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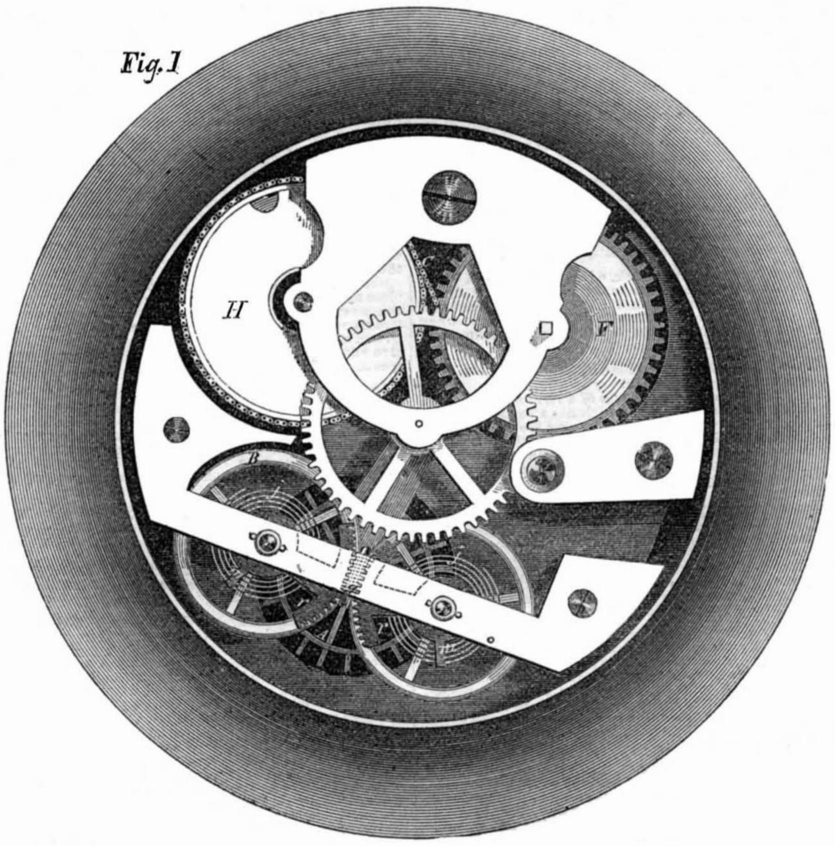
IMPROVEMENTS IN WATCHES.

Fig. 1



Improvements in Watches.

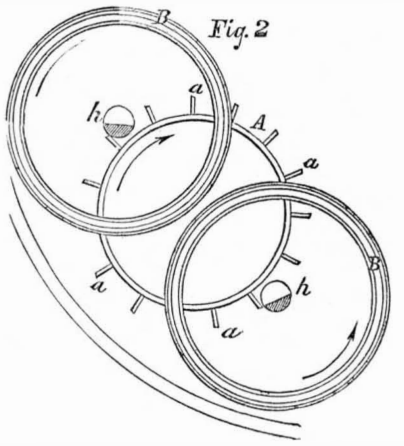
The first of these improvements consists in an escapement of novel character, which is not influenced by shaking the watch, and is, therefore, more regular in its action than any of the existing or known forms of escapement. A second improvement consists in a novel device for compensating for the tendency to variations of the balance consequent upon changes of temperature. And a third improvement consists in certain novel arrangements of the barrel, main spring, fusee, and chain, for the purpose of reducing the friction on the fusee pivots, and equalizing the friction on the barrel.

The invention is illustrated in the accompanying engravings, in which fig. 1 is a plan of a watch movement with the improvements. Fig. 2 is a separate diagram of the escapement.

A is the escape wheel, having its teeth, *a a*, beveled inwards, in the direction of their revolution, which is indicated by an arrow in fig. 2. B B are two balance wheels, each having a hair spring, *j*, applied in the usual manner. These are arranged with their axis on the same plane with the axis of the escape wheel, and on opposite sides thereof, and are supposed to be geared together, to oscillate in opposite directions by very fine teeth. These teeth, which are not exhibited in the drawing on account of their extreme fineness, are to be cut and finished in the most accurate manner known, so as to work together with the least possible degree of friction, and without lubrication. On the staff of each balance is a cylinder, or, more properly speaking, a segment of a cylinder, *h*, which is concentric to its respective balance, the versed sine of the said segment being about equal to one-third of the diameter of the cylinder, of which it forms a portion. Each balance receives in its turn an impulse from the escape wheel, by a tooth of the escape wheel working across the chord of its cylindrical segment, *h*, and giving motion, by the gearing, to its fellow in an opposite direction, and the escape wheel remaining, for a time, stationary, between the operations on the segments, in consequence of one of its teeth resting on the cylindrical portion or arc of one or other of the segments, thus producing a perfect dead beat. The balances, in their vibrations, are intended to make about one complete revolution. The escapement wheel remains stationary during half a revolution of the balances.

The operation of the escapement is partly illustrated by fig. 2, where a tooth of the escapement wheel is represented in the act of escaping from the segment of the right hand balance, after having moved across the straight face or chord thereof, and given it an impulse in the direction of the arrow shown near the balances, and another tooth at the opposite side is just falling on the arc of the segment of the left hand balance, which is at the time rotating in the opposite direction to that which has just received its impulse from the escape wheel. The rotation of the two balances will continue in the directions indicated, the escapement being, in the meantime, stationary, until the force of the impulse has been overcome by the hair springs, when the direction of the rotation of both balances will be changed, but the escapement will still be held stationary till the segment of the left hand balance begins to present its chord or flat side to the tooth, and to receive impulse from the tooth moving across it. The continued operation is but a repetition of what has been described, each balance in turn receiving the impulse and imparting it to the other. This alternate action of the cylindrical segments of the balances produces an exceedingly regular escapement, which is not to be influenced by any shaking or jarring of the watch, for the two balances being differently influenced by any movement of the watch, the influence upon

Fig. 2



one will be counteracted by that upon the other, and they will vibrate their proper distance, and neither more nor less, even if the watch be violently shaken in a circular direction. This escapement requires less impulse than a single balance escapement, owing to the peculiarly effective action of the teeth of the escapement wheel on the cylindrical segments.

The device for compensating for the variations of the balance is applied to each balance; it consists of a stout ring surrounded by a closely fitting coil of spring steel, one end of the said coil being secured to the ring, and the other end being forked to receive and form a curb to the hair spring, *j*. The brass ring fits tightly to a fixed pivot, which is concentric to the staff of the balance, the said staff passing freely through it. The expansion and contraction of the brass ring, by changes of temperature, being greater than that of the surrounding steel coil, causes the forked end of the coil to move in a circumferential direction, and thereby to increase or diminish the effective length of the hair spring, and thus to diminish or increase its power, the expansion causing the effective length of the spring to be diminished and its power increased, and the contraction causing its effective length to be increased and its power diminished.

The regulation of the watch is effected by an endless screw, *q*, (see fig. 1) which is fitted in suitable bearings to gear with toothed segments, *r*, attached firmly to each compensating ring, so as to turn both rings at once in opposite directions, and with them the forks or curbs *m m*, to lengthen or shorten the effective length of both hair springs, as may be necessary.

The arrangement of the barrel, H, main spring, E, fusee, F, and chain, G, in this watch differs from the arrangement of the corresponding parts of other watches in two particulars. In the first place, the chain, instead of being arranged to draw on the opposite side of the fusee to that from whence the power is transmitted by the fusee wheel to the center pinion, as in other watches, is arranged to draw on the same side as that from which the power is given to the center pinion, as is illustrated in fig. 1. In the old arrangement, the drag of the chain and the resistance offered by the pinion act in similar directions on opposite sides of the axis of the fusee, and both forces are thrown upon the fusee pivots, thus producing the greatest possible amount of friction; but in the new arrangement which is shown in fig. 1, the drag of the chain and the resistance offered by the pinion are in opposite directions on the same side of the center of the fusee, and hence are made as nearly as possible to counteract each other in their effect on the pivots of the fusee, and thus the friction on the fusee pivots may be reduced so as to average only about one-fifth of what it is in the old arrangement. This new arrangement involves the arrangement of the coil of the main spring in a direction the reverse of what it is in the old arrangement of the chain, and the consequent revolution of the barrel in the reverse direction. The other point of difference in the arrangement of the barrel, main spring, chain, and fusee, consists in reversing the positions of the larger and smaller ends of the fusee, that is to say, placing the small end of the fusee next the fusee wheel, instead of the large end. The effect of this is to bring the drag of the chain at the time when the watch is fully wound, which time the spring is most powerful, opposite the middle of the barrel, and opposite the middle of the length of the arbor of the fusee, instead of at one end of each, as is thus causing the friction to be equally distributed on the ends of the barrel and both pivots of the fusee arbor instead of nearly all on one end of the barrel and one pivot of the fusee arbor.

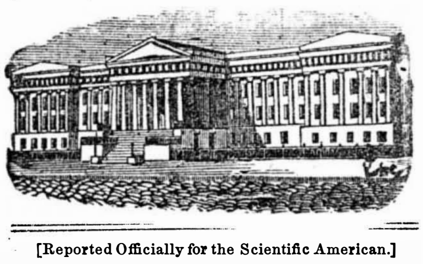
By the above arrangements for reducing the friction on the fusee pivots and equalizing the friction in the barrel and on the fusee pivots, a more easy and uniform transmission of the maintaining power is obtained, and the movement of the chain will be regular, instead of in a series of jumps, as it is in the old arrangement. The chain is hooked to the barrel near where the spring is fastened, to take away the friction in the barrel when the watch is fully wound, or the spring in its greatest force.

For further information address the inventor, J. Muma, Hanover, York Co., Pa. American and foreign patents applied for.

Tooth Powders.

Tooth powders, regarded as a means merely of cleansing the teeth, assist greatly in preserving a healthy and regular condition of the dental machinery, and so aid in perfecting as much as possible the act of mastication. In this manner they may be considered as most useful, although it is true, subordinate medicinal agents. By a careful and prudent use of them, some of the most frequent causes of early loss of the teeth may be prevented; these are, the deposition of tartar, the swelling of the gums, and an undue acidity of the saliva. The effect resulting from accumulation of the tartar is well known to most persons, and it has been distinctly shown that swelling of the substance of the gums will hasten the expulsion of the teeth from their sockets; and the action of the saliva, if unduly acid, is known to be at least injurious, if not destructive. Now, the daily employment of a tooth powder sufficiently hard, to exert a tolerable degree of friction upon the teeth, without, at the same time, injuring the enamel of the teeth, will, in most cases, almost always prevent the tartar accumulating in such a degree as to cause subsequent injury to the teeth; and a flaccid, spongy, relaxed condition of the gums may be prevented or overcome by adding to such a tooth powder some tonic and astringent ingredient. A tooth powder containing charcoal and cinchona bark, will accomplish these results in most cases, and therefore dentists generally recommend such. Still there are objections to the use of charcoal; it is too hard and resisting, its color is objectionable, and it is perfectly insoluble by the saliva, it is apt to become lodged between the teeth, and there to collect, decomposing animal and vegetable matter, around such particles as may be fixed in this position. Cinchona bark, too, is often stringy, and has a bitter, disagreeable taste. M. Mialhe highly recommends the following formula:—Sugar of milk, 1000 parts; oil of mint, oil of aniseed, and oil of orange flowers, so much as to impart an agreeable flavor to the composition.

His directions for the preparation of this tooth powder, are, to rub well the lake with the tannin, and gradually add the sugar of milk, previously powdered and sifted; and lastly, the essential oils are to be carefully mixed with the powdered substances. Experience has convinced him of the efficacy of this tooth powder.—[S. Piesse's Perfumery.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING JUNE 11, 1856.

HAND CORN PLANTERS—George Atkins, of Pittsburgh, Pa.: I claim attaching the plate, E, by a hinge or joint to the lower part of the box, A, the plate, E, having a curved plate. G, attached to its inner side, which plate is provided with a hole, g, and works over the curved portion, a,' of the plate, D, which is attached to the lower end of the box, A. The straight portion, b, of the plate, D, being fitted and working between plates, c c, attached to the plate, E, substantially as shown and described, so that the distributing device may be operated by merely throwing forward the box, A.

MARBLE SAWING MACHINE—Cyrus Avery, of Tunk hannock, Pa.: I claim the combination of the slide bars, C, link, E, lever, F, with the rack and movable stirrup, H, the whole being constructed, arranged, and operated in the manner and for the purpose set forth, and not otherwise.

THRASHING AND WINNOWING GRAIN—Alfred Belchambers, of Ripley, Ohio: I claim the plates or rubbers, U V, placed in the shoe, I, when the upper plate or rubber, V, is hung upon a shaft, m, as described, so that it may vibrate laterally by the shake motion of the shoe for the purpose specified.

COUNTING COIN—M. F. Bonzano, of New Orleans, La.: I claim the manner of passing the pieces in regular order through a slot by means of a toothed wheel, for the purpose of making them aid as a pinion to revolve a wheel connected by other wheels with a registering index.

BENDING HAY FORKS—Nathan Brand, of Leonardsville, N. Y.: I am aware that numerous machines have been made with a former, and vibrating arms or levers for bending pieces of wire and metal for various purposes, therefore I do not claim such devices when so used.

But I claim, in the described machine for bending and giving a proper form to hay forks with two tines and a shank, the combination and arrangement of the following devices, consisting of the stationary jaw, A, provided with a ledge or side projection, a, the disk, B, with a score for the shank of the fork, the hinged wings or side levers, D D, operated so as to bend the tines around the jaw, A, the hinged jaw, C, so arranged as to give the tines the curve required, and press the shank into the score in the die, B, and give it the proper position in relation to the tines, substantially as described.

