in the United States is 40,481.

The force which holds the atoms or minute particles of matter together which form the substances found on this earth, is called the "attraction of cohesion." Upon the shape of these atoms there has been much philosophical discussion, and it is not yet decided, some saying that they are round, others maintaining that they are square; but of their existence there has been no doubt since Dr. Dalton first argued the necessity of their being.