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TERMS--$2 a-year,—**$1** in advance and the remainder in six months.

Paris Fuel Shops.

The fuel required to cook a dinner in Paris costs nearly as much as the dinner itself.—Fuel is very scarce, and the American is surprised to find shops all over the city, fitted up with shelves like those in shoe stores, upon which is stored wood, split up in pieces about the size of a man's finger, and done up in bundles, as matches were in the days of the tinder box, steel, and flint; they are about the size of a bunch of asparagus. These little bundles sell at from two to six sous. Larger sticks are bundled up in the same way, and sell at a frightful price. Charcoal is sold by the weight, and hard coal being nearly as expensive as wood, can be bought in the smallest quantity at any of these fuel shops.

Sugar Planters' Convention.

The sugar planters of Louisiana recently held a covention at New Orleans. The President, Hon. John More, stated in his address, that the sugar crop of 1854-5 produced 346,-635 hogsheads of sugar, and 577,840 barrels of molasses, and the crop of 1855-6, 235-000 hogsheads of sugar, and 350,000 barrels of molasses. He asserted that adequate facilities for the transaction of this trade were not furnished by the city authorities of New Orleans. This deterred him and other planters from sending their crop to that market, and he urged that, unless proper accommodations were furnished there, the planters would be obliged to combine and establish a new depot somewhere else.

The people of New Orleans should at once furnish such accommodations.

Remedy for Toothache.

Chambers' Journal alludes to a process described by Dr. Roberts before the Royal Scottish Society of Arts, for cauterising the dental nerve, and stopping teeth without pain, by means of a wire applied to the patient's tooth perfectly cold, and afterwards instantaneously heated to the required extent by a small electric battery.

Education in New York City.

There are 125,000 children of the proper age for schooling in New York, and they are educated at the public cost, the annual expenditure of the city for that purpose being $917,853—almost one million dollars. This is a much larger sum than is expended in any other city of the Union, and perhaps of the world. In addition to the amount named, it is believed that not less than $500,000 is annually spent for the support of private schools.

Steamboat Tunnage of the United States.

	Tuns.
Steamboat tunnage enrolled on the Ohio river	144,473
Residue of the Mississippi valley	129,050
Steam tunnage of the Lakes	106,154
Steam tunnage on the Atlantic seaboard	261,283
Steam tunnage oh the Pacific coast	14,279
Aggregate	655,239

Works are being erected in Birmingham, England, for the manufacture of architectural devices in basalt. The "ragstone" of the locality is melted and cast in cold molds, producing a species of basalt, or glassy lava, to which the name of obsidian is given.

IMPROVED ORNAMENTAL CASTER.

Our engraving is illustrative of an improved Ornamental Caster, made by Messrs. R. Gleason & Son, Dorchester, Mass., on which an application for a patent is pending. The novelty consists in the combination of egg cups with the caster in such a manner as to increase the elegance of the whole design. Between the curves of the caster boxes there is a small platform, furnished, in its center, with a spindle, *a*; on this spindle the egg cup, *b*, is placed, a cavity in the bottom of the cup being formed for that purpose. The spindle serves to prevent the cup from falling when the caster boxes are tipped or revolved, although from the external appearance the cups would seem to have no security of this sort.

The extreme ends of the platforms before named, terminate in graceful ornamental hooks *c d*, between which the egg spoons, *e*, are securely hung, and by their presence add to the completeness and beauty of the design. They give the effect of pendants, so much admired in ornamental metallurgy of various kinds.

The figurative ornaments seen on this caster are of a very rich character, and while there are combined with them the additional conveniences for egg cups and spoons, the cost of the article is hardly at all increased. These casters, we have no doubt, will become very popular. For the private dining table, the hotel, or the steamer, they are admirably appropriate.

Messrs. Gleason & Son are extensive manufacturers of this kind of ware, and have facilities for the production of the most magnificent specimens. For further information respecting the above improvement address the manufacturers.

Life Boat Ships.

The *Nautical Magazine* recommends all ships to be built on the life boat principle; and it states that, without exception, every steamship launched in New York last year was provided with bulkheads, dividing the engine-room from the other space of the hold. The making of these vessels into water-tight compartments is a step in advance for the safety of life from the dangers of the ocean.

The magazine also advocates the use of a deep iron keelson, made hollow, and connected with a tube at each end of the vessel, by which the hold would be well ventilated by a current of air constantly passing through. This is a good idea, and worthy of being promptly acted upon. For want of proper ventilation, timber ships last only about half the usual time they would otherwise do.

The new steamship *Fulton*, which sailed on her first trip to Havre last Saturday, is divided into five water-tight compartments, and is fitted up with every means to render it a steam life ship, that is if a hole were stove in her hull, as happened in the lamentable case of the *Arctic*, it will not sink, nor can the water from a leak reach the boiler room, to flood the fires. In addition to the life-boat principle on which this steamship is constructed, she has eight large Francis' metallic life-boats, capable of carrying 450 persons, and a life preserver for each, also two of Worthington's largest sized steam pumps, and 11 others, capable of being employed as fire pumps. The case of the *Arctic* has led to the adoption of the most efficient measures for the prevention of such a catastrophe happening to any of our steamers.

Salts for Stables.

If a compound of gypsum and sulphate of magnesia be used on the floors of stables, it will absorb the moisture and ammonia, keep the stable dry and free from offensive smell. The compound salt, after it has absorbed all the moisture possible, is removed to be used for manure, and fresh salts applied in the same way. This is an excellent plan for keeping stables dry and healthy.

A Worthy Example.

A correspondent of the Providence (R. I.) *Journal* states that Geo. M. Richmond, Esq., has established an evening school on his premises, near the Woonasquatucket Print Works, for the benifit of the juvenile portion of his help, and for as many other boys, who reside in the neighborhood, as can be accommodated. He provides them with a school-room, teachers, books, and other things necessaay for the prosecution of their studies, free of expense. Some of the boys have not had any schooling, and others have not had sufficient to be of any material benefit to them without further instruction. It is for these two classes principally, that Mr. Richmond has established the school; a part of their leisure hours devoted to useful studies wil improve their minds and correct their morals.

What Labor Does.

To show the effects of mechanical labor in advancing the price of iron, the North British *Quarterly Review* presents the following calculation:—"A bar of iron valued at $5, worked into horse shoes is worth $10·50; needles, $355; penknife blades, $3285; shirt buttons, $29,480; balance springs of watches, $250,000. Thirty-one pounds of iron have been made into wire upwards of one hundred and eleven miles in length, and so fine was the fabric that a part ofit was converted, in lieu of horse-hair, into a barrister's wig.

Strong Decks for Ships.