SAW SET—Lebbeus Brooks, of Great Falls, N. H.: I claim arranging the adjustable angular bed in the jaw lever and with respect to the jaws and sliding gauge applied thereto, substantially as explained.

SAFETY VALVES—Robert Cornelius, of Philadelphia, Pa.: I claim the arrangement of the weight and lever of an ordinary safety valve, so that as soon as the steam reaches its limit of pressure the weight shall so change its position as to open and keep open the aperture of discharge of steam, in the manner and for the purpose substantially as described.

MAKING LEATHER—Chas. F. Crockett, of Newark, N. J.: I claim making sheets of leather of any desired size and thickness of curriers shavings or buffings, by lapping and cementing them together while in a moist state, and then subjecting the mass to pressure, substantially as and for the purpose specified.

DIFFERENTIAL GOVERNOR FOR MARINE AND OTHER ENGINES—Charles N. Clow, of Post Byron, N. Y.: I am aware that governors operated by pumps have been heretofore used, and that a piston moved similarly to piston L has been attached to the throttle valve of the engine; and therefore I expressly disclaim such a construction.

But I claim controlling the throttle valve of the engine by means of pistons, L and D, and valves, E E, by producing a vacuum on either side of piston, D, alternately, as the motion of the engine may require, the parts of the apparatus being arranged and operating substantially as set forth.

SHIPS CAPSTANS AND WINDLASSES—James Emerson, of Worcester, Mass.: I claim nothing new, irrespective of the arrangement and operation together, substantially as specified, of the parts of the capstan, made to couple and uncouple at pleasure for joint or separate action, as required, nor do I claim the application of a friction strap or belt to a windlass barrel.

But I claim the double or divided capstan or windlass, arranged for operation in the manner specified, and consisting of an upper hand operative portion of the body or capstan proper, G, and under loose portion of said body, H, separately controllable by friction strap, J, or gearing at pleasure wiih the upper operative portion, G, of the body of the capstan, as and for the purposes set forth.

LOCKS—Michael Erb and F. C. Goffin, of Newark, N. J.: We do not claim the sector tumblers with slots cut in them at varying points, for they have been previou ly used.

But we claim placing said tumblers upon the shaft, C, as shown, viz., the end tumbers, D', being attached permanently to the shaft and the tumblers, D, placed loosely upon it, with washers, b, between them, substantially as shown and described, whereby a positive action or movement is given to the tumblers, the use of springs dispensed with, and the lock rendered durable, simple, and economical to manufacture.

STRAPPING TACKLE BLOCKS—J. B. Fayette and D. Wheeler, of Oswego, N. Y.: We claim for tackle blocks a strap made in two parts, each part having a hook at one end to hook into the eye of the block hook, and a hole near the other end for the bolt that fastens them together, substantially as shown and described.

CARRIAGE SPRINGS—John U. Fiester, of Winchester, Ohio: I claim forming elastic twisted springs with elliptical curves for the purpose of giving to the same greater strength and elasticity, and also a lateral and vertical motion, as set forth.

SILVER PLATE, CAKE, AND FRUIT BASKETS—R. Gleason, Jr., of Dorchester, Mass.: I claim attaching the two lids or covers, E E, to the box, A, of the basket by the swivel joint hinges, F F, constructed as shown; the lids or covers corresponding in form to that of the body, A, whereby the lids or covers may be placed over the body, A, or turned downward and secured by the catches, G G, underneath the body, substantially as described.

ADJUSTING CIRCULAR SAWS—George Hutton, of New York City: I claim the combination of the two spherical faced and peculiarly perforated movable collars, C and D, with the concave fixed collar, E, and the concave washer, F, substantially as described and for the purposes set forth.

I also claim the employment of the adjusting screws, J and K, in combination with the described collars, C and D, the concave fixed collar, E, and the concave washer, F, as set forth.

REFRIGERATORS—Samuel Hickock, of Buffalo. N. Y.: I do not claim an inner and outer box, case, or frame, nor the combination of these; neither do I claim filling the space between the inside frame and the outside box or case with any fibrous or pulverized bad conductor of heat.

Neither do I claim making the inside frame convex or concave.

But I claim covering the inside box case or metallic rame with woolen, flannel, or other cloth, in such a manner that the water as it drips from the melting ice, will drip on to and saturate the cloth, and from the cloth will be conducted out of the case, thereby producing a strata of cold water, held in the cloth, over the entire surface of the inner metallic frame, and surrounding the articles to be kept cool, substantially as set forth.

MOLASSES PITCHERS—Henry W. Goodrich, of Boston, Mass.: I do not claim applying to the outside of a pitcher or vessel a cup or reservoir to catch the drippings from its nose or spout.

But I claim arranging the drip receiver, the pipe thereof, and the discharging end of the pipe with respect to the nose and neck of a pitcher, substantially as specified, in order that when the pitcher is being tipped for the purpose of pouring from its nose, none of its liquid contents may pass into the mouth of the discharge pipe, the drop receiver and its pipe, substantially serving to catch the drippings from the nose and convey the same back into the pitcher, as explained.

DEVICES IN PLANING MACHINES—Valentine Houck, of Buffalo, N. Y.: I ask a patent for the improvements described, so that I may either construct a machine combining them, or send the improvements to others to be used upon machines already constructed.

CLEANING RING TRAVELERS IN SPINNING—Henry S. Houghton, of Blackstone, Mass.: I do not claim the use of a brush to clean a throstle, whether automatically operated or otherwise, when the line or dead spindle alone are used.

But I claim the application of a brush, when constructed and operated substantially as described, to the delicate movement of the ring traveler, so as to rapidly clean the same without breaking down the thread.

PARING APPLES—Horatio Keyes, of Leominster, Mass.; I do not claim the machine described for operating the cutter, for that has been previously used.

But I claim attaching the cutter head, D, to the bar, M, by a pivot, d, and having a lip or bearing piece, e, on the cutter head, for the purpose specified.

VALVE FOR DOUBLE ACTING PUMPS—John C. King, of Belvidere, N. J.: I claim a single acting pump valve, with two chambered faces standing at angle to each other and operated by the pressure of the water from the pump cylinder to answer as suction and delivery valve to a double acting pump, substantially asset forth.

BRICK PRESS—Lewis Kirk, of Reading, Pa.: I claim the oscillating mold chamber, in combination with the clay guard, concentric with its trunions, and the piston, P, actuated by the oscillation of the mold chambers when constructed, arranged, and operated in the manner and for the purpose set forth.

DOOR LOCK—Christian Knauer, of Birmingham, Pa., assignor to Warwick, Atterbury & Co., of Pittsburgh, Pa.: I claim actuating the bolt of a right and left hand lock by means of a tumbler which has a vertical motion, for the purpose of freeing and securing the bolt, and also a vibrating motion for throwing in or out, the tumble being arranged in relation to the key in such a manner that the bolt will be thrown out the same distance in whichever way the key may be inserted, substantially as set forth.

PLOWS.—N. S. Lockwood and J. D. Winn, of Dayton, Ohio: We claim welding the post, A, or breast, A', to the mold board, B, and attaching the share, C, and land side, C', to the mold board and post or breast by means of the flanch, A', at the lower end of the post or breast, and the plate, C', of the share and land side, through which flanch and plates, screw bolts, F F, pass, substantially as shown for the purpose specified.

COTTON GIN FEEDERS—L. J. Mallard and Wm. S. Baker, of Riceboro, Ga.: We claim the combination of the screen, g, with the revolving toothed cylinder, c, constructed in the manner described, and when so placed in relation to the ginning rollers, G, that any excessive accumulation of cotton between them shall be removed or prevented, and the excess be retained between the cylinder and screen, until its quantity shall be equalized and relieved by the gin.

ARTIFICIAL TEETH—Saml. Mallett and A. B. Smith' of New Haven, Conn.: We claim the combination of two punches, one immovable, the other movable in the slot, c, with a spring, d and the two cavities, one, e, in the plug, or immovable punch, and the other, e', movable with the movable punch, the latter to be set by the insertion of the wires of the teeth into said cavities, in order to make the distance between the holes in the plate correspond with the distance of the pins in the tooth, as described.

ODOMETERS AND COUNTING MACHINES—Jos. L. Martin, of Baltimore, Md.: I claim, the following parts, combinations, and applications: first, the attachment of a friction clutch to the ratchet lever, operating against the bar of the connecting rod for producing the requisite motion in the first wheel, so arranged that any excess of motion in the bar, will not produce excess of motion in the wheel, and I claim this, whether in combination with the ordinary train of wheel work, with a single or double ratchet pawl, or in combination with the arrangement of wheel work described.

Second, though I do not claim operating the count wheel by a cam or eccentric placed at its center, where this is actuated by means independent of the axle of the carriage, and disconnected therefrom, as by the weight and clutch of Julius Thompson, patented Oct. 31, 1854, I do not claim the combination of the cam (whose axis is attached directly to the carriage axle,) with the connecting rod and frictional clutch upon the ratchet lever made substantially as described.

CARTRIDGES—Edward Maynard, of Washington, D.C. I am aware that cartridge cases of a tapering shape, have been made of sheet copper, or other hard metal combined with soft metal rings, as described and represented in a patent granted to A. E. Burnside, March 25, 1856.

And I am also aware that the said cartridge can only be used in a movable breech piece, and that it does not possess, in other particulars, the peculiar advantages which distinguish my improved cartridge for breech-loading fire arms.

I claim my improved cartridge for breech-loading fire arms, composed of a hard metal cylindrical case charged with powder, and combined with a projectile of such shape, that whether the case receive a large or a small charge of powder, the said projectile is self retained in contact with the powder, in such a position that its point must be coincident with the axis of said case, and a perfectly tight joint formed between said projectile and case, by filling the grooves in the former, with greasy matter, substantially as set forth.

ELASTIC BANDS—David McComb, of Memphis, Tenn.: I claim the combination of the link or slide with the hooked ends of hoops, for the purpose of securing them from opening, with the expansive force of the bale.

I also claim the peculiar formation of the link, as exhibited, which forms a secure means of keeping the hooked ends of the hoop together, and has a guard which keeps it to its place, is easy of application in putting on, and may be removed at pleasure without mutilation.

SMOOTHING IRONS—O. F. Morrill, of Boston, Mass.: I claim attaching to the iron a vessel or receptacle for containing alcohol or other spirit, constructed with a spout or chamber, into which the spirit is conducted by a wick and heated by a flame properly applied thereto, the said spout or chamber having attached to it and communicating with it, a small tube through an orifice of which the gas or vapor thus generated is forced in a jet and ignited by coming in contact with the flame employed for generating the gas, by which arrangement a jet of flame is made to impinge upon the hollow chamber of the iron, as se forth.

I also claim constructing the iron with a partition, r r, at the rear portion of the iron, for the purpose described.

REFLECTING QUADRANTS—Thos. Hedgcock, of Surrey Co., Eng. Patented in England March 31st, 1855: I claim the detector glass, G, applied and operating, as described, in combination with the index glass, A, and horizon glass, B, for the purpose of facilitating observations, in the manner set forth.

CLUTCH FOR FLOUR PACKERS—J. T. Noye, of Buffalo, N. Y.: I claim the clutch formed by the hollow shaft, W, with slots, s, and chamber, K, in connection with the round shaft, T, with driving pins, f, and balance or slide guards, o, to drive the pins up into the chamber in the manner and for the purpose of packing flour in barrels.

APPLE PARER—J. D. Seagrave, of Worcester, Mass.: I do not claim allowing the knife holder to turn either way.

I claim the attaching the spring, s, to the rod, P, so as to hold or return the knife to nearly right angles to the line of motion of P, to or from the center of M, as described.

PORTFOLIO—James Shaw, of Providence, R. I.: I do not claim, separately or in itself considered, the roller, B.

But I claim the roller, B, attached to the covers, C C, provided with the grooves, b c, and rings, d, which are fitted in the grooves, c. substantially as described for the purpose set forth.

HARVESTERS—J. C. & L. C. Pluche, of Cape Vincent, N. Y.: I claim the frame, C, when arranged in respect to the driving shaft, D, and having the bar, E, attached to its lower end, and the strips, f, attached to the bar, E, the upper ends of the strips, f, having a roller, g, attached to them, which roller is fitted and works in a guide, F, the finger bar, G, being connected ta a shaft, k, fitted within the bar, E, when the whole is constructed and arranged substantially as shown for the purpose specified.

AUGER HANDLES—N. C. Sanford of Meriden, Conn.: I claim in augers having an eye for the passage and retention of the handle, fastening the stick or handle in the eye of the auger shank by means of the screw, C, passing through the eye, B, handle, E, and into a recess, a, in the shank, in combination with the clamp or screw plate, D, on the under side of the stick within the eye, and operated by the screw, as specified.

CORN HARVESTERS—W. S. Tilton, of Boston, Mass.: I claim the rotating cutters, G G, and stationary knife, J, placed within an adjustable frame, E, arranged as specified.

OPERATING CUTTERS—John Tear, of Chicago, Ill.: I am aware that a divided or sectional cylinder has been used, and that these sections have been operated by cams to give them lateral and vertical motion. These I do not claim.

I claim, in turning or cutting irregular forms, the use of a cutter head, in which the knives or cutters are caused to traverse during the rotation of the cylinder for the purpose of adapting themselves to the shape of the thing to be cut by them.

SIZING HAT BODIES—Jos. Thomas; of Brooklyn, N.Y. First, I claim combining with the wheel, D, the wheels, E and U, or their mechanical equivalents, for giving the main wheel a vibrating motion, when used with a stationary plate or bed, in order to rub the goods back and forth, and also in combination therewith, the mechanism for giving the main wheel the constantly advancing motion when arranged and operating in a manner substantially the same with that described.