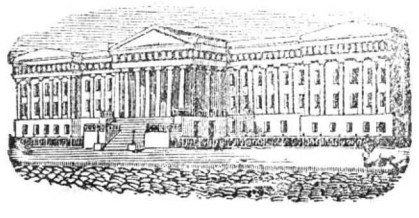
M. Nillus, a French mechanician, says that almost all vessels, whether wood or iron, have hitherto been constructed on a wrong principle. The greatest possible strength has been given to the sides and bottom, while the deck has been neglected. But a ship should be regarded as a great tube or box, capable of sustaining a load at the middle while suspended at its ends, or conversely, or sustaining loads at each end while supported at its middle.—To obtain this result with the least weight of materials, Mr. Nillus says that the upper and lower parts of the vessel—otherwise the deck and the bottom—should be the strongest.

Dry Kilns.

The advertisement of Bulkley's Dry Kilns, which appears in the appropriate column, is corrected to read "at a cost of two cents per barrel," instead of "two cents per pound."—This important difference is worthy of being noted down.

Enormous Railroad Scale.

The largest railroad scale in the world, in actual use. is one built by Messrs. Fairbanks & Co., of Vermont, for the Mine Hill and Schuylkill Haven Railroad, in Pennsylvania. It is one hundred and twelve feet long, and is capable of sustaining a load of a hundred tuns.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING FEB. 5, 1856.

BELL STENCH TRAP—Chas. H. Eush, of Fall River, Mass.: I do not claim as new in themselves the perforated plate, or grating, or bell, or cup, with surrounding chamber and central exit pipe, arranged as described, to form, in combination, a stink trap for sinks, as such is old, and commonly known as the bell stench trap.

But I claim providing the said grating or perforated plate, E, of the sink with a funnel neck or tube, F, arranged centrally, over, and in combination with the bell or cup, 2, made separate or detached from the grating for operation together, as shown and described, for greater convenience in the use and better cleansing of the trap, with total exemption from escape of effluvia in the apartment wherein the sink is placed under every use of the trap, by funnel or otherwise, as set forth.

CORN DRYER—Solomon Fernheisel, of Tyrone Township, Pa.: I claim the perforated pipes, no's. 2 and 3, in combination with the hopper placed above the hot air chamber, A, as described, so as to allow the air to pass between the inner perforated pipe and the smoke pipe, while the hot air from chamber D passes between the outer perforated pipe and the exterior pipe or casing, O, substantially in the manner and for the purposes set forth.

ORE WASHER—Wm. Ball, of Chicopee, Mass.: I claim in machines for washing pulverized ores, the trough, I, constructed with the ledge, K, as described, and operated in connection with a head of water kept above the level of the said ledge, in the manner set forth.

RAKING ATTACHMENT TO HARVESTERS—A. H. Caryl, of Sandusky, O.: I do not claim a reciprocating rake placed beneath the platform, C, for that has been previously used.

But I claim operating the rake, that is, the rod, E, provided with teeth. b, by means of the weight, I, and pulley, G, the weight and pulley being connected to the rod, E, by chains, f, and otherwise arranged substantially as shown and described.

PHOTOGRAPHIC PLATE FOR VISE—Levi Chapman, of New York City: I do not claim fitting a jaw with a limited motion combined with a sliding jaw, retained by a ratchet or pins, as metallic vises have heretofore been constructed on this plan.

But I claim the arrangement of the jaw, d d, with the piece, 3, between the slides, 4 4, and between the cross piece, e, acted on by the crank piece, f, or its equivalent, when combined with the jaw, e, changeable in the grooves, 2 2, in the sides, b b, of the trough, in the manner and for the purposes specified.

LUGS FOR CAST-IRON SHINGLES.—John Cook, of Westmoreland, N. Y.: I do not pretend to have invented cast-iron shingles, or giving them any particular form or external shape, nor do I claim them with the rib, a, or the half round flange, b, or the lap, c, or the elevations, g, as all these contrivances have been heretofore in use.

But I claim the projection, e, with the nail hole, f, on the under side of the shingle for fastening the same to the rib, either on its upper or lower edge, at choice, and for securing the nail from the wet, thereby preventing it from rusting and becoming loose.

PUMPS—Edward N. Dickerson, of New York City, and Elisha K. Root, of Hartford, Conn.: We claim, first, two buckets working in pump barrels, so arranged that the column to be raised passes through both in succession, in combination with the spiral cams or their equivalents, so arranged as to move said buckets with uniform velocity, and to maintain, practically, a uniform and constant lifting action upon the water, substantially in the manner described.

Second, imparting to the column of water, by means of a reciprocating pump, a constant and uniform flow through the ascending main, substantially as described.

HEATING FEED WATER APPARATUS FOR LOCOMOTIVES—Peter S. Ebbert, of Chicago, Ill.: I claim the auxiliary pipe, y, as arranged, in relation to that part of the main pipe containing a valve, so that communication may exist between the water space of the boiler, and the interior of the feed water pipes in the smoke stack, when the feed pump is not in operation, as set forth.

SAW SET—John G. Ernst, of York, Pa.: I claim the expanding arms, a a a a, in connection with the plate, c, and screw nut, E, arranged and operated in the manner described.

CUTTING FILES—Major H. Fisher, of Sing Sing, N. Y., assignor to Jos. A. Hyde, of Bridgewater, Mass.: I claim the sliding and self-adjusting chisel holder, g, constructed and operated substantially as described.

THREE WHEELED VEHICLES—Elisha S. French, of Binghamton, N. Y.: I claim the combination and arrangement at the rear of the vehicle, substantially as shown and described, of the castor hung swiveling wheel, F, in such connection with the perch or body, that while in the forward run of the vehicle the said wheel runs in a parallel course, central to the other two advance wheels, and at considerable distance behind them, it in backing the vehicle is caused to occupy a like parallel and central position, with its rim or tire in direction of the travel but in closer proximity to the fore wheels, and on the reverse side of the swivel towards the front end of the vehicle, and out of the way, as it were, whereby additional facilities are afforded for backing the vehicle in a crowded thoroughfare, and the other advantages specified are obtained.

FEED WATER APPARATUS TO STEAM BOILERS.—Thos. Firth, of Cincinnati, O.: I claim the arrangement of the pistons, q q, beam, 10, pins, 29 29, attached to the valve, 12, and spring, 13, or their equivalents, for giving motion to the steam valve, 12, for admitting steam to and from the steam cylinders, 4 4, and pipes attached thereto.

BENCH VISE—Thos. Gissinger, of Alleghany, Pa.: I claim the projection, g, and the projections, l and K, arranged as described, and for the purpose set forth.

BENDING SHIP'S HOOKS—Elisha Harris, of Providence, R. I.: I claim the roller or former, A, of the intended form of the interior of the hook provided with a pocket or clamp for securing the eye of the blank during the bending operation, substantially as described.

MAKING ROPE—Oliver S. Hazard and Isaac Peck, of Coventry, R. I.: We claim the movable self-adjusting trumpet guide, Z, as described.