Second, I claim combining and arranging the circular plate or bed, B 1, and table, C 1, in such manner that by the levers, A', or their equivalents, and cords, b b, the same mechanism may adjust the plate, B 1, to the wheel, D, and also the table, C 1, to the ratchet rollers, and thus give any pressure desired to the goods, substantially as specified and for the purposes set forth.

COAL HEATING BAKERS—J. D. Wheelock, of Maysville, Wis.: I claim the use of the descending flue or tube, E, in two parts, the one sliding into the other, so that the same can be lengthened or shortened at pleasure for the purpose of passing off the fumes and smoke of the coal burned in the chamber, F, in combination with the said chamber, F, and the perforated bottom, H, and top, D, for baking purposes, substantially as set forth.

WATER HEATERS—Edward Whiteley, of Boston, Mass. I claim the diagonal partition, o, between the pipes, K and L, operating in the manner and for the purpose specified.

Second, I claim the inclined roof of the heater for the purpose of expelling the air therefrom, in the manner substantially as described.

REVOLVING HARROWS—G. J. Olendorf, of Middlefield, N. Y.: I do not claim to be the inventor of inverted gear, pinions, ratchet wheels, ratchets, or a cylinder constructed with a series of spikes on its surface, for I am aware that these have long been in common use.

But I claim the construction and combination of the several parts of my revolving harrow, the whole being arranged and described as set forth.

PRE-TANNING COMPOSITIONS—I. B. Williams, of Salem, Mass.: I do not claim the employment of either carbonate of soda or niter in the tanning liquor.

Nor do I claim the employment of a hydrated solution of nitrate of potash and muriate of ammonia in the treatment of hides, preparatory to their being immersed in the tan vat.

But I claim subjecting the hides, after the liming and drenching of them preparatory to their being immersed in the tanning liquor, to the action of a bath of the car bonate of soda and niter, and one of an acid solution or mixture, as specified, the same being for the purpose as set forth.

SAPONIFYING FATS—G. T. Wilson and Geo. Payne, of Belmont Vauxhall, Eng.: We are aware that oils and fats have been heated with steam, and that it has been used as a carrier in the still, but they have not been treated in accordance with our process, viz., by steam maintained at about 550 to 600 degs. temperature above specified, and so as to produce results attained by it.

We therefore lay no claim to the processes mentioned of treating oils or neutral fats by heat and artificial pressure, so as to prevent the formation and use of steam or vapor; nor do we claim the common method of treating them by steam in a super-heated state.

But we claim our improved process of treating them so as to distil over glycerine with fat acids mixed but uncombined, as explained.

WELDING IRON PLATES—Wm. Bertram, of Woolwich, Eng. (assignor to John W. Cochran, of New York City.) Patented in England Dec. 21, 1854: Having described the manner of carrying out my invention in the construction of ships, bridges, boilers, and other structures, when numerous sheets, bars, or plates of iron are used.

I claim welding the separate faces of such bars or plates together by pressure or concussion, while at the same time they are subjected to opposite blasts of heat, in the manner set forth.

MOWING MACHINES—Cornelius Aultman and Lewis Miller (assignors to Ball, Aultman & Co.,) of Canton, O. We do not claim connecting the cutter bar to the machine by a hinge joint; nor do we claim the joint at or near the extremity of the cutter bar.

But we claim connecting the cutter bar to the machine by the double rule joint, or the double jointed coupling piece, B C, in the manner and for the purposes set forth.

WORKING STEEL—Horace Vaughn, of Providence, R. I.: I claim the dry chloride of sodium and bi-chromate of potash, with or without the prussiate of potash for hardening and tempering steel, combined, applied, and operating substantially as set forth.

RE-ISSUE

CUTTING THREADS OF WOOD SCREWS—Cullen Whipple, of Providence, R. I. (assignor to New Bngland Screw Co., assignor to Cullen Whipple, aforesaid.) Patented Aug. 8, 1842. Re-issue dated March 5th, 1850: What is claimed is, first, in combination with the shaft or mandrel, which gives the rotary motion to the screw blank, the employment of the rotating wedge-formed cam, or the equivalent thereof, for determining the pitch of the thread, and for permitting the return motion to repeat the operation, substantially as described.

Second, causing the chaser or cutter, at each successive cut, to approach nearer to the axis of the screw blank by means of a revolving conical cam, which, at each successive operation, acts by a greater radius, substantially as described.

Third, governing the motions of the chaser or cutter, to make the core or body of the screw of a conical or tapered form along the whole or any part of its length, by combining therewith a cam of gradually enlarged diameter, substantially as described, the form of such cam depending on the form intended to be given to the core or body of the screw.

Fourth, combining the cam which determines the form of the core or body of the screw (to make it tapering or conical in whole or in part,) with the chaser or cutter by means of a rock shaft and adjusting lever, substantially as described, the said adjusting lever being interposed between one of the arms of the rock shaft and the face of the cam, so that by the use of a set screw or otherwise analogous device, the cutter or chaser may be readily set, as described.

Fifth, shifting the cam which determines each successive cut of the chaser or cutter, by combining therewith a ratchet movement, operated by an eccentric or cam, the wheel of the ratchet being provided with pins, which operate a lever connected with the cam, to shift, substantially as described.

Sixth, disconnecting the shaft or mandrel from the driving power at the end of each complete operation of the machine by combining the clutch or the eqaivalent thereof, with the ratchet, by means of an index wheel or perforated rim, which, at the required periods, liberates or acts upon the connections of the clutch to disengage it, substantially as described.

Seventh, making the chaser or cutter for chasing or cutting the threads of screws by machinery with a groove of the form of the thread in its cutting face and in the direction of its length, substantially as described, whereby the said chaser can be sharpened by simply grinding off at the end, and without changing the form of the groove, and whereby also the said chaser cuts on both sides of the thread, and finally on the edge thereof, as described.

Eighth, the combination of the screw driver for holding and rotating the screw blank, with the tubular rest open at the side, to support the shank of the blank while being threaded, substantially as described. [Twice re-issued.]

ADDITIONAL IMPROVEMENT.

BREECH LOADING FIRE ARMS—Abner N. Newton, of Richmond, Ind. Patented June 27, 1854: I claim, first a swivel jointed cylindrical breech-pin, D, the rear portion of which is armed with lugs, b b, ond studs, c d e, and an inclined plane, f, all operating in the manner and for the purpose specified.

Second, I claim the locking of the cylindrical breech-pin, D, by means of lugs, b b, on said breech-pin, rotating on slightly inclined planes, said planes formed within the barrel on opposite sides at the rear of the mortise, C, or their equivalents, substantially as set forth.

Third, I claim the peculiar combination and arrangement o the four parts or pieces of an ordinary gun lock, to wit, the hammer, mainspring, tumbler, and feather spring, making one plain simple piece, operating as represented.

Fourth, I claim the slotted thumb lever, E, in combination with the studs, c d e, whereby the swiveled breech is caused to rotate from left to right, and from right to left in locking and unlocking said breech, and whereby the breech is also moved back and forth, substantially as described.

DESIGNS.

STOVES—Isaac Diller, of Lancaster, Pa.

COOKING STOVES—Garrettson Smith, Henry Brown J. A. Read, of Philadelphia, Pa.

AIR-TIGHT STOVES.—Garrettson Smith and Henry Brown, of Philadelphia, Pa.

NINE PLATE STOVES—Garrettson Smith, Henry Brown and J. A. Read, of Philadelphia, Pa.

STOVES—Garrettson Smith, Henry Brown and Jos, A. Read, of Philadelphia, Pa.

STOVES—S. W. Gibbs (assignor to Perry & Norton,) of Albany, N. Y.

COOKING STOVES—J. F. Allan (assignor to Stratton & Massey,) of Philadelphia, Pa.

Wood Bearings to Shafting of Steamers.

The British steamer *Himalaya* having had the old brass bearings removed, substituted lignum vitæ bearings to her screw shafting, which have operated much better. A correspondent of the London *Artizan* thus describes the results of their application :—

"Since the application of this material the vessel has run about 30,000 miles, during which time the engines have made about 8,000,000 revolutions. The total wear down in the stern-post does not exceed 1-8 inch., which is, of course, very trifling for the work done. The screw shaft is lined with brass at the part bearing on the wood, and this bearing is 18 inches diameter × 4 ft. long. The lignum vitæ is inserted into the cast-iron stern pipe in segments, each piece being the whole length of bearing, and about 3 inches wide × 3-4-inch thick, so that the segments combine into the form of the pipe, in a somewhat similar way as the staves of a cask. The abutting edges of these segments are rounded off to form water-ways, and their surfaces are also scored in several places to allow a free circulation of water on every part of them. These segments are prevented from running round with the shaft through its friction by a strip of metal, which is pinned on to the upper side of the stern-pipe, and against the edges of which the lignum vitæ segments abut. They are kept in at the inner end by a shoulder in the stern-pipe, and at the outer end by a ring, which is screwed on to the stern-post.

We are indebted to the courtesy of Mr. Gray, the engineer of the *Himalaya*, for a description of a very ingenious application of lignum vitæ which he has adopted in his collar or thrust bearing. He found this bearing wore considerably, and when in the Mediterranean last year, the brass rings had thus become so reduced that there was a space of about 3-4 of an inch on the slack side of the collars. He determined to try the experiment of interposing lignum vitæ segments between the thrusting collars on the shaft and the brass rings on the bearing, and fitted them in four segments of a circle to each collar, so that they can be slipped in their place without removing the bottom brass. They are prevented from running round with the shaft by a brass plate screwed on to the lower brass, and are so easily removed and re-fitted that two hours only are necessary for applying new segments to the block. A set of lignum vitæ segments, thus applied, will last for from 7,000 to 10,000 miles, and the expense of fresh segments is comparatively trifling."

This steamer, next to the *Persia*, is the largest afloat in active service. It recently made a very rapid passage to Halifax from the Crimea with 2,000 troops.

A new Metallic Alloy.

Equal parts of iron, cobalt, and nickel fused together, make a very hard alloy of dazzling whiteness, resembling silver. It is suitable for making knife blades, fine files, and other such articles.

(For the Scientific American.)

The Sun.—No. 2.

Sometimes only a few spots are observed on the sun, sometimes their number amounts to more than two hundred, and at other times the disk of the sun has been said to be spotless. M. Schmidt counted above two hundred single spots and points in a group visible on the 26th of April, 1846, and one hundred and eighty in a cluster seen in the previous August.—Scheiner never found the disk of the sun wholly clear from spots, excepting for a few days in December, 1624; at other times he saw twenty, thirty, and sometimes as many as fifty at a time. From this up to 1650, spots were common, but between the last date and 1670, a period of twenty years, only a few were observed. Since 1700 they have been almost constantly observed, though in greater abundance during some years than others. M. Schwabe, a German astronomer, has observed that there has been a periodical recurrence of the solar spots, at least, for several years. In 1828 they were very numerous; but they decreased gradually in number for the ensuing five years, up to 1833, at which date they reached a minimum. During the next four or five years they increased quite rapidly, arriving at their maximum again in 1837 or 1838 From this they decreased again up to 1843 or 1844; and then went on increasing. In 1848 they were very numerous. It has been calculated that their period between consecutive minima is a fraction above 11 years, or that nine mean periods occur in a century. The period between their minimum and maximum is variable, the mean being above five years. Whether this is the expression of a physical law or not, there appears to be a remarkable coincidence in their appearances.

The rotation of the sun appears to carry his spots, when visible, across his disk from his eastern to his western limb. Owing to the inclination of his axis, at different seasons of the year, the lines described by the spots in apparently moving over the sun's disk, have different inflections. In the beginning of December the spots apparently move in direct lines and a little downwards in passing from left to right over the disk. The axis of the sun is then inclined towards the right, its north pole being to the west of the apex or highest point of the disk, and the earth is situated in the plane of its equator. After this the lines described by the spots begin to be curved upwards, so that in the beginning of March they become considerably convex towards the upper part of the disk, or in other words, appear elliptical like the nearer semi-circumference of a circle somewhat inclined to the line of sight and having the eye below its plane. The north pole of the sun, in this case, is inclined from us; and we can perceive a portion of the sun beyond his south pole, which is removed a little into the visible hemisphere. In the first week of June, the spots appear to move in nearly direct lines, inclined upwards to the right. The axis of the sun is now inclined to the left, and its north pole is to the east of the highest point of the disk. Near the middle of the month of September, the lines described by the solar spots are inflected downwards, so as to be convex towards the lower part of the sun, or just the reverse of their position in March. About the first weeks of December and June, then, the plane of the solar equator passes through the earth; in March this plnne is above the earth, being thus from December to June, and in September and the adjacent months below her. When the earth is in this plane of the solar equator, it must be in the line in which this plane intersects the ecliptic; in other words, in the line of its nodes. The heliocentric places of the earth, when thus in the nodes of the sun's equator, are, according to late observations of Dr. Petersion, at Altona, 73° 29′ and 253° 29′ respectively; in the former it passes to the south and in the latter to the north of the solar equatorial plane. The sun's equator has the greatest latitude north in heliocentric longitude 163° 29′, and the greatest south latitude in the opposite longitude of 343° 29′.

Explanatory Note.—*Macula*, plural *maculæ*, latin, a spot; a spot on the skin or on the surface of the sun. *Facula*, plural, *faculæ*, latin, a small torch, a little light; a small bright spot on the sun. *Luculus*, plural, *luculi*, latin, from *luceo*, to shine; a brilliant speck. *Nucleus*, plural, *nuclei*, latin, a nut, the central part of a body, about which matter is collected; the interior of a solar spot within the bordering penumbra; the central body of a comet, within the envelope. *Penumbra*, latin, *pene*, almost, and *umbra*, a shadow; the partial shadow in eclipses; the less dark border of a solar spot.

Coal in Oregon.

Messrs. Editors.—I think, from a remark in one of the numbers of the Scientific American, you have not much faith that coal exists in this Pacific country, at least, to any extent, therefore I send you a few facts in regard to the Coos Bay Coal Mine.

Coos Bay is situated in Oregon, about 350 miles north of San Francisco, and 40 miles north of Port Oxford. Empire City, on Coos Bay, was first settled by Messrs. Northrup & Simonds about two years ago, and they have devoted much time and labor surveying the country to discover coal, and with this I send you a small piece, that you may see it is coal, and no mistake.

It burns free, much like the Cannel coal of England, and it is used by many steamers, mills, foundries, &c., and with entire satisfaction. This coal has met with some opposition from importers of coal from Atlantic States, as it can be sold for much less than imported coals; and there is no doubt but this mine will yet be able to supply San Francisco market. Messrs. Northrup & Simonds can land their coals in San Francisco for about $9 per tun.

This company is mining about 100 tuns per day, and in a short time will take 300 or 400 tuns per day. The coal vein is from 6 to 9 feet thick, and it can be distinctly traced for a distance varying from 2 to 5 miles wide, and about 20 in length. There is a railroad from the mine to the landing, which is about one mile distant. They have worked into the mine 100 yards, at a slope of 3 feet in 100.—Vessels drawing from 10 to 13 feet of water can come to the landing and load at the rate of 200 tuns in 15 hours. Coos Bay affords a good harbor at all seasons of the year, but there is a bar at the entrance which makes the passage dangerous in stormy weather. These few facts were furnished me by the agent of Messrs. Northrup & Simonds, Mr. Silas Fuller, of San Francisco.

Charles Livingston.

San Francisco, May, 1856.

How to Obtain the Metal Aluminum.

The following method of obtaining the above-named metal is taken from a late lecture delivered in London, by Rev. J. Barlow, F.R.S., on the subject.:—

"Clay is a silicate of alumina; in fact, three-fourths by weight of a portion of pure clay are silica. Of this silica, one-half is oxygen, the other half is silicium, a substance altogether new in its properties; it is not affected by water or by air, and it can be kept in either; it has no luster, or any other resemblance to a metal; it is analogous to carbon.

Now, it is important to notice that, it was not from silica (the oxyd,) but from the fluoride and chloride of silicium that Berzelius obtained this substance. This fact, perhaps, instigated Wohler's successful attempt to decompose the *chloride* of aluminium (a fusible and volatile substance,) by the vapor of potassium, which has no effect on the oxyd of aluminium. But the production of the chloride of aluminium demands a concentration of chemical power. The hydrated chloride, resulting from the solution of alumina in hydro-chloric acid, on being evaporated, decomposes the last portions of the mother-liquor, and the operation ends by the re-production of alumina. This difficulty was surmounted by Œrsted: he caused the affinity of oxygen for carbon, and of aluminium for chlorine to act simultaneously, and under the most favorable circumstances, by chlorine gas being led over an intimate mixture of alumina and charcoal heated to redness in a porcelain tube. The anhydrous chloride was thus evolved in vapor, and condensed in a suitable receiver. The apparatus contrived by M. Deville for procuring this substance, was exhibited. Wohler's process of obtaining aluminium from its chloride is well known. The following modification of that process, devised by M. Deville, was shown in action.

A tube of Bohemian glass, 36 inches long, and about one inch in diameter, was placed on an empty combustion-furnace constructed for the purpose. Chloride of aluminium was introduced at one extremity of the tube; at the same extremity a current of dry hydrogen gas was made to enter the tube, and was sustained till the operation was finished. The chloride was now greatly warmed by pieces of hot charcoal, in order to drive off any hydrochloric acid it might contain; porcelain boats, filled with sodium, were inserted into the opposite extremity of the tube; the heat was augmented by fresh pieces of glowing charcoal until the vapor of the sodium decomposed that of the chloride of aluminium. Intense ignition usually attends this re-action. At length the aluminium was liberated in buttons, which were found in the boat adhering to a substance consisting of the mixed chlorides of aluminium and sodium. The boat was now transferred with its contents to a porcelain tube, through which hydrogen gas was passed. At a red heat, the double chloride was distilled into a receiving vessel, attached to the tube for the purpose; the buttons of aluminium were collected, washed with water, and subsequently fused together under a flux consisting of the double chloride.

Another method of obtaining aluminium from the chloride has been adopted with success. It is as follows:—

4·200 grammes of the double chloride of aluminium and sodium (*i.e.*, 2·800 grammes chloride of aluminium, and 1·400 grammes common salt,) 2·100 grammes of common salt, 2·100 grammes of cryolite, thoroughly dry, and carefully mixed together, are to be laid in alternate layers, with 840 grammes of sodium (cut into small pieces,) in a crucible lined with alumina—a layer of sodium should cover the bottom of the crucible. When the crucible is filled, a little powdered salt is to be sprinkled on its contents, and the crucible, fitted with a lid, is to be introduced into a furnace, heated to redness, and kept at that temperature until a re-action, whose occurrence and continuance is indicated by a peculiar and characteristic sound, shall have terminated. The contents of the crucible, having been stirred with a porcelain rod, while in their liquified state (this part of the operation is essential) are poured out on a surface of baked clay, or any other suitable material, the flux, &c., on one side, and the metal on the other.

In the experiment just described, the cryolite chiefly fulfills the office of a flux. But, twelve months since, Dr. Percy obtained aluminium directly from this mineral. Cryolite is a fluoride of aluminium and of sodium. Dr. Percy found that layers of this substance, minutely pulverized, and heated with sodium in the manner described in the last experiment, yielded aluminium. Cryolite is found only in Greenland."

Electricity the Cause of Waterspouts.—A New Theory.

Two violent currents of air meeting at an angle cause a vortex, and form a hollow vertical whirling tube, sucking up within its folds heavy objects, and carrying them, sometimes, to a great hight. On a minor scale, these may be observed on a dry, windy day, in the shape of dust-whirls, on any public road. Heretofore, waterspouts have been attributed to such a cause—two intense angular currents of air meeting, and forming a huge vortex on the face of the ocean, lifting up the waters, as it were, by a huge hollow screw of wind, thus forming the waterspout.

Dr. M. F. Bonzono, of the U. S. Mint, New Orleans, goes deeper into the subject, and presents the following new theory of the cause of waterspouts, and he backs it up with good arguments:—

"From the conductor of an electrical machine suspended by a wire, or chain, a small metallic ball, (one of wood covered with tin-foil,) and under the ball place a rather wide metallic basin, containing some oil of turpentine, at the distance of about three-quarters of an inch. If the handle of the machine be now turned slowly, the liquid of the basin will begin to move in different directions, and form whirlpools. As the electricity on the conductor accumulates, the troubled liquid will elevate itself in the center, and, at last, become attached to the ball. Draw off the electricity from the conductor to let the liquid resume its position: a portion of the turpentine remains attached to the ball. Turn the handle again very slowly, and observe the few drops adhering to the ball assume a conical shape, with the apex downwards, while the liquid under assumes also a conical shape, the apex upwards, until both meet. As the liquid does not accumulate on the ball, there must necessarily be as great a current downwards as upwards, giving the column of liquid a rapid circular motion, which continues until the electricity from the conductor is nearly all discharged, silently, or until it is discharged by a spark descending into the liquid. The same phenomena takes place with oil or water. Using the latter liquid, the ball must be brought much nearer, or a greater quantity of electricity is necessary to raise it.

Those who have had occasion to observe the sublime phenomenon of a waterspout, will at once perceive, in this experiment, a faithful miniature representation of the gradual formation, progress, and breaking up of that grand phenomenon.

If, in this experiment, we let the ball swing to and fro, the little waterspout will travel over its miniature sea, carrying its whirlpools along with it. When it breaks up, a portion of the liquid, and with it anything it may contain, remains attached to the ball. The fish, seeds, leaves, &c., that have fallen to the earth in rain squalls, may have owed their elevation in the clouds to the same cause that attaches a few drops of the liquid, with its particles of impurities, to the ball.

It is well known that waterspouts generally form on hot summer days in southern climates, and in so-called dead calms. They never form on windy days, nor in rainy weather. If, in our experiment, we blow upon the surface of the liquid, the discharge of electricity from the ball will be so much facilitated as to prevent the elevation of the liquid entirely, or, at least, to retard it very much. By holding a pointed conductor near the liquid, the elevation of it is entirely prevented. It seems not a forced deduction that lightning rods, and not the firing of cannon, are the proper safeguards against the formation and disastrous effects of waterspouts. When we contemplate the effects of electrical attraction on liquids, our attention is naturally drawn to its effects with regard to gases, and especially atmospheric air. The non-conducting air will, like other fluids, be attracted, electrified, and repelled, to seek its dissimilar electricity, giving rise to currents and counter-currents, and at the electrical machine to the phenomenon known as the electrical wind, whilst by the operation of the grand electrical machine of the clouds, it produces those fearful and destructive currents known as whirlwinds and tornadoes.

The table lands of Mexico are never wetted by rain, and but very sparingly by dew. It is in these elevated and dry regions that whirlwinds are most frequent. Waterspouts and whirlwinds seem to be the lightning rods that nature constructs to afford to the electricity of the clouds a passage to the earth."

California Fisheries.

The Monterey (Cal.) *Sentinel*, says:—"It is a matter of great wonder why more has not been done to open out the mine of wealth which nature has of old established in the fisheries of California and the North Pacific. Probably there is not in the whole world a coast so abounding in productive fisheries as that of our State, Oregon, and Washington. Sardines, mackerel, codfish, and salmon are not found in any part of earth's shores, as numerous as they are hereaway. In summer and fall they arrive in our bay in such shoals as to astonish the stranger."

A Great Tailor's Shop.

M. Godillot, in Paris, employs sixty-six sewing machines, kept in motion by a steam engine of nine horse power, and which sewed all the overcoats for the Crimean army. Besides the machine, one thousand women and girls are constantly engaged in sewing.

New Inventions.

An American Engineer in Defence of Hot Air.

In an article in the London *Illustrated News*, of the 23d of February last, J. Bourne, author of some excellent works on the steam engine, severely criticised the claims set up for Captain Ericsson's new hot air engine. This has given some of his friends great offence, it seems, and one of them, stated to be an eminent proprietor of engineering works in this city, has published an article in a recent number of the London *Mechanic's Magazine* as an answer to Mr. Bourne. The following is a portion of the article :—

"The advantage resulting from the mere proportion thus exhibited of force imparted to the machine, and force expended in compressing the cold air, is by no means apparent to those who merely theorize in the matter. Indeed, Captain Ericsson's disappointed expectation, in relation to the caloric ship, is solely to be attributed to his disregarding the size of the supply cylinders, on the strength of his theoretical deduction that, however great the force expended in compressing the air, it would be returned by the working cylinders independently of heat. The differential force of the gigantic pistons, considered by itself, certainly appeared most satisfactory, but proved too precarious in practice. The resisting force within the machine was too great in proportion to its entire motive energy—there was not margin enough to meet the unavoidable losses in practice. Already six engines have been built under the recent patent, with cylinders varying from 15 to 40 inches diameter, all of which are now under trial. One of these, an engine with cylinders of 30 inches diameter, finely executed, and working with peculiar regularity and smoothness, is intended for Europe.

"Altogether, Captain Ericsson has built twenty-seven engines, in New Town, actuated by heated air, *twenty-five* of which the writer has seen in operation. The vast labor expended in planning, independently of execution, can only be appreciated by those who are acquainted with the wide range of Captain Ericsson's experiments, and the diversity of form and combination of these engines, destined shortly to supersede steam as a mechanical motor."

Although intended to be complimentary to Capt. Ericsson, this article is, unwittingly, the reverse. It is stated in the above that by altering the proportions and making different mechanical arrangements, in the new hot air engines they are rendered so perfect that "they are destined shortly to *supersede* steam as a mechanical motor." It is also stated that the advantages of the particular proportions of the new hot air engine, are not apparent to those who merely theorize in the matter. Well, this is a plain charge, that Capt. Ericsson merely theorized, and failed to theorize right in the construction of his old engines, which are confessed to have been failures. The failure of the caloric ship is called a "disappointed expectation," in other words, an exhibition of theoretical and practical miscalculation; that is the plain meaning of the above language.

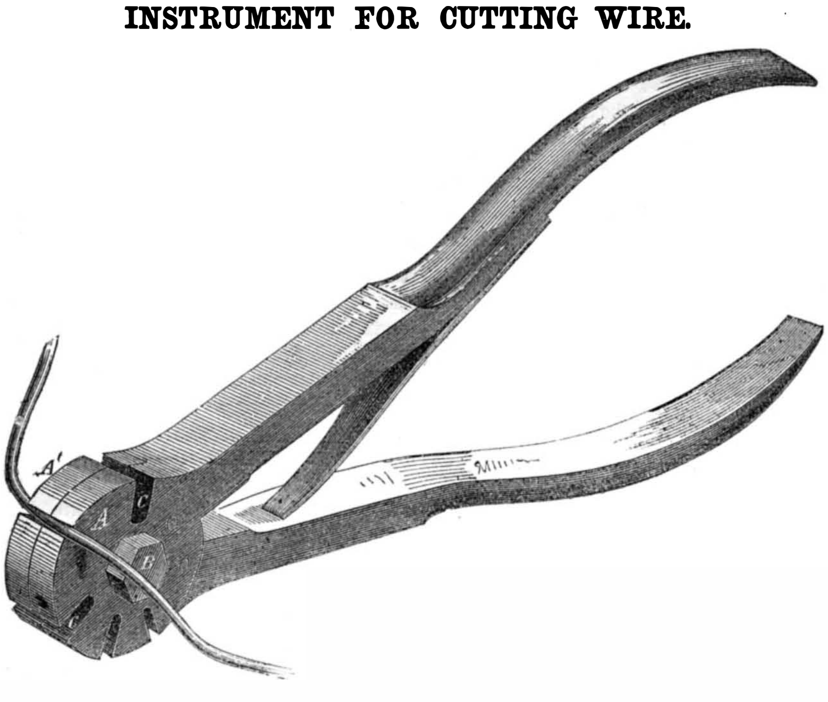
The author of the above article has seen twenty-five of Capt. Ericsson's hot air engines in operation. They were built at some out-of-the-way place called New Town; whether this is the quiet rural inland village on Long Island, or not, we are not informed. He certainly has been very fortunate in seeing so many hot air engines working, but it is remarkable that there is not a single one of them in public practical operation, doing useful work, anywhere. The first engagement that ought to be fulfilled, to show how the hot air engines are destined to supersede steam, would be to place one of them in the New York *Evening Post's* press-room, to drive the presses.