BRICK PRESSES—Henry J. Hughes, of Davenport, Iowa: I claim, firstly, the table actuated as described, or by any other equivalent means, by which the bricks are discharged after being pressed and by which they are borne away from the press head.

Secondly, the specific arrangement described, for oiling the mold during its passage up and down over the head.

HOT AIR FURNACES—Samuel Macfarran, of Philadelphia, Pa.: I claim, first, connecting with the inner end of the bottom plate, O, of the space, for supplying the furnace with fuel, a ring, N, for supporting and holding together the segmental plates of the fire pot, so as to enable said ring to be held firmly by its connection, with the plate, O, which is secured to the front part of the furnace, as described.

Second, I claim arranging the adjustable horizontal plate, e, having spaces in its edges in which the heating pipes fit above the fire pot, and capable of being raised and lowered for the double purpose of diverging the heat entirely around the said heating pipes and in contact with the sheet-iron radiating casing, and regulating the draft of the furnace, and in fact, converting into an air tight heater if desired, substantially as described.

CARRIAGE SPRINGS—Richard Montgomery, of New York City: I claim the corrugated spring, D, when used in connection with the spring, A, substantially as described.

WEIGHING SCALES—S. S. Mills & M. Bissell, of Charleston, S. C.: We claim connecting the scale beam, A, with arms, a a' a'', two or more, and otherwise arranged as shown, so that either of the weights on the arms may, when not in use, be placed in line with the fulcrum of the beam, substantially as described and for the purpose specified.

FLOUR BOLTS—Stephen C. Mendenhall, of Richmond, Ind.: I claim, first, the direct and positive expansion and contraction of the valves, g g g, between fixed and varying points in the manner and for purpose set forth.

Second, I also claim the combination of the expanding and contracting valves, g g g, with the cords, d d d, pulleys, f f f, drums, x x x, and indicators, j j j, or their equivalents for the purpose specified.

FIRE POKERS—George R. Moore, of Mount Joy, Pa.: I claim the arrangements, or any of their equivalents, by which the several motions of the poker are obtained. Also the arrangement or its equivalent, for contracting the handle of the poker at pleasure.

LANTERNS—Francis Morandi, of Boston, Mass.: I claim the funnel, D, applied to the lantern, in the manner and for the purpose substantially as set forth.

FASTENING FOR THE HINGES OF DAGUERREOTYPE CASES—Samuel Peck, of New Haven, Conn.: I claim the combination of the metal straps or supports with the material of the case when the same is plastic, so as to strengthen the case and form a secure fastening for the hinges, substantially as set forth.

METTALLIC PENS—Myer Phineas, of New York City: I claim the spring, a, when placed upon the upper side of the pen, and so connecting and arranged as to serve the twofold purpose described.

OSCILLATING ENGINES—Juan Pattison, of Brooklyn N. Y.: I claim the arrangement of parts, viz.: the arched steam pipe saddle, hollow valve, and chest, substantially as described, for passage and distribution of steam on cylinders of oscillating steam engines.

HARVESTERS—B. F. Ray, of Baltimore, Md.: I claim, first, providing the main or driving wheel of reaping and mowing machines, with a stationary guard plate in the manner and for the purpose described.

Second, the sliding bar arranged in the same horizontal plane with and perpendicular to the axle of the driving wheel of reaping and mowing machines, in combination with the bell crank, for the purpose of giving direct and positive motion to the cutting apparatus when arranged obliquely to the line of draft, substantially as described.

Third, forming in the sliding bar a slot for the reception and operation of the bell crank, as set forth.

SAW MILLS—John S. Snider, of Lancaster, Ohio: I claim such construction of the scale wheel and its combination with the large cog wheel, G, that the position of the lever when on its rest, will be always zero, and that the log may be moved at both its ends equally any required distance, by raising the lever from its rest and counting one-eighth of an inch, (or a different fraction, according to the cast of the wheels,) for each cog that the pawl may pass over and pressing the lever down again up on its rest, when the requisite distance is obtained, so that the setting of the log requires no calculation or reference to a scale, and may be done with perfect accuracy by the ear or by the eye, and it is thus set at both ends by a single scale wheel and a single pawl, and thus set necessarily exactly alike at both ends, which is not the case where the ends are set each by its separate framing.

I also claim the combination of wheels which are so adjusted as to effect the above-named objects, and also to give greater power to the lever in moving heavy logs and more accuracy in adjusting them, as the log is thus made to move slow in proportion to the motion of the lever, and is not subject to be put out of its place by its own momentum, or by the spring of the rods.

In this construction and combination the journal and the pinion wheel and scale wheel are cast together, and the rod passes through the journal, and moves with it, so that the lever, when pressed down, moves the pinion wheel which gives motion to the wheel, which moves the head block slide, and at the same time the journal moves the rod, and by it the tail block slide, so that the rod communicates motion to the tail block slide only, and is not put to the strain requisite to move both slides, and with them both ends of a heavy log. The combination and construction which produces the effect, I also claim.

SEWING MACHINES—Alfred Swingle, (assignor to Elmer Townsend,) of Boston, Mass.: I do not claim a tension apparatus composed of a spring bearing against a fixed surface or another spring, the thread being down between the two.

But I claim as a tension apparatus the combination of a rotary grooved roller, and a pressure roller operating by means of a spring or its equivalent, essentially as specified, the same when a wax thread is used, producing advantages substantially as stated.

CONSTRUCTING CAST IRON BUILDINGS.—Harriet V Terry, admrx, of Wm. D. Terry, dec., of Boston, Mass.: I would state that I do not claim the boxes and ties when used separately, as this has been done before.

But I claim forming cast-iron hollow walls for buildings by means of the combined use of the boxes, plates, and tie pieces, provided with rebates and tongues for firmly uniting them together, substantially in the manner described.

ALARM LOCK—S. J. Frank, of Guilford Center, N. Y. I claim the use of the spring, G, and rod, j, when used in connection with the plate, L, arranged and operated in the manner set forth.

WROUGHT IRON SHAFTS—Otis Tufts, of Boston, Mass.: I claim constructing large wrought-iron shafts with pieces separately wrought and fastened together, substantially as described.

SOFTENING LEATHER—John B. Wentworth, of Lynn, Mass.: I do not claim boarding a skin by doubling it and performing the remainder of the operation between two boards, by manual labor in the usual way.

I claim the combination of the roller by the rotary boarder, F, and the bar or concave, E, arranged and made to operate together, substantially as set forth.

I also claim the combination of the holding and draft mechanism, or rollers, I I I, with the boarding mechanism or rollers, the boarder and concave or bars, as specified.

I also claim the napping or filing mechanism, or roller, M, and bed, L, in combination with the boarding mechanism, and the holding and feed rollers thereof.

I also claim combining with the movable table or bed, k, the rollers, G H, and bed, L, so that they may be moved simultaneously by either, towards or away from the board. er, F, the bed, E, and rollers, I and M.