We have not, at present,—and, indeed, it is not required of us—to take up any more space in our columns in discussing this question. As a simple matter of news relating to engineering, we thus bring it before our readers. It is for those who have asserted, and who do assert, that hot air will soon supersede steam, to prove their words by deeds, and who so able as this eminent New York engine builder, the author of the above article. He has the means, and until he proves his assertions by open conclusive works, his defence of the new hot air engine will be regarded by all our steam engineers with suspicion.

Convenient Writing Ink.

Dissolve half a pound of the extract of logwood in five gallons of hot water, and add half an ounce of the bi-chromate of potash. Stir for a few hours, and bottle for use. The cost for five gallons of ink is about twenty-five cents. F. H.

INSTRUMENT FOR CUTTING WIRE.



Improved Wire Cutter.

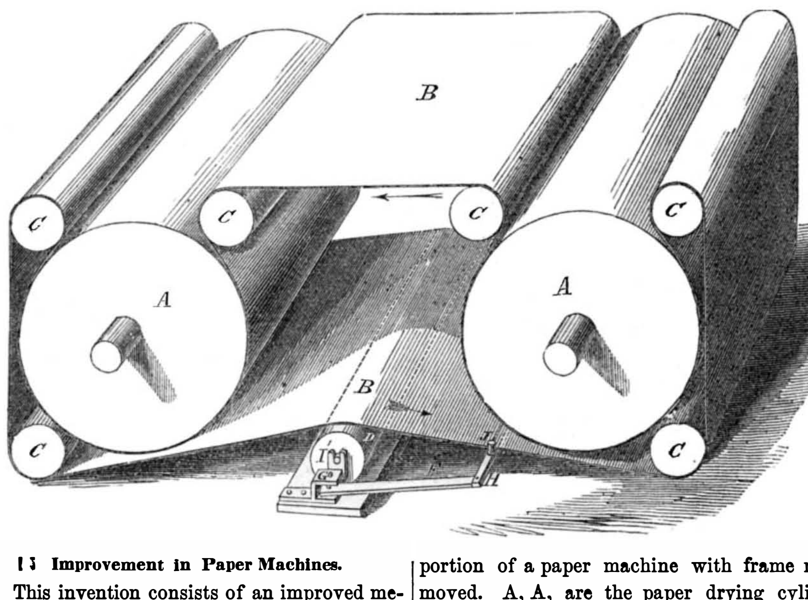
When wire is cut by means of the common nippers, or bent back and forth with plyers until it breaks, there is a burr left upon the pieces, which must be placed in a vise or smoothed off with a file. The wire must also be straightened out again by hand. These inconveniences, although not amounting to much individually, become very objectionable where any considerable quantity of wire is to be cut, or nice work desired, as for example in pianoforte making.

The present improvement consists of a pair of disks, A A', having handles, put together like nippers. The disks, A A', are pivoted at B, and have slots through their peripheries at C; these slots are of different sizes, so as to accommodate different varieties of wire. The wire to be cut is placed in the slots, as shown, and the handles pressed; this causes the disks to turn in different directions, and the sharp edges of the slots sever the wire.

When wire is cut with shears, the blades tend to push it out from between them; but in this improvement the disks act in a contrary manner, and tend to hold the wire firm, so that there is no slip.

This improvement obviates all the objections of the common nippers, or other methods of cutting, and saves time, labor, expense of files, &c. It severs without leaving any burr whatever, and without bending the wire in the least; no after-smoothing is required: the work is done quicker, far better, &c. We regard it as a very excellent and useful invention. Patented Sept. 18, 1855, by Wm. Grover, of Holyoke, Mass. Sell for $2·75 each. Further information can be had by addressing E. D. & G. Draper, Hopedale, Milford, Mass. See their advertisement in another column.

IMPROVED SELF-ACTING FELT GUIDE.



Improvement in Paper Machines.

This invention consists of an improved method of guiding the felt cloth used in the manufacture of paper, by which the felt becomes its own regulator. The guide works without perceptible friction, and is said to be so perfect in its operation, that the attendant has no more care or trouble with the felt than with the belts which drive the machine. By the use of this improvement, one felt cloth will outlast two which are guided by hand in the common way, and the edges of the cloth, which naturally give out first, will wear as long as the body parts. The invention is adapted to all kinds of felts, occupies very little room, can be applied to any kind of paper machine with very little trouble and small expense.

Our engraving is a perspective view of a portion of a paper machine with frame removed. A, A, are the paper drying cylinders, heated by steam in the common manner. B is the felt cloth; C are a series of rollers over which the felt passes; D is the guide roll over which the felt also passes. This roll is hung in movable bearings, I', which arrangement constitutes the improvement. F are crooked levers pivoted at G, and bent up and forked at I', so as to form the movable bearings of roll D. The other end, F, is pivoted to a connecting rod, H, which extends from lever F to a corresponding rod on the other side of the machine. Upon this connecting rod are two upright friction rollers, J. The journals of roll D, being placed in the forked bearing, I', and friction rollers, I, adjusted to the width of felt, B, the machine is ready for use. The operation of the improvement will be easily understood. When the felt inclines to one side, the connecting rod, H, will be carried with it, and move the levers, F, and thus shift the bearings of roll D, in such a manner as to carry the felt back again to its place. The invention works so easily that even if the felt is very slack it cannot get out of place. We consider the above a valuable improvement. Invented by Mr. P. H. Wait, and patented April 8, 1856. For further particulars address N. W. Wait, sole agent, Sandy Hill, Washington Co., N. Y.

Artificial and Peruvian Guano.

There is very little use, we conceive, of our planters and farmers making any more efforts to obtain Peruvian guano at a lower price than that at which it is now selling. A letter before us, by J. Y. De Osma, the Minister of the Peruvian Government at Washington, settles this point. It states that the Peruvian Government conducts the guano trade with foreign countries on its own account and risk, and regulates and establishes the price of this fertilizer, and that it finds it difficult to supply the demand for it at $50 per tun. It is also stated that only about one-fourth of the supply is consumed in the United States, and that if a cheaper fertilizer can be obtained any where else, our farmers are not compelled to purchase of Peru. We, indeed, cannot blame that government for obtaining the highest prices it possibly can for guano; our farmers do the very same with their products. But cannot as good a fertilizer be manufactured artificially for $30 per tun? This is an important question for our chemists to answer. The commercial value of the principal constituents of Peruvian guano—including ammonia, phosphate of lime and potash, equal $65 per tun—therefore, an artificial fertilizer, containing a like amount of such constituents, cannot be manufactured from drugs sold in the market at the present prices. But then, we have the wide sea washing our coasts, from the products of which, we think, cheap fertilizers might be manufactured. Sea weed contains a great amount of kelp, which is a crude alkali, eminently fitted for mixing with the myriads of coarse fish and king crabs that infest all the sea swamps and inlets of the Atlantic coast. These no doubt can furnish a great amount of ammonia and phosphates, and it appears to us, that an artificial guano, might be manufactured from them so cheap as to preclude the necessity of sending to the Chinca Islands for the Peruvian. Here is a wide field for the introduction of a new manufacture, and from which fortunes may yet be made.

James' Patent Bill.

The *New York Herald* continues to belabor this foul monstrosity. In an article entitled "Corrupt Legislation," the *Herald* says :—

"The next instalment for the benefit of the plunder jobbers will be the new patent right scheme under consideration in the Senate. We may expect, in the full developement and success of this plot, a new term of monopoly to all the old patent monopolies—pistols, plows, planing machines, and what not, of the last twenty, twenty-five or thirty years. To this end we understand that the machinery of the lobby at Washington is in perfect trim, and well oiled throughout, and that it includes newspaper editors, reporters, &c., in any quantity, and cheap for cash. We should infer, from the special pleading of some of our city cotemporaries, that at least one gallant chevalier of the fraternity has a pretty long finger in the pie. And why not? Does not the good book say, that 'where the carcass is there will the vultures be gathered together?' But what is to be the end of all this? We look at the condition of Mexico, and turn down the leaf."

Figures in Relief upon Marble.

A method has been discovered for tracing figures in relief upon marble with great facility. For this purpose, the desired figures are first traced upon the marble with chalk, they are then covered with a coat of varnish, made of common Spanish sealing-wax, dissolved in spirits of wine, after which a mixture of equal parts of acid of salt and distilled vinegar is poured upon the marble, which corrodes the ground while the figures remain in relief, as if engraved, saving the cost of time and expense.

Scientific American.

NEW-YORK, JUNE 28, 1856.

Awarding Prizes for Improvements

The awarding of prizes properly for new and useful improvements by Mechanical, Agricultural, and like associations is a subject which deserves particular public attention at the present time. Prizes are offered by such institutions as inducements to excite inventors and others to study and labor, in order to accomplish superior results—to make improvements in the arts. This method of exciting the inventive genius of any people is commendable, and wherever it has been carried out in a proper spirit, has been the means of developing improvements and advancing civilization. When any association offers public prizes for the accomplishment of any specific object, it becomes a public contractor for the efforts of genius and skill, and is sacredly bound to fulfill its part of the engagement. If it fails to do this, it not only injures its own character, but retards the progress of improvement by destroying the confidence of many ingenious persons regarding the integrity of all associations of a kindred character.—It is thus that such persons may be prevented from becoming future candidates for such prizes, and the genius that would otherwise be called into exercise for victory in such contests, is left to lie dormant and unproductive.

The qualifications required of any society for awarding prizes properly, are simple and prominent. They embrace, on the part of those chosen as judges, and examining committees, a perfect *knowledge* of their duties, and unswerving honesty in fulfilling them.—With these qualifications, no society need have any fears in awarding prizes for improvements; but without them no society can do its duty wisely or well. With perfect ability to judge correctly, but lacking integrity to award justly, the least deserving candidate for a prize may receive the highest, and the most deserving candidate be denied his just claims. In this manner a great wrong may be done; and at many of our Fairs such wrongs, we believe, have been done. Again, with perfect honesty on the part of an examining committee, but without ability to judge correctly respecting the nature of the improvements submitted to their inspection, the awarding of prizes must be with them like the drawing of a lottery—a blindfold operation.

We have been led to make these remarks at present to direct public attention to the subject, by a circumstance which recently transpired in this city.

Our readers will remember that we related on page 284, how the Common Council of this city had offered three prizes of $500, $300, and $200, for the three best steam fire-engines publicly exhibited on the 6th of last month; and that the chief prize had been awarded to the most inefficient machine exhibited. This was our expressed opinion at the time. It now affords us pleasure to record the fact of that decision being reversed, and a new one made, which gives satisfaction, we understand, to all who can impartially judge of the merits of the case. An appeal was taken by those justly interested in the former decision, and it was referred to a special Board of Engineers, who, in addition to the public trial already reported, gave each engine a private trial, and were at great pains to make the examination thorough in all respects. This Committee awards the first premium to Lee & Larned's, the second to Burnham's, the third to Smith's machine.

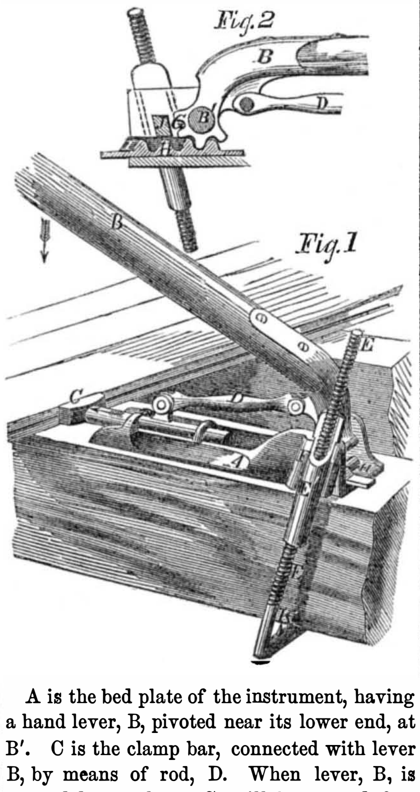
By the former decision, the machine which now receives the lowest prize was awarded the highest. The Board of the Common Council and that of the Aldermen have concurred in the decision of the new Examining Committee, and so has the public. In this case no harm finally resulted from the error first committed, because it has been rectified; but there are a great number of institutions in our country who offer and award prizes annually at their Fairs, and whose decisions, owing to the nature of their organization, once made, right or wrong, are never changed. Many complaints have at various times reached us regarding wrong and improper awarding of prizes at various Fairs, but not knowing the facts of the particular cases we could not intelligently give our opinions regarding those complaints. But at this particular period of the year, prior to the holding of the now very numerous State and County Institutions, Annual Fairs throughout our country, we call upon all such institutions to be very careful in their selection of judges and examining committees for awarding prizes. Let no persons be appointed to such offices unless they possess the qualifications we have pointed out, or hereafter some of them may be called upon—not to their credit—to reverse their decisions or suffer public disapprobation of their conduct.