I also claim when the boarder is made of a series of separate rubbers springs, and holding frame, as set forth, applying the sectional rubber to the frame by means substantially as described, viz., by a bar f, and movable end, b', whereby the rubbers may be either detached from the frame, or maintained without it, as specified.

GRAIN AND GRASS HARVESTERS—Abner Whitely, of Springfield, O.: I do not claim oscillating the finger bar about an axis within itself, irrespective of the relations between the main frame and the master wheel shaft, as described, or otherwise, the result being substantially the same, that the driver is enabled, while the team is in motion, and the master wheel shaft being rigidly connected with the main frame to change the angle of the fingers and cutters without moving the finger bar from the ground.

BELT FASTENINGS—Abner Whitely, of Springfield, O.: I claim the hook, B, made as described, for the purposes set forth.

DOCTORS OF CALICO PRINTING MACHINES—John Standing, of Fall River, Mass., (assignor to himself and James Baxendale, of Providence, R. I.): I do not claim applying to the shaft of the doctor a mechanism for imparting to it a variable reciprocating motion, as such by no means is new, but having invented for such purpose a new mechanism which is very simple in its construction and efficient in operation, one possessing decided advantages over most if not all others in use to effect such a result.

I claim the combination of the eccentric to the crank, k, the connecting rod, I, and lever, G, so applied to the shaft, C, and the shaft of the doctor, and made to operate the doctor, substantially as specified.

WRITING DESKS—C. H. Bergmann, of New York City: I claim to construct the upper box of writing desks with adjustable or expanding sides, in the manner and substantially as specified.

CHAMBERED BREECH LOADING CANNON—C. C. Terrell, of Shullsburgh, Wis. (assignor to himself and Samuel Crawford, of Mineral Point, Wis.): Though I do not claim the invention of the wedge to force a movable chambered breech into connection with the barrel, I claim the combination of lock lever, N, the wedge, i, and the two, h h, in any manner substantially as described, for the purpose of forcing up and drawing back the breech to and from the barrel.

Second, I claim the priming tube, m, combined with the stationary priming magazine, F, to take a new priming therefrom every time the position of the breech is changed by attaching it to the lock lever, N, and furnishing it with a wedge or inclined projection, 14, to open the valve of the magazine, when the lever is raised to unlock the breech, substantially as described.

Third, the combination and arrangement of the hammer trigger, and mainspring with a lock lever, N, which is employed to lock and unlock the breech to and from the barrel, substantially as set forth.

ATTACHING COMPOSITION SOLES TO BOOTS AND SHOES—John M. Wimley (assignor to himself and W. H. Penrose,) of Philadelphia, Pa.: I do not claim the mold, nor do I confine my claim to any particular form of the staples or nails by which the sole is secured to the boot or shoe.

I claim the use of the staples, D D, in the manner substantially as described, for the purpose of attaching composition soles to boots and shoes.

RE-ISSUES.

TONGUING AND GROOVING MACHINES—C. W. Brown, of Boston, Mass. Patented originally Aug. 14th, 1844: I claim giving a lateral movement to either of the edge cutters by any suitable arrangement of mechanical devices, while the board is being fed through the machine, so as to adapt the edge cutter to any taper of the board.

Second, I claim arranging the box or bearing of the shaft or either of the edge cutters, so as to slide laterally on a rail, and connecting said box or bearing to a sliding guide bar, which bar is governed or regulated in its movements by the edge of the board, and kept up against said edge by means of a weight operating on it, so as to press it laterally, through the medium of a rack and pinion, as set forth, the mechanical arrangement and operation being substantially as specified.

Third, I claim the combination of the sliding bolts, r' s', with the turning rod, o' o', having right angular arms, n'' n', p' p', and pawl, l', and ratchet wheel, k', on the end of the shaft, which the weight, i, turns or revolves, said combination being arranged substantially as set forth, and for the purpose of permitting or checking the operation of said weight, i, upon the sliding guide bar, d', as specified.

ADDITIONAL IMPROVEMENT.

CANDLESTICKS—Abner Whitely, of Springfield, Ohio. Patented originally Jan. 8, 1856: I claim, first, securing the lip, A, to the stem, D, and within the slide, E E, as described, whereby I am enabled to use a solid lip, and avoid all leakage.

Second, I claim the open slide, as described, for avoiding damage, as set forth.

ORNAMENTAL FELT CLOTH—O. B. Tomlinson, of Athens, Pa. Patented originally May 16, 1854: I claim the manufacturing of ornamental felt fabrics by placing loose woven or knit felting or shrinking fabrics, of any color or design upon the surface of a sheet of batting composed of any felting or shrinking substance, and shrinking the same ornamenting fabric, or fabrics into the body of the felt, in the manner substantially as described, to form an ornamental felt fabric of the character and quality described, for the purpose set forth.

HYDRAULIC HEATERS—L. W. Leeds and R. M. Smith of Philadelphia, Pa. Patented originally May 16, 1854: We do not claim hexagonal tubes, as we are aware they have been heretofore used in stoves and furnaces.

We claim the use of the radial ribs, d d, in combination with the tubes, F F, irrespective of form of said tubes for the purpose set forth.

DESIGNS.

GATES—H. E. Wesche, (assignor to Robt. Wood,) of Philadelphia, Pa.

California Items.

COAL—A coal bed has actually been discovered, and the coal thoroughly tested in San Francisco. The locality of the mine is 30 miles from Stockton, on a spur of the Coast Bange mountains. The steamer *Cornelia* tried a quantity of the coal in running down and up San Francisco Bay; it burned with a clear flame, and produced very little ash. There are at present six men engaged in mining the coal. The vein at first showed a thickness of 14 inches; but now, at a depth of 16 feet from the surface, it has widened to 3 feet 9 inches. It is calculated that this coal can be mined and delivered at San Francisco for $7 per tun. These coals can be run down on an inclined railroad to the city of Stockton, without the use of engines; the weighted cars going down on one side on a double track, can draw up the empty cars to the mine by a rope on the other track. Coal is more useful than gold; therefore this discovery will prove to be of great value to the Pacific States.

TABLE MOUNTAIN GOLD—Tunnels have been run into this mountain to reach what is supposed to be the bed of an ancient river, where some rich gold deposits have been found. The old river appears to have run at one time between steep banks. Lava from a distant volcano flowed into the river bed, filling it up, and then rose like a wall above its banks. The course of the river was thereby changed.—The amount of labor and expense requisite to tunnel this old mountain varies. The rim rock is harder the lower down it is worked, and if the tunnel is too high for the bed of the river in the basin under the mountain, the labor is lost.

LARGE ARTESIAN WELL—In the city of San Jose there is a splendid large artesian well in one of the streets. It is formed at the top into a basin, six feet in diameter, and resembles a huge bowl. The supply of water is large, it is to be conveyed by pipes through different streets.

EXPLOSION—The Stockton *Republican* gives an account of an explosion which recently took place at the flouring mill in that city.—The accident was caused by the collapsing of a flue of the boiler, and the boiler, 40 feet long, was hurled to a distance of 140 feet, against a house, which it demolished.

New York Docks.

A city which is now the third shipping port in the world might be able to afford respectable and convenient docks for the use of its shipping. This is not the case with New York city, at whose wharves are to be seen forests of masts belonging to the ships of all nations. The Mayor, in his late Annual Message, directs the attention of our citizens to our miserable dock architecture, and gives our merchants a well merited rebuke for their indifference and neglect in providing proper dockage. He says:—

"We present a singular contrast, in this respect, to every other seaport of any magnitude known to ancient or modern commerce. The quays and docks of London, Liverpool, and indeed, nearly all the English ports, are first class, and even our Canadian neighbors excel us in such works.

"At St. Petersburg, in Russia, there is one granite pier of four miles in extent. At Havre, the docks are the principal structures of importance, having cost immense sums, and are justly the pride of its citizens. Indeed, there is not a city of Europe, possessing navigation, which does not surpass us in the necessary provision for the proper convenience and protection of its shipping." How true all this is: it makes us somewhat ashamed of having boasted of the enterprise of our merchants. Our docks are a disgrace to our city; but we must put the blame on our merchants, for if they had moved right in the matter we would have had good docks before this.

At various times for years we have directed attention to the building of stone piers and docks, and the erection upon them of fire-proof storehouses or sheds for the protection of merchandize while being shipped and unshipped during rainy weather, but no attention seems to have been paid to our suggestions. Peter Cooper has proposed to employ the city poor (those who are able to work) in quarries, getting out stone, for building docks. This is a good idea, and would, no doubt, effect a considerable saving of city funds. But will it ever be carried out? The plan being a good one, there does not appear to be any doubt of its *not* being carried out.

The Cold; the Cold.

The past month and the beginning of this one will be long remembered, in the annals of our country, for the intense cold experienced over such a wide extent of territory. Away down in Texas the river Brazos was frozen over, and the ice so thick that teams were crossing on it. In Virginia the snow was deeper than it had been for 60 years, and the cold was so severe that great numbers of birds, and wild animals perished. At St. Paul, in Minnesota, the thermometer had ranged from 20° to 40° below zero for three weeks. The atmosphere there, however, was dry and still, and persons did not feel the cold more keenly than those in New York, where winds usually prevail during cold. In Cincinnati, the thermometer was as low as 18° be low zero. On the borders of Tennessee the thermometer was 5° below zero on the 23rd ult. The cold in the city of New York has been very moderate in comparison with that experienced in some places further south and west of the Alleghanies. On the morning of the 22nd ultimo, the shores of the Bayou Lafourche, in Louisiana, were margined with a sheet of ice, six feet in width. The "oldest inhabitant" being consulted, declared that such a thing had never occurred before. A portion of the ice was two inches thich. So says the *Thibodeaux* (La.) *Minerva.*

We are indebted to Hon. George Vail, M. C., for useful public documents. We hope Mr. Vail will be prepared, when the proper time comes, to lend his valuable assistance in bringing round the much needed reform in our present defective patent system; and also to resist the Woodworth Patent Re-extension whenever it comes up for tangible action in the House of Representatives.

The Persia.

This large new iron steamship arrived on the 9th inst., after a stormy passage of fourteen days. We have not had time to visit her on going to press, but will be able to do so, and present a description of her engineering arrangement in our next number.

Robert Stephenson on Railways.

Robert Stephenson, M. P., having been elected President of the Institution of Civil Engineers in London, gave an excellent inaugural address on taking the chair, on the 8th ult. The following is a condensed summary of it :—

"Railroads now spread over Great Britain and Ireland like a net-work, to the extent of 8054 miles. In length they are equal to the 10 largest rivers of Europe united. The cost of these lines has been £286,000,000, equal to one-third the amount of the national debt. There are 50 miles of tunnels; 11 miles of viaduct in the vicinity of London alone; the earthworks excavated measured 550,000,000 cubic yards—a mass of earth sufficient to raise a pyramid a mile and a half high, with a base equal in area to St. James's Park. The trains run 80,000,000 miles annually; 5000 locomotive engines and 150,000 vehicles compose the running stock; the engines in a straight line would reach to Chatham, and the vehicles from London to Aberdeen. The companies employ 90,400 officers and servants directly, and upwards of 40,000 collaterally—130,000 men, representing a population of 500,000 persons, or 1 in 50 in the entire community dependent on railways. The engines consume annually 2,000,000 tuns of coal, 4 tuns every minute, flashing into steam 20 tuns of water—an amount more than sufficient for the wants of the population of Liverpool. The coal consumed by the engines is nearly equal to the whole amount exported to foreign countries, and one-half the annual consumption of London.

Last year 111,000,000 passengers traveled by railway, each averaging a journey of 12 miles. The receipts were £20,215,000, and there is no instance on record in which the receipts of a line has not been of continuous growth, even where portions of its traffic had been abstracted by competition on new lines. The wear and tear is great; 20,000 tuns of iron have to be replaced annually, and 26,000,000 sleepers perish every year. To supply these 300,000 trees are felled annually, which could be grown on little less than 5000 acres of forest land. He then suggested various means for meeting these unavoidable outlays for deterioration, which after a few years reach an annual average, as well known as the cost of fuel, and should be admitted as an annual charge against receipts.

"Nothing was so profitable as passenger traffic. An average train will carry 100 persons, and the cost was under 15d. per mile; 100 passengers produced, at five-eighths of a penny per mile, 5s. 2 1-2d. Minimum fares paid best on short routes, but with respect to the higher fares, greater expenses were incurred for increased comfort and accommodation.

"The postal facilities afforded by railways were very great. But for their existence Mr. Rowland Hill's plan of penny postage never could have been effectually carried out. Railways afforded the means of carrying bulk which would have been fatal to the old mail coaches. For this great blessing, therefore, the nation had to thank the railways.

The electric telegraph—that offspring and indispensable companion of railways—was next considered. 7200 miles of telegraph, or 36,000 miles of wires, were laid down, at least. 3000 people were continually employed, and more than 1,000,000 public messages were annually flashed along this "silent highway." To the working of railways the telegraph had become essential. The needle was capable of indicating at every station whether the line was clear or blocked, or if accident had anywhere occurred. The telegraph could, therefore, do the work of additional rails, by imparting instantaneous information to the officers, and enabling them to augment the traffic over those portions of tbe line to which their duty might apply. As a perpetual current was passing through the wires, the guard or engine-driver had only to break the train-wire in case of accident, and the officers at the nearest station were instantaneously apprized that something was wrong, and that assistance was needed.