Recent American Patents.

Improved Quadrant.—By Thomas Hedgcock of Wandsworth Road, England.—This is a very ingenious nautical instrument for accurately determining both latitude and longitude, without a chronometer and without lunar observations. An observation of the sun, only, is required. We are informed that the instrument has been practically tested, and found to be highly successful for the purposes named. If this is so, the invention is one of great importance and value. We hope to receive further confirmations of its good qualities.

Improvement in Augers.—By N. C. Sanford, of Meriden, Conn.—Consists in passing a screw down through the eye of an auger, through the wood handle, into a nut or plate. By turning the screw, the nut or plate is brought snugly up to the under side of the handle, and firmly secures it in the eye. This is a capital improvement. It enables the carpenter to use almost any sort of a stick for an auger handle, for it does not require close fitting.

Improvement in Carpenters' Clamps.—By H. W. Oliver, Whitneyville, Conn.—The implement shown in our engraving is intended to assist carpenters in clamping boards firmly together during the process of laying floors.



A is the bed plate of the instrument, having a hand lever, B, pivoted near its lower end, at B'. C is the clamp bar, connected with lever B, by means of rod, D. When lever, B, is pressed down, clamp, C, will be moved forward, in the direction of the arrow, and pressed against the edge of the board.

The implement is attached to the floor beam by means of the screw hook, E, the nut of which slides up and down between guides, F, on plate A. The lower end of lever B terminates in a segment gear, G (see fig. 2,) which works the rack, H, back and forth. One end of the rack, H, is made wedge-shaped. J is a button which attaches nut E' to A. When lever B is pressed down, the rack, H, moves in the direction of the arrow and pushes the wedge, I, under button J, whereby the latter is lifted, and with it nut E', and hook screw, E. The teeth of the latter, at K, are thus made to enter the beam and hold the implement from slipping.

When the rack, H, is moved in a contrary direction, the wedge, I, withdrawn from beneath the nut, J, and the hook screw, E, drops, carrying the teeth, K, out of the wood, so that the implement may be moved along on the beam to a new position.

When the lever, B, is bent down (as in fig. 2,) it remains self-fastened, the rod, D, being brought to a parallel line, like a toggle joint.

The facility with which this implement may be fastened and detached, its simplicity, cheapness of manufacture, and great strength, render it a most excellent assistant for carpenters. Address the inventor as above, or apply to J. A. Knight & Co., 334 Broadway, New York City, for further information.

Improved Windlass.—By James Emerson, of Worcester, Mass.—Consists of a capstan, windlass, and friction straps or brake, peculiarly arranged. The capstan turns independently of the windlass, and the movement of both is controlled by the strap. The improvement facilitates the warping of vessels to any given position when at anchor. It is also highly useful for general marine purposes. Mr. Emerson is a genius and has patented a great number of valuble improvemens in this line of invention.

Improvement in Locks.—By M. Erb & F. C. Goffin, of Newark, N. J.—Consists in placing a series of sector tumblers upon a shaft, whereby they may be operated without the use of springs, and the lock thus rendered extremely simple, far more durable, and less liable to get out of repair than the locks commonly used.

Improved Corn Planter.—By George Atkins, of Pittsburg, Pa.—This is a small implement, to be carried in the hand. The lower part is thrust into the ground wherever the seed is to be deposited. By the the act of thrusting, the seed is liberated from within, and caused to fall into the earth. The parts are very simple.

Machine for Thrashing and Cleaning Grain.—By Alfred Belchamber, of Ripley, Ohio.—The claims of the patentee will be found in the official list, in another part of this paper. The invention was fully illustrated and described in our last week's issue.

Improved Apple Parer.—Horatio Keyes, of Leominster, Mass.:—Consists in the peculiar construction of the knife head, whereby the cutter is made to conform to the inequalities of the surface of the apple, and cause the apple, however uneven or irregular in form, to be pared in an even and perfect manner.

Machine for Cutting Down Corn Stalks.—By W. S. Tilton, of Boston, Mass.—Consists of a two-wheeled vehicle, having two upright shafts, placed one on each side near the wheels. Horizontal knives are attached to the shafts, which are made to revolve by connection with the wheels of the vehicle. As the machine advances, the stalks are clipped by the knives, and fall prostrate. Farmers will be pleased with this invention.

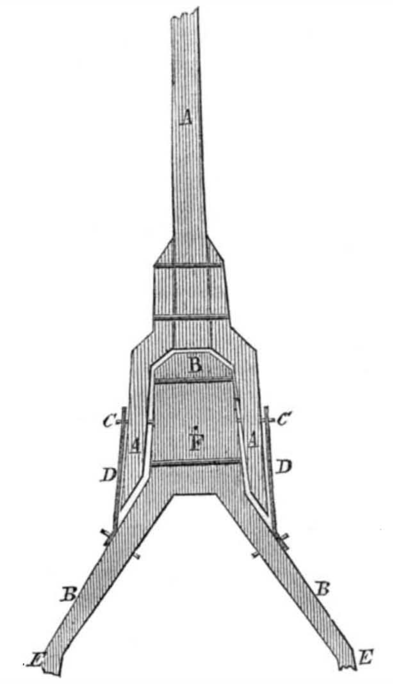
Portfolio for Binding Music Sheets, &c.—By James Shaw, of Providence, R. I.—A roller, constructed of wood, is permanently attached to the back of the portfolio on the inner side of the covers. The roller is equal in length to the covers, and has a longitudinal groove cut in it its entire length; it also has grooves cut in it circumferentially at equal distances apart. Metallic rings are fitted loosely into the grooves. The music sheets, maps, engravings, or other articles, are secured to the rings within the portfolio, by means of a needle and thread.

Improvement in Plows.—By N. S. Lockwood and J. D. Winn, of Dayton, Ohio.—Consists in a peculiar mode of attaching the post or breast to the mold board, and in the peculiar mode of attaching the share to the mold board. This invention is alleged to cheapen the cost of manufacture and increase the durability of plows to which it is applied.

Improved Harvester.—By J. C. Pluche and L. C. Pluche, of Cape Vincent, N. Y.—Consists in a pecular means employed for raising and lowering the sickle, whereby it may be made to cut the grass or grain at any desired hight from the ground; whereby, also, the sickle is allowed to conform to the inequalities of the ground. This appears to be a good invention.

Improvement in Cake Baskets.—By R. Gleason, Jr., of Dorchester, Mass.—Consists in having the lids or covers connected to the basket by swivel joint hinges, whereby the lids may be used as covers over the top of the basket, or, if not wanted, turned down underneath the basket, out of sight. This invention is designed for metallic or plated cake and fruit baskets. It is an ingenious and highly ornamental improvement.

Improvement in Wagon Tongues.—By J. T. Banghman, of Frazeysburgh, Ohio.—The object of this invention is to reduce the weight usually sustained on the necks of the animals that draw the vehicle. This is done by dividing the tongue into two parts, one of which is stationary. The whiffletrees are placed upon the stationary part, and the length and weight of the other portion or guiding tongue considerably lessened.



In our engraving, A is the movable or forward part of the tongue, and B the stationary or after part. They are united by a bolt at C. D are braces for supporting C. The after tongue, B, is connected at E with the axle of the vehicle.

The whiffletrees, or, as some call them, the double-trees, are generally attached to the movable tongue, and their weight is thus thrown upon the necks of the animals. But by the present improvement the whiffletrees are attached at F on the stationary tongue. This lessens the weight of the movable tongue, permits it to be made shorter, prevents galling of the necks of the animals, &c. The advantages of this improvement speak for themselves. Patented May 6th, 1856. Address the inventor for further information.

Recent Foreign Inventions.

Manufacture of Alum.—Peter Spence, chemist, of Manchester, England, has secured a patent for obtaining liquor or cake alum by a new process. He takes China clay, and breaks it into small pieces about the size of beans, and places them on a false bottom in a vessel lined with lead. The clay is now covered for about twenty-four hours with water impregnated with sulphurous acid gas, mixed with 1 per cent. of sulphurous acid, and slightly heated. This dissolves the iron out of the clay. The clear liquor is now run off, and the clay retained, is again covered with pure water, which, after standing six hours, is also run off. Diluted sulphuric acid is then added, heat applied, and the liquor brought up to 240° Fah., and kept at that until the sulphuric acid is saturated with alumina; this requires about forty-eight hours to accomplish. The solution is then run off in leaden coolers, where the alum concretes into cakes.

Chlorine and Peroxyd of Iron.—G. A. Thibierge, London, has patented a peculiar process for manufacturing chlorine and accessory products. In the common way of manufacturing chlorine, the peroxyd of manganese is employed, but this is dispensed with in the new process. Mr. Thibierge passes hydrochloric or muriatic acid gas over iron at a high temperature, and thus obtains protochloride of iron and hydrogen gas. He then passes common air over the proto-chloride of iron at a high temperature, and thus obtains peroxyd of iron and chlorine gas.

Photography.—E. Mayall, of London, has obtained a patent for the application and use of a new material in photography, known by the name of "artificial ivory." This substance is formed of small tablets of gelatine or glue immersed in a bath of sulphate of alumina, (alum) or the acetate of alumina. A combination takes place between the alumina and glue, and forms the substance for receiving the photograpic pictures, as a substitute for the common metal plates and prepared paper. It is stated that it receives a polish equal to ivory, and the tints of the pictures have an exquisite softness, far surpassing those of the daguerreotype. The process for obtaining pictures is the same as that commonly pursued in photography.

Artificial Hard Grain of Leather.—To give any kind of leather the appearance of genuine *hard grain*, J. A. Richards, of London, takes a skin of real hard grained leather, electrotypes it, and then bends the plate thus produced round a roller or drum, and mounts it on a shaft. He then passes the leather to receive the hard grain appearance under this roller, which is subjected to great pressure.

Preserving Animal Food.—This subject appears to be attracting great attention abroad at present. We recently (on page 308) gave the description of the process patented by M. Demait, of Paris. The following is exactly similar to M. Demait's, with the addition of a finishing coating of an albumen composition. The meat is cut in pieces and is pressed, to remove all the blood and serum, and then subjected to the fumes of sulphuric acid gas for a few hours. It is then taken out, exposed to the air for a short time, and dipped into a warm composition of animal albumen, some molasses, and a decoction of marsh mallows. This composition covers the meat with a coating, which protects it from the action of the atmosphere. This method of preserving meat has been somewhat extensively tested, and with success, by the French government Meat thus treated, it is said, has been carried from France to Algiers, and back again, and it tasted sweet and pleasant when cooked. A patent for this process was obtained in the name of R. A. Brooman, of the London *Mechanic's Magazine.*

Joseph Hand, of London, has also secured a patent for preserving meat by a process varying but little from the above. It consists in exposing the meat, in a close chamber, to the action of binoxyd of nitrogen, nitrous acid, and sulphurous acid, in a gaseous state, either singly or combined. The specific action of the acid gases is the great feature in all these patented processes. Smoking meat, to render it more preservative, is a very old, common, and well known method. It is the specific action of the pyroligneous acid in the smoke on the meat, which accomplishes the preservative result. The action of the English and French governments in granting recent patents for the application of certain acid gases, or a combination of them, in preserving meat, shows us how liberal they are in encouraging inventors in making improvements, however small, in important and usful processes.

Still Another.—M. Martin de Lignac, of Paris, has also been granted a patent for preserving meat. It consists in subjecting raw meat, cut into cubes about an inch square, and subjecting them in close chambers, to currents of warm air at about 75° Fah., until the meat has lost half its weight. It is then powerfully compressed in cylindrical tin boxes to about one-fifth the space occupied before it was dried. The lids of the boxes are then soldered on and a small hole left in the top of each. The boxes are then submitted to a heat of 212°, to raise any moisture in the meat into a steam, when they are soldered up perfectly tight.

Important Patent Cases.

The following important patent cases were tried during the present term of the United States Circuit Court, held by Judge Betts in New York City:

Isaac M. Singer and Edward Clarke, versus James Pigot.—This was an action for an alleged infringement of a patent granted to Morey & Johnson, in 1849, and re-issued to the plaintiffs as assignees, in 1854, for improvements in sewing machines.

The point chiefly in controversy was the right to the use of a device (now generally used in sewing machines,) to hold the cloth to the feeding apparatus by a yielding pressure during the operation of sewing with a machine. This being claimed in the re-issued patent, and not in the original, the defendant set up that the re-issue was too broad to be sustained by the original: that the two were not for the same invention: that in the Morey & Johnson machine there is no patentable combination of the spring pressure with the feeding apparatus: that the claim is equivocal and bad from ambiguity: and that the thing, as claimed, was not new with the patentees, but had been before used and patented by Thimonnier, in 1830 and 1845, in France; and used by Howe in 1845–6, and by Bradshaw, in 1847, in this country.

The trial continued two weeks, and the jury after being out all night, and nearly all day, on Monday, were discharged by the Court, as not being able to agree,—eight being for the defendant and four for the plaintiffs.

Charles M. Keller and A. L. Jordan were for the plaintiffs; and George Gifford, of New York, and Joel Giles, of Boston, for the defendant.

Alexander Smith and Jonathan Smith versus Alvin Higgins, Elias S. Higgins, and Nathaniel D. Higgins.—This was a suit for an infringement of a patent granted to Alexander Smith, in 1850, and re-issued in 1852, for apparatus for parti-coloring yarn, by dyeing, by free impression for ingrain carpets, known as "Tapestry Ingrain Carpets."

The plaintiffs and defendants are both manufacturers of carpets, and the plaintiffs claimed a large amount of damages.