"Railway accidents occurred to passengers in the proportion of one accident to every 7,195,343 travelers. Ladies and gentlemen could scarcely sit at home at ease with the impunity with which it appeared that they could travel by railway. How frequent, comparatively, were the accidents in the streets; how fearful the misadventures to those 'who go down to the sea in ships.' Yet Parliament had seen fit to legislate expressly for accidents by railway without legislating in the same way for accidents from other sorts of locomotion. This was unfair to railways, and ill-calculated to afford protection to the public where it was needed.

The moral results of railways were equally remarkable: railways were equalizing the value of land throughout the kingdom by bringing distant properties practically nearer to the center of consumption, and by facilitating the transit of manures, thus enabling poor lands to compete with superior soils. Before railways existed internal communication was restricted by physical circumstances; the canal traffic was dependent on the supply of water at the summit levels, and upon the vicissitudes of seasons of either drouth or frost. Railway communication was free from all those difficulties, and every object that nature had opposed, science had hitherto effectually surmounted."

The legislation of Parliament of which Mr. Stephenson complained, is, no doubt, one reason why accidents on English railroads are so few in number. All our railroad companies will do well to lay to heart the benefits of the railway telegraph. The N.Y. and Erie R.R. has found it to be a great saving. When will the time come that our railroads will be as safe as those in England? While we have over 19,000 miles of railroads to the 8000 of Great Britain and Ireland, ours cost only $589,920,000, Englands' cost $1,430,000,000. R. Stephenson is the son of George, the builder of the *Rocket*, the first successful passenger locomotive.

Fullers Earth.

MESSRS. EDITORS—The supposed soap mine found in the Table Mountain, California, and recently mentioned in the SCIENTIFIC AMERICAN, is beyond doubt a bed of Fuller's earth. The very place to find it is among silicious mountains, for its chief ingredient is fifty-three per cent. of impalpable silex, combined with from ten to twenty-four of alumina, twenty-four water, a small quantity of magnesia, and colored of a greenish brown with oxyd of iron. Its being found in conjunction with pipe clay is direct proof of its identity, for the best quality of pipe clay contains nearly twenty per cent. more silex, twenty-five per cent. more alumina, and only ten of water.

To test Fuller's earth it is first dried, put into a basin and covered with water, when it will fall into a paste as soft as soft soap. It is also tested with an acid, and if any effervesence is observed it is unfit for the use of the fuller. It is used as a cleanser, to remove dirt, grease, and any remains of soap from cloth. It is a far better cleanser than soap, but produces the reverse effect in felting, as it leaves the pores of the wool and the thread more open than before it was used. All woolens colored in the piece, except for black, are first cleansed with fullers earth; and blues, and some other very dark colors, are cleaned with it. Fuller's earth, or pipe clay, is used to make the brown soaps so much esteemed.

Fuller's earth is a very rare mineral, more being found in England than on the whole continent of Europe. During the last English war I was informed that it could be found around the coast of Rhode Island. I spent two days searching for it, but found nothing better than common clay. About thirty years ago I sent an article to the *Statesman*, describing fullers earth, and requesting that samples might be sent me bearing any appearance to it. Out of one hundred samples sent me, only one, from Virginia, contained fullers earth, and that was so full of sand and gravel as to render it worthless. Our market, therefore, is supplied from England. WM. PARTRIDGE.

Binghamton, Feb. 4, 1856.

Sharpening Files by an Acid.

I see in your paper of Jan. 26th, an extract from the *National Intelligencer*, headed "Sharpening Edged Tools." I have used and seen used, for some time, dilute acid, in sharpening files, thus causing, as I believe, a great saving. The principle upon which the sharpening is effected, is, that a file tooth or edged tool presents two sides and but one edge, and while the acid combines with and takes from the edge, it removes a like amount from each side, thus reducing the thickness of edge. J. A. M.

The Teeth and Management of Circular Saws.

MESSRS. EDITORS—The number of teeth a saw should have varies under different circumstances. In most mills they have thirty, which, generally, is too many, as the feed seldom exceeds 1 1-4 inches to each revolution of the saw, which gives each tooth but 1-24 of an inch to cut. A saw-tooth, when properly dressed, will cut 1-8 of an inch at once, in most timber, requiring but a little more power to cut 1-24, because the additional power is only required to split the saw-dust from the log, in lengths of 1-8 instead of 1-24 of an inch, an operation which is easily performed, as the fibers of timber offer but little resistance to their separation. There is a limit, however to the amount each tooth will cut out advantageously, and it varies in different kinds of timber. The fibers of such timber as is difficult to split require to be cut in shorter lengths than that which splits easily. My opinion is, that a saw-tooth should cut at least 1-16 of an inch in the worst, and about 1-4 in the best timber; and where there is not sufficient power to secure this result every alternate tooth should be broken out; for 12-horse power, fifteen teeth in a saw are sufficient. Where less than 12-horse power is employed, the diameter of the saw should not exceed 48 inches. Indeed, the employment of two saws of small diameter, one placed above the other, results in a considerable saving of power, in most instances. In cases where the majority of lines do not exceed 12 inches in depth, two saws, each 32 inches in diameter, should be employed. They cost $33, and cut a line of the same depth that a 58 inch saw cuts, which costs $170. The small saws, being thinner, cut a smaller kerf, and consequently consume less power. The saving of power is manifest, because the tooth is much nearer the center of the saw, and therefore exerts less leverage against the engine. The greatest objection to the employment of two saws lies in the difficulty of keeping them in line; but as the upper saw is chiefly used in reducing the log to the proper size for making plank, the seam comes off on the edge of one plank, and does not materially injure the lumber. A small saw is also easier kept in line than a large one, and the saving in cost, power, and timber, amply repays for what little additional attention is required.

The shape of the tooth is a matter of great importance. It should have as much pitch as possible, so as to cut, instead of scrape out the saw-dust, yet care should be taken that it is not so slender as to break. No more should be filed from the back of a tooth than is necessary, to prevent it from rubbing the log, and all the metal which is not required to strengthen the tooth should be filed from the front of the tooth, in order to give it as much pitch as possible. J. W. GAREY.

Granada, Miss., Jan. 1856.

Our Climate not Changed.

MESSRS. EDITORS—In the SCIENTIFIC AMERICAN for Jan. 12th I observed an article on the vexed question of "change of climate." I send you a table of thermometrical observations by Dr. Daniel Drake, late of Cincinnati, which will go to show that the climate in this particular part of the world has not changed, when compared with recent records:

1806	54·10 deg.
1807	54·40 "
1808	56·40 "
1809	54·40 "
1810	52·77 "
1811	56·62 "
1812	52·05 "
1813	52·76 "

The above table exhibits the mean annual results of eight years, the average being about 54 1-4 degrees. From an article in the Patent Office Report for 1853, I find the mean annual range of the thermometer at Cincinnati for the last eighteen years to be 53 7-10 degs.

A READER.

Washington, Ky., Feb. 1856.

Cheap Steam Engines for Farmers.

MESSRS. EDITORS—Let me reply briefly to your correspondent "Farmer," of Chicago, Ill. First, he is right about the frailty of all the corn-stalk cutters in use, and the fault is not with inventors that they are trifling, and "forever out of kilter," but with farmers.—The principles of some of the machines now in use are well enough for efficient and rapid work, but not one "Farmer" in five hundred is willing to pay the cost, and a fair profit on such a construction as will make the machines substantial and durable, and no manufacturers can afford to prepare plans and patterns, and constructs machine for a few purchasers that he must hunt up in one and another State of the Union.

Second, he wants iron feed troughs; he can have them to any amount by paying what they are worth, and I venture there is not a foundry in the States that have not talent enough to construct suitable patterns if "Farmer" will give them his plan, and to make "nice light cast-iron feed troughs."

Third, "but most of all he wants a cheap and simple steam engine. If the steam engine could be so cheapened and simplified that one of sufficient power for farm uses could be made for $100 or $125, their sales would be far more extensive, &c."

Aye, there's the rub Mr. "Farmer;" engines for farm use have been made thus simple, thus cheap, but they were "always out of kilter," and farmers, by waiting for the good times of perpetual motion, when they could get "something for nothing," have lost millions of dollars to the farming interests of the country. I believe I am familiar with every variety of portable farm engine, that has yet been introduced extensively in this country or in Europe, and venture to say that, with the price of metals at their present standard, no manufacturers will ever succeed in making small sizes of portable engines, with the necessary attachments of pumps, pipes, cocks, valves, chimney, &c., and so constructed as to be safe, to use in and around barns, and to carry high steam, for less than $100, per horse power, and I know no good plan yet that will enable manufacturers to sell, even at that price, below 6 horse power. "Farmer" should know that for four horse power engines he must have at least 50 to 60 feet of active fire surface to his boiler, and to be safe it must be strong. The locomotive form of boiler seems yet best adapted to such use, and in its simplest form (for a four horse boiler, safe under 150 lbs. of steam,) such boiler will weigh about 1200 lbs., and I suppose cannot be afforded at less than 17 cts. per pound finished with its tubes in, which will give us $204 as cost of boiler. The balance of the work cannot be well done and of good proportions and materials, for less than $250, and afford a reasonable profit to the manufacturer. Farmers must learn, as mechanics and manufacturers have, by bitter experience, that to have power, we must have strength of construction, good proportions in parts, and an intelligent supervision in running engines, and when they are willing to pay for good machines as others who wish good power do pay, they will get what they require, but to ask for a good engine for farm purposes for $125 is but a poor means to encourage efforts to supply farm engines. JOSEPH E. HOLMES.

Newark, G., Jan. 8, 1855.

Alteration of Coast Lights.

The many changes already made, or in contemplation, in the character of lights along our coast, viz.: from steady to revolving or flashing lights, and *vice versa*, will, we fear, cause much loss of life and destruction of property. Changes of this kind should never be made without at least twelve months' public notification of the contemplated alterations. The Boston (Mass.) *Journal* states that two vessels have already been lost on the coast of Massachusetts, from the removal or change in the character of lights long established and familiar to mariners.

Mechanical Ball.

Messrs. Singer & Co., the celebrated Sewing Machine manufacturers of New York, give a grand ball and supper on the 13th inst., to their employees and customers. It is to be a splendid affair.

New Inventions.

Ericsson's New Hot Air Engine.

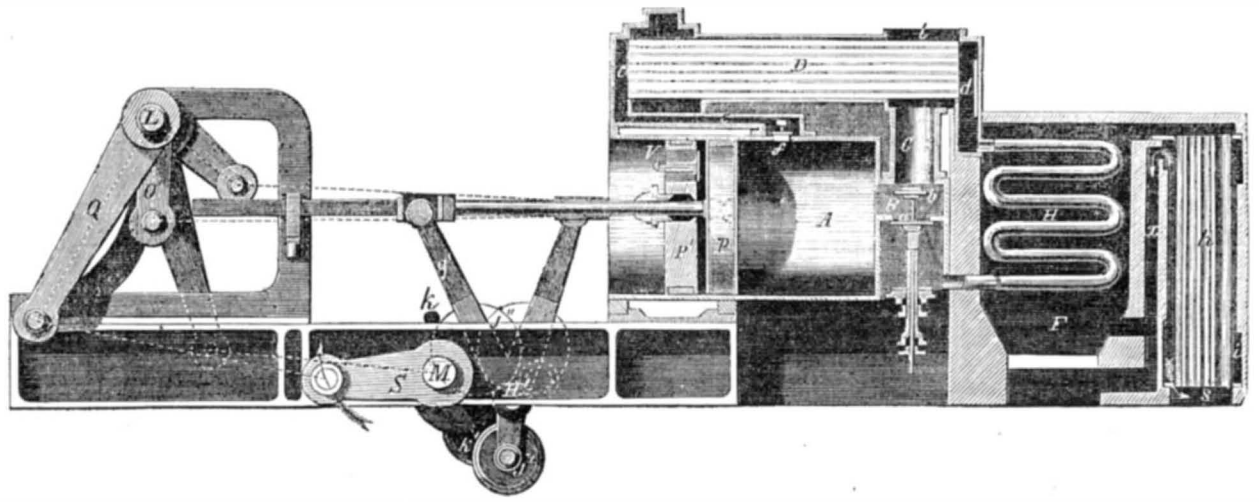
The accompanying engraving is a side elevation in section of the Hot Air Engine for which Capt. Ericsson recently obtained patents in America and Europe. This engine is a horizontal one; the old ones on the ship *Ericsson* were vertical. The pistons are single acting, that is, they are operated by the hot air only in one direction, it therefore requires two cylinders to form one rotating engine. The reader will therefore consider that there is another similar horizontal cylinder, with all its adjuncts, on the other side of the one shown—which is the nigh one—and that their rods are yoked to one shaft, and are working together, forming an entire hot air engine.

This illustration is taken from the London *Mechanic's Magazine*, furnished to that periodical by Captain Ericsson's agent. This and Paine's Electic Light are the only American inventions, we believe, we have copied from foreign magazines.