The defendants admitted the novelty of the apparatus, as described, both in the original and re-issued patent, and contended that the same was not infringed by them: that the apparatus employed by them was not invented by the patentee, and that if the re-issued patent be construed so as to cover the defendants' apparatus, then it would be void, first, because it would be a fatal departure from the original patent; and, second, because it would then cover more than what was new with the patentee.

The trial continued for two weeks, and the jury, after being out one day, rendered a sealed verdict for the defendants.

The case was tried by Charles M. Keller and Samuel Blatchford for the plaintiffs, and by George Gifford for the defendants.

Notes on Patented Inventions.—No. 11.

India Rubber Manufactures.—On March 9, 1844, Charles Goodyear was granted two patents, one for shirred or corrugated india rubber goods, and the other for a machine used in making them. The claim for the goods was "Forming them of strips or threads of india rubber, and covering them on opposite sides with lamina of cloth, leather, or other material, and uniting them all together by a cement of india rubber, so as to produce a new manufactured article." The machine patented with the manufactured article, embraced a pair of rollers and an endless belt; the threads or strips of india rubber, with the cloth on both sides, were made to adhere by the cement, when passed between the rollers. There was also a stretching frame combined with the rollers, for preserving the strips or threads of india rubber at the required distances apart.

On the 15th of June following, Chas. Goodyear obtained his great patent for vulcanizing india rubber. This embraced mixing the india rubber with sulphur and carbonate of lead, and submitting the compound to a heat of about 270° Fah. The white lead and the subjection of the compound to this heat, are the new features of this invention; the sulphurization was the discovery of N. Hayward.—This new process of Mr. Goodyear was a very great improvement upon his old one of tanning the surfaces of such fabrics by the use of a metalized acid. The high heat to which the compound was subjected promoted the chemical union of the sulphur with the india rubber, and formed a vastly superior and improved fabric to any previously manufactured—it was real vulcanized india rubber. In a trial which took place in England in June, 1854, for an infringement of Hancock's patent for vulcanizing india rubber by the sale of American india rubber shoes, Mr. Goodyear gave evidence that he had invented the above improvement in 1842, and sent an agent to England to endeavor to sell the secret. He, however, committed the great oversight of not securing a patent in that country before he exhibited his samples to Mr. Macintosh, and his foreman, M. Hancock.—Hancock did not purchase Mr. Goodyear's invention, and smelling sulphur in the samples he set to work experimenting and discovered the process for himself. It has been stated, however, that while Mr. Goodyear had only used a high heat in a warm chamber to vulcanize his goods, Hancock was the first to use steam for the purpose, which is a superior method.

We have now arrived at the grand focal point in the history of india rubber manufactures—the invention of vulcanization, or that property imparted to it, by which it is rendered permanently elastic, not easily affected with acids or alkalies, and which enables it to withstand all changes of atmospheric temperature. This invention is one of the most important ever discovered, and the credit of it is due to America.

By a calm investigation of the subject, the evidence we have examined completely ignores the claims of Hancock of England, as the first inventor. But the invention of vulcanized india rubber is not, as we have shown, the work of one mind, nor the result of a lucky stray thought, it is a discovery of growth, as it were. Hayward discovered the sulphurization process, then some years afterwards Goodyear discovered the heating process; both are required to produce vulcanized india rubber.

Since this discovery the application of the substance to an almost endless variety of manufactures is one of the most enterprizing evidences of its useful and adaptable character. Quite a number of patents have been received for such manufactures, but they are all subordinate, and of minor importance to the producting of the vulcanized material, the patent for which will not expire June, 1858.

Henry G. Tyre and J. Helm, of New Brunswick, obtained a patent for an improved machine for cutting threads of india rubber for shirred goods in Oct. 1844; and in the same month Horace H. Day obtained a patent for a machine for stretching the threads of india rubber, and facilitating the manufacture of such goods.

In April, 1845, Nelson Goodyear, of Newton, Conn., secured a patent for combining india rubber with grit, iron, and other metal filings.

In May succeeding he also secured a patent for combining india rubber with fibrous materials, like silk and wool, to give solidity and tenacity to india rubber fabrics, and to make them firm and solid with a smooth surface like leather.

On the 5th of July succeeding, Charles Goodyear obtained a patent for combining stocking-knit cloth with sheets of india rubber, thus producing a new water-proof fabric, which, we believe, has not since been manufactured.

In the same year Horace H. Day, J. Helm, and H. G. Tyre secured a patent for an improvement in machinery for cutting threads of india rubber, and James Bogardus, of New York, obtained a patent for another machine for the same purpose.

On April 17th, 1847, William Ely, of New York, secured a patent for vulcanizing india rubber without the use of sulphur, substituting for it, calcined, or the carbonate of magnesia mixed with india rubber, and submitting the compound to steam heat. We do not know if this compound is equal to a sulphur compound or not; but the two are essentially different in their nature.

In June following J. Gilbert and G. Gay, of New York, obtained a patent for treating india rubber, embracing no less than seven claims, covering the use of sulphurizing india rubber with the fumes of sulphur, as a substitute for flower of sulphur. Also for exposing the fabrics to the action of dry air combined with steam, to remove the clamminess from them. Some arrangements of the machinery were also claimed.

In September following, James Thomas, of New York, also obtained a patent for sulphurizing india rubber with a sulphur acid, preferring a hypo-sulphite, or a mixture of hyposulphite with sulphuret of lead. These two patents seem to be designed to obviate the one embracing the simple use of flour of sulphur. The improvement is questionable.

In April, 1848, C. Goodyear secured a patent for making india rubber balloon articles, such as balls, in a different manner from that secured by E. Chaffee in a previous patent.

On the same date Charles F. Durant obtained a patent for dissolving india rubber with perchloride of formyle.

In January, 1849, H. G. Tyer and J. Helm, of New Brunswick, N. J., were granted a patent for the use of salts of zinc as a substitute for white lead in india rubber compounds containing sulphur. As Patrick Mackie had obtained a patent, in 1834, for the use of sulphate of zinc, it appears to us that as his patent has expired, its use is now public property connected with india rubber.

This subject will be concluded next week.

Does the Moon Rotate on her Axis.

Since we published a short article, on page 320, stating that the common accepted theory of the moon rotating on her axis once in 28 days, was disputed in England by J. Simonds, Inspector of Schools, and others, we have received a number of communications with diagrams to illustrate how it does rotate once in the time specified. All these communications prove exactly what their authors intend they should, but they are not proper answers to the question in dispute. By the moon rotating on her axis once during her sideral revolution round the earth, she must present the same face to one fixed point of the earth, but not the same face to every portion of the earth. It is asserted by those who dispute the axial rotation of the moon, that, like the ball of a governor on the steam engine, continually revolving, but not rotating and showing the same face to its shaft, so the moon always shows the same face to every part of the earth. Is this so? That is the question. It can easily be determined by observation at different points of the earth's surface. If photographs were taken of the moon's disk in England and America, and compared together and examined by a microscope, the dispute, we conceive, would soon be settled. In the meantime those who deny the moon's rotation, assert that the theory of its rotation in about 28 days, was invented to account for seeing the same face of the moon, from only one fixed point of the earth, and that in Eu rope.

Every observer of the moon has noticed that it always presents—very nearly—the same face towards us. This is accounted for by allowing her to make but one rotation on her axis, during her single revolution round the earth. But these periods are not exactly equal, for the time of the moon's revolution, is subject to small irregularities whereby we sometimes see a little more of one of its edges than usual either on the eastern or western sides of her equatorial regions. This is called the moon's *libration*, and is also claimed by those who dispute her axial rotation, as favorable to their view of the question. It would be an anomaly, however, in the motions of the bodies in our solar system if the moon possessed no axial rotation; therefore reasoning *a priori*, we would conclude it had such a motion. Deductions, however, must never be allowed to stand fo facts in science, the soul of which is, correct observation.

New Polishing Powder.

Mix equal quantities in solution of oxalic acid and sulphate of iron, then dry the precipitate, calcine it, and use it in fine powder. It is superior to lixivated colcothar for polishing optical glasses, and fine metal work.

Electro-Chemical Baths.

An article on this subject by Prof. Vergnes—the inventor—will appear in our next number.

TO CORRESPONDENTS.

J. O. G., of Vt.—Your proposition to construct a balloon to start from the top of Mt. Washington during the summer, with a pleasure party for Saratoga, is somewhat out time. You should have begun its construction last winter if you expected to have it ready for embarkation in season. You ask our advice as to the best means of propelling the aerial car, and also as to the cost of such an establishment. We confess our inability to meet your wishes on these points. Rufus Porter, late of Washington, and Professor Pennington, of Virginia, have bestowed more time to the consideration of this subject than any other persons known to us. If you could put your heads together, perhaps something grand might result from your combined wisdom. If you are really serious about the matter and wish the best advice we can offer, we advise you to drop the scheme and go to hoeing corn and potatoes—a more profitable employment of your time, by far.

L. M. C., of Mass—If you would amalgamate linseed oil with the pulp of paper machie, it appears to us it would render it water proof. Or by mixing it with a very thin solution of india rubber, then submitting the sheets, before they are quite dry, to the fumes of sulphur in a hot chamber or oven, you would accomplish the object. These are suggestions merely, as you are acquainted with the use of copal and other varnishes for rendering such articles water-proof.

H. A., of C. E.—From the data you have given us, we make the nominal power of your wheel 37-horse. If it is well made, its actual power will be 28-horse; if not first-rate, deduct a third from its nominal power.

G. B. O., of ——.—India rubber and gutta percha have often been proposed as a better material for railroad cars than wood, so as to remove the accidents arising from splinters by collisions. Corrugated sheet iron, we think, is a better material, and is fire-proof

B. P., of Conn,—There is no special treatise on gums to which we can refer you. Gum copal will make a water proof fabric stiff; a thin varnish of gutta percha will not do it.

T. G. S., of Md.—The method described by you for finding out the hight of a tree is not so good as the old plan so well known, by the use of a notched rod held up o the eye.

A. L. B., of Phila.—$675 is the lowest price for the engine. The metal nickel contains no acid. Overman's Metallurgy will give you some information. You will find it for sale in your city.

W. B., of Pa.—We have been told that sweet oil drunk freely is an antidote for that terrible poison strychnine, but personally we cannot endorse the statement. You might make some experiments with animals.

H. McL., of Me.—One square foot of grate surface and nine square feet of heating surface—flues, &c.—are allowed for each horse power in a boiler.

C. C. M., of N. Y.—All new boilers are subject to priming. A funnel-shaped mouth-piece with a perforated plate on the pipe that conducts the steam to the cylinder tend to shed the water and prevent it passing over.

D. C. W., of Ohio—Write to A. M. Mace, of Springfield, Mass., about his Benzole apparatus.

J. C., of N. Y.—You cannot obtain motallic silicon in this city.

Fairchild & Lawhead, of Morgantown, Monengalia Co., Va., wish to correspond with a manufacturer of the best lathe for turning carriage spokes.

E. W., of N. Y.—The courts have decided that the Norcross Planing Machine is not an infringement of the Woodworth. See case reported in the Sci. Am. some time ago.

G. E., of Wis.—The method of case hardening iron with the prussiate of potash is described on page 256, volume 3, Sci. Am.

J. C. C., of Mich.—You will find the information wanted about files on another column.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, June 21, 1856:—

N. B. S., of Ind., $110; C. W. O'L., of S. C., $25; G. B. C., of N. Y., $10; E. & A. S., of N. Y., $25; H. B. & Co., of N. Y., $250; T. W. R., of Ala., $30; W. H. B., of Ind., $350; J. H. Jr., of N. Y., $20; E. C. C., of Mass., $25; C. W. & Co., of Min., $100; V. & B., of N. Y., $100; S. B. F., of Mass., $30; J. A. B., of N. J., $30; M. S. P., of Mass., $30; G. S., of N. Y., $30; P. & P., of ——., $20; A. M., of Mass., $25; J. B., of Ill., $25; J. S., of Conn., $30; S. & G., of N. Y., $30; J. T. D., of N. Y., $52; W. M., of O., $25; E. G. S., of N. Y., $25; H. H. J., of N. J., $30; J. C., cf Ill., $25; W. P. C., of La., $50; R. G. Jr., of Mass., $10; D. C. W., of Pa., $25; T. B., of Conn., $25; A. & G. M. F., of N. Y., $30; A. G. B.. of Conn., $25; W. W. H., of ——., $30; H. P., of O., $27.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, June 21:—

E. T. H., of Pa.; D. C. W., of Pa.; C. W. O'L., of S. C.; S. W., of Ind.; J. B., of Ill.. (2 cases); T. B., of Conn.; E. C. C., of Mass.; D. H., of Conn.; H. P., of O.; A. & G. M. F., of N. Y.; A. G, B., of Conn.; E. G. S., of N. Y.; J. S., of Conn.; S. & G., of N. Y.; J. C. T., of Ill.; W. M., of O.; A. M., of Mass.

Important Items.

To the Unfortunate—We are no longer able to supply the following back numbers of the present volume Nos. 6, 12, 14, 15, 17, 18, 19, 21, 22, 23, 24, 25, 27, 28, 29, 30, 34, 35, and 37. Such numbers as we have to furnish, are gratuitously supplied to such subscribers as failed to receive them; and we would take occasion to state, that any person failing to receive their paper regularly, will confer a favor by notifying us of the fact. Missing numbers should be ordered early, to insure their receipt, as an entire edition is often exhausted within ten days after the date of publication.

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

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

Receipts—When money is paid at the office for subscription, 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.

Literary Notices.

The Marble Workers' Manual—This is a very excellent treatise on marbles, and the methods of working them—translated from the French by M. L. Booth. It also contains an appendix concerning American marble, which thus renders it of greater interest to American marble workers. It describes the various kinds of marble of Greece, Rome, and other countries, and points out their characteristics. The working of designs, coloring marble, making artificial stone, and a vast quantity of other information relating to the subject is presented in a clear and vigorous style. This book should have a large circulation, as the workers in marble are very numerous in our country. I: is published by Sheldon, Blakeman & Co., this city.

North British Review—The number of this distinguished Review for this quarter contains nine very fine essays. Historical Painting is a review of Macauley, or rather, his style, and is very favorable to that historian. Grotes' history o' Greece, Indian Literature, British New Testament Criticism, and Peace and its Political Duties, are some of the subjects treated. This Review is always profound, and characterized by a spirit of moral liberality and candor. It is published by Leonard Scott & Co., 54 Gold st., this city.

United States Magazine—The July number opens a new volume, and commences a new era in the history of that work. The magazine comes to us in handsome book form, and contains 100 pages splendidly illustrated. It compares closely, if indeed, in some respects it does not exceed the best of our present monthlies. How the publishers are enabled to furnish so elegant a work for so small a price is a puzzle. Terms 20 cts. per single copy. $2 a year. Emerson & Co., N. Y., publishers.

Rachel and the New World—This is an amusing volume by Leon Beauwallet, one of the suite of Mdlle. Rachel, the celebrated French actress. It details, with the nervous ardor and exaggeration common to all Frenchmen, the incidents and strange sights which befel the author and his friends in a strange land. Nothing suits him. No place but Paris is fit to live in. But his story is told in a dashing racy style, that interests and delights the reader. Dix & Edwards publishers, No. 321 Broadway, N. Y.

Haswell's Mechanics' Tables—This is a very useful and convenient little volume, by C. Haswell, the well known Marine Engineer. It contains a great number of useful tables, and rules for measuring surfaces, cubes, &c., and how to cut out sheets, hoops, and plates of metal for boilers, domes, &c. It is such a work as every engineer should have at his elbow to save him a vast amount of labor in calculating. It is published by Harper & Bro. this city.

The Modern Story Teller—A handsome book comprising over 300 pages, made up of selections of "the best of stories of the best authors." For summer reading, when short piquant stories are taken with a relish, this book is particularly adapted. Price 50 cents. G. P. Putnam & Co., 321 Broadway, publishers.

The Pictorial Fourth of July Brother Jonathan is a splendid sheet. It is filled with large and beautiful engravings. B. H. Day, publisher, Beekman street, N. Y.

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Science and Art.

Opinions Regarding the Cause of Cholera.

John Lea, of Cincinnati, author of the Geological Theory of Cholera, recently published an article in the Cincinnati *Gazette*, addressed to us, in which he adheres to his opinion that cholera shuns all primitive formations where no calcario magnesian water is to be found. He asserts that if people died of cholera in New York in 1854, "They must have subjected themselves to the disease by the use of hard water, or doses of magnesia." He also says: "I have never yet known a single individual to die of cholera who used rain water exclusively. I believe that not one has died who used water that had been boiled, and he cholera generating impurities precipitated." He asserts that the use of rain water is a preventive of this disease, and that it is neither looked for nor feared in southern cities, villages, and on plantations, where such water is exclusively used as a beverage. If this is so, cholera need be no cause of terror in any place; and, we admit, it is not of so much consequence to know what causes the disease as to know how to prevent it. We have no positive data, however, on which to place implicit reliance for such opinions. He is, undoubtedly, mistaken in regarding the use of hard water and doses of magnesia as being the cause of so much cholera in 1854, in New York. The water with which this city is supplied contains only 2·8 grains of carbonate of lime and magnesia to the gallon—thus it may be called soft water. If cholera were a geological disease, belonging to the limestone-magnesium formations, it is certainly strange that before the introduction of Croton water, when New York was furnished for a long period with water containing 128 grains of limestone and magnesian impurities to the gallon, cholera was unknown. During the prevalence of cholera in August, 1854, from 600 to 1,000 persons were carried off by it weekly. We are not so credulous as to attribute such mortality to large doses of magnesia taken by those persons,—Croton water having its source in the primitive formations of gness and mica.

Impure water, no doubt, causes and contributes to disease, but this is mostly owing to the organic matter, and not the lime or magnesia it contains. This was found to be the case in London during the prevalence of the cholera in 1848-9. One district in that city was supplied by two river water companies—one company supplying 25,000 houses and the other 40,000. The mortality was only 37 in 10,000 of the population supplied by one company, while it was no less than 130 in the same amount of population supplied by the other. This difference of mortality was unmistakably traced to the water, not, however, to any excess of lime or magnesia in the one over the other, but organic matter. This is the opinion of the most eminent physicians in London, as expressed by them in a conversation which took place in the Society of Arts only so recent as the 14th of last month, in discussing Dr. Clarke's method of purifying water by the use of hydrate of lime. There are so many facts before us which seem to contradict the geological theory of this disease adopted by Mr. Lea that we cannot accept it.

We are not prepared to deny that the use of rain or boiled water is a sure preventive of this disease, as Mr. Lea asserts. If this is so, we heartily rejoice that the remedy is so simple. But we must have more facts (we really hope we may obtain them) to endorse this theory before we can place implicit reliance in it.

New Water-proof Clothing.

"Twenty thousand tunics now being prepared for the French army, are, according to a recent statement of M. Payen, a chemist of some note, rendered water-proof by the aid of alum and sugar of lead, without the aid of india rubber or gutta percha, or any other gums or oils. The process given is very simple, and is claimed to render any species of tissue water-proof. Dissolve two pounds and a half of alum in four gallons of water; dissolve, also, in a separate vessel, the same weight of acetate of lead in the same quantity of water. When both are thoroughly dissolved, mix the solutions together, and when the sulphate of lead, resulting from this mixture, has been precipitated to the bottom of the vessel in the form of a powder, pour off the solution, and plunge into it the tissue to be rendered waterproof. Wash and rub it well during a few minutes, and hang it in the air to dry."

The above we have seen in a number of our exchanges. We are well aware that cotton goods, immersed in solutions of alum and sugar of lead, after being thoroughly dried, repel water, and are exceedingly difficult of saturation in hot water; but we were not aware that goods treated in the manner above described, could be rendered water-proof—equal to those made of India rubber. An experiment, however, can be easily tried by any person.

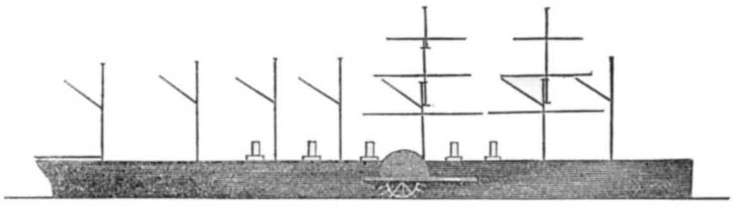
The Great Eastern Steamship.

Our readers have already been made acquainted with one of the most gigantic enterprises of this or any other age, now in the act of being carried out in the city of London; we mean the leviathan iron steamship now being constructed under the superintendence of those distinguished engineers, Brunel and Scott Russell. But although the dimensions of this great vessel are somewhat generally known so far as figures are concerned, we cannot form so correct an idea of masses by these, as by comparing one mass with another. The accompanying diagrams, we present for this purpose.

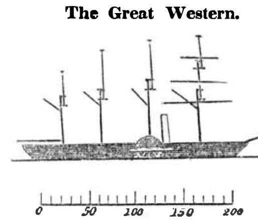
At a glance we can judge from these of its enormous dimensions. *The Great Western* was considered a large and noble steamer in its day; then the *Great Britain* was a world's wonder when it first floated on the deep; now it has been partly dwarfed by the *Persia*, whose gigantic proportions place her without a rival, at present, in navigating the ocean. But large though this ship is, and large though the others were, the accompanying figures show them, by comparison,—as it has been justly termed, "minnows by the side of a Triton."

In an article in the *London Quarterly Review*, it is stated that the great ship was projected by Mr. Brunel—the father of "Transatlantic Steam Navigation," and that it is building at Milwall, London, at the works of Scott Russell & Co, The material of the hull is the best iron plate, and the principle upon which these are combined together is novel. In length it is 700 feet, in breadth 60—nearly twelve times the length of its breadth. It has no ribs springing from the keel, and none of the ordinary ship framework. It has, however a system of ribs, or rather webbing, not transverse like the common ribs of ships, but longitudinal, running from stem to stern, up to eight feet above the water line;—these form thirty-two webs, sub-divided into convenient lengths and covered inside with iron plates three-quarters of an inch thick, thus forming a double planking, or rather her frame-work forms a system of cells upon the same principle of construction as the Menai Tubular Bridge,—combining the strongest method of construction with the least weight of material.

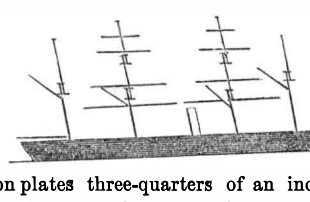
THE GREAT EASTERN.



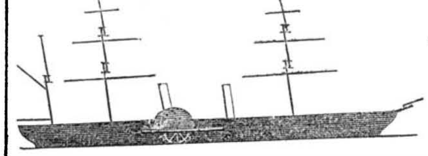
The Great Western.



The Great Britain.



The Persia.



Heretofore, iron ships have been built on the same principle as wooden ones, by lightening their sides gradually towards the deck. This faulty construction has led some of them to break in halves when run upon rocks and left suspended at the center of their keels. All the lines of a ship are curved. In wooden ships, the elasticity of the planking allows it to be easily modeled to the ribs; but not so with unyielding plates of iron an inch thick. Each plate receives the exact form for the place it is to occupy before it is placed in position. Each plate, therefore, formed the subject of separate study to the engineer, with the exception of some situated in the mid-ship section. For each plate, therefore, a model or pattern was required. The plates were first cut by huge shears, driven by a steam engine and the inclination or curve given to each by passing them through a system of adjustable rollers, and when completed each was numbered, like stones for an arch, to indicate the exact place it was to occupy in the ship. The plates of this vessel have been rivetted together like those of a steam boiler. It is divided into ten water-tight compartments, or bulk heads, 60 feet apart; also into a number of sub-compartments, and with a double top iron celular deck, and iron lower decks. By this multiplication of rectilinear apartments, this ship is made almost as strong as if it were made of solid iron, and yet in proportion to its size, it is rendered as light as a wooden ship; and it is so put together, that if it were broken into several parts, each would float and sustain itself.

The vessel is to be driven by two different kinds of propelling agents—paddle wheels and a screw,—the first combination of the kind placed on a steamer. Her paddle wheels, 56 feet in diameter, will be propelled by four engines, the cylinders of which are 6 feet 2 inches in diameter, and the stroke 14 feet. The motive power of these will be generated by four boilers. Enormous as are these engines having a nominal power of 1,000 horses, and standing nearly 50 feet high, they will be far inferior to those devoted to the screw. These will be supplied with steam by six boilers, working to a force of 1,600 horses—the real strength of the combined engines being equal to 3,000 horses nominally, but actually nearly twice that amount. The shaft of the screw is 160 feet long, weighs 60 tuns, and the screw is 24 feet in diameter. The calculated speed of the ship under steam is expected to average from fifteen to sixteen knots. Sails will not be much used except for keeping her steady, but in case of a strong fair wind arising, she is furnished with sails to run at a high speed. She is to have seven masts, two of which are square-rigged, and the whole spreading 6,500 square yards of canvas. It will be observed by the diagram that she carries no bowsprit, and has no sprit sail. This plan is borrowed from the Collins steamers to avoid top weight at the bow. Her whole crew is not to exceed 400 men. Steam sailors are to be employed in the form of four auxiliary small steam engines to do the heavy work, such as heaving the anchor, pumping, and hoisting sail.

It is obvious, that some special means must be adopted to direct this vast mass of moving iron as she flies on her course. The usual contrivances will not apply. No speaking trumpets, for instance, could make the captain heard either by the helmsman, or the look-out at the bow, more than three hundred feet away, and the engineer, would be beyond the reach of his voice. On ordinary occasions a semaphore will, in the day time, give the word to the helmsman, whilst at night and in foggy weather, he will be signalled how to steer by a system of colored lights. The electric telegraph is also to be employed to communicate the captain's orders to steersman, engineer and others.

If the wheels—56 feet in diameter—of this ship, make only 10 revolutions per minute, or 280 feet of piston velocity, which is not a high speed in these days, it will run at the rate of 18 1-4 miles per hour, allowing 11 per cent. for slip. If the *Great Eastern* makes such an average speed, she will cross the Atlantic—3000 miles—in six days and a half.

The saloons and apartments belonging to this ship will be most capacious—800 first class, 2000 second class, and 1200 third class passengers can be accommodated.

We almost tremble for the proper management of such a huge leviathan of the deep; but this is the age of great engineering enterprises, and Uncle John Bull is a fellow of wonderful capacity, courage, and determination. At the late half yearly meeting of the Company to whom she belongs, it was stated that it would be ready for launching about the 1st of September next, and she would make her first voyage to Portland, Me., and ply for some time between Liverpool and that port. Her first voyage will, therefore, be made to the "Great West," instead of the "Great East," as was first contemplated.

The following are the dimensions of some of the largest steamers in the world:—The *Great Western*, 236 feet long, 25 broad; *Great Britain*, 322 feet long, 51 feet broad; *Himalaya*, 350 feet long, 43 broad; the *Persia*, 370 feet long, 45 broad; the *Adriatic* 354 feet long, 50 feet broad; the *Vanderbilt*, 335 feet long, breadth 45 feet. The *Great Eastern* is more than twice the size of the largest of these.

The Royal Geographical Society, of London, has awarded a gold medal to Dr. E. K. Kane, for his discoveries in the polar regions. At the same meeting of the Society, Lieut. Maury was elected a member.