A is the cylinder, which is made to answer the purpose of hot air working cylinder and cold air feed pump. It has a fixed bottom with a central passage in it to the hot air valve box, B; its other end is open, or rather, has no fixed cover. The valve box, B, has an induction port for hot air to enter by a valve, *a*, and a port for the exhaust air to escape, by a valve, *b*, the stem of which passes through the hollow stem of valve *a*. These two valves are operated by any common valve gear, from crank shaft, M, to give them separate and positive motions. The exhaust hot air escapes through a pipe, C, into the regenerator, which is a chamber with a series of small tubes, D. There are two pistons in the cylinder, A; the inner one, P, exercises power by the hot air acting directly on it to push it out; and when the stroke is made, the valve, *a*, closes its port to shut off the hot air, and then the valve, *b*, opens its port, and the exhausted air escapes into the regenerator, circulating around tubes, D, and then escapes into the air by pipe *l*. P' is another piston in the cylinder, A. The cold air to be heated to keep up the supply, is forced into the regenerator, to be partially heated by the exhaust hot air. To do this, the operations are complicated and peculiar. From cylinder, A, as feed pump, the cold air passes through the port of valve, *f*, into a passage, *e*, thence into a chamber, *c*, thence through the tubes, D, then out into passage, *d*, and from thence into the coiled tubes, H, of the heater, above the fire of the furnace, F, where it is fully charged with heat. The products of combustion—smoke and gases—pass down through flue tubes, *h*, and escape at S, to the chimney. These flue tubes are enclosed in a chamber which has an aperture, *i*, near the bottom to admit air, and another near the top through which the current passes after circulating among the tubes. The air which can be thus admitted is partially heated, and can be directed by dampers to feed the fire, if necessary, by the passage, *x*, and also to cool the heater pipes, H, if necessary. The hot air passes from the heater tubes into valve box, B, thence into cylinder, A, and forces out the piston, P, which is now represented as being at the end of a stroke, the hot air cut off, and the exhaust valve, *b*, opened. The rod of piston P, passes through a stuffing box in piston P'. This rod is connected to an arm, *g'*, which vibrates on a fulcrum pin, H'. This arm carries two rollers, *j' j''*, one on each side of the fulcrum pin. These rollers are alternately acted upon by two cams, *k k'*, on the crank shaft, M. The cam, *k*, acts on roller, *j''*, and the cam, *k'*, on roller, *j'*. In the figure the arm and its rollers are represented in the two opposite extreme positions. The cam, *k'*, operates the roller, *j'*, to carry piston, P, inwards towards the bottom, or inner end of the cylinder, and the other cam, *k*, governs its motion in the opposite direction when it (the piston) is impelled by the hot air. The cold air piston, P', has two wrist pins, one on each side of the stuffing box, through which the rod of P' passes. These pins are clasped by two rods on the vibrating arm, O', secured on a rock shaft, L, which is provided with another arm, Q, connected by a rod, shown in dotted lines, to the crank, S, on the shaft, M. The two single engines, A, are connected with the one shaft, M, by cranks set at right angles to one another on opposite sides. In the figure, the connecting rod of the off cylinder is represented as being returned ready to commence an outward stroke, while piston, P, is ready to be forced back.

To commence operations, the regenerator is first charged by a hand pump to about the pressure of the atmosphere. The engine is then started in the position shown. As the crank, S, is moving in the direction of the arrow, but little motion is imparted to piston P'; but piston P is then carried rapidly towards the inner end of the cylinder, A, by the action of its cam, *k*, on roller *j''*, of the arm, *g'*; this cam as it rotates operates the piston inwards, and retains it briefly nearly at rest at the end of the stroke. During this inward motion of the piston, P, the cold air piston, P', makes but a small portion of its inward stroke; the air valve, V, in this piston, now opens inwards by the pressure of the atmosphere, and the cold air rushes in and fills up the space between the two pistons, P' and P. The piston, P', is then moved downwards, the valve, V, closes, and the air is partially compressed between the two pistons. The off hot air piston in the other cylinder works the cold air piston, P'. The piston, P, is now acted upon by hot air from heater, H, and is forced outward compressing the cold feed air still more between it and piston, P'; in fact, it is compressed until its pressure exceeds that in the regenerator, when the valve, *f*, opens, and the

ERICSSON'S NEW HOT AIR ENGINE.



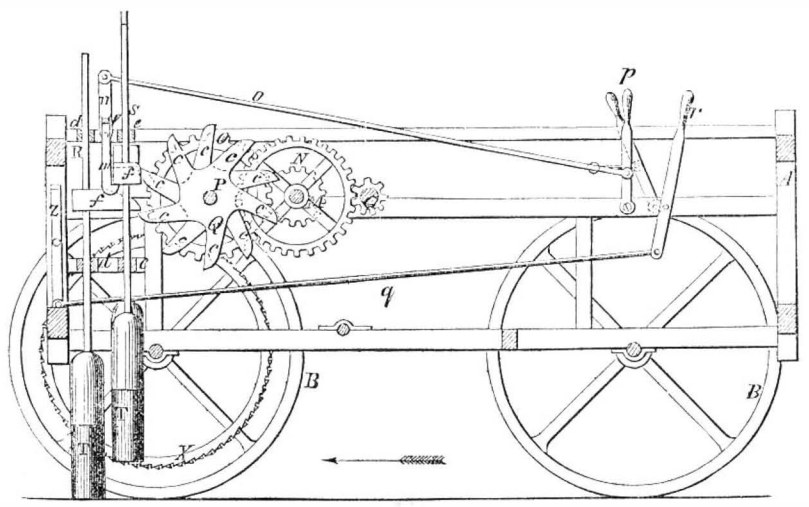
cold air rushes into the regenerator to feed it. This valve closes, when the piston, P, passes it. These actions repeated embrace the operations of this engine.

The difference between this engine and the old ones of Captain Ericsson is but small. Of course, as this engine is a horizontal one, it must have connections and a positive motion to move back the single-acting pistons, and these are shown in the figure. But if we set this engine on end and make it a vertical one, it is just the two old engines, illustrated on pages 153 and 154, Vol. 8, Scientific American, compounded. It is true, the main cylinder here is made to answer for both feed pump and working cylinder, but this is no advantage that we can perceive.

It is rather an obscure and complex arrangement, not so simple as the separate air pumps and hot air cylinders, and the direct connections of the engines on the ship *Ericsson*. And yet the manner of working the two pistons in one cylinder and making a feed pump and single air engine of one cylinder, constitute all the new improvements claimed.

The crown plates of the heater furnaces which gave way in the late hot air engine, are laid aside in this one, and the heater, H, here shown, is exactly the same as the oldest one used by Captain Ericsson. The famous wire gauze regenerator appears to be laid aside and the old tubular one adopted, with this difference, that the same air was to be used over again in the old engine, while in this one a new charge is taken in at every stroke, and the old charge exhausted. This air engine does not obviate the great objection to the use of air as a motive agent, that is, a whole cylinder full of cold air at every stroke must be heated up to 490° to obtain the low pressure of 15 lbs. on the square inch. It is too bulky to use as a motive agent.

APPARATUS FOR RAMMING DOWN PAVING STONES.



Paving Machine.

The solidity and durability of nearly all the various kinds of stone pavements used for carriage ways depend much on the finishing blows which they receive from the rammer. However carefully selected or smoothly laid the stones may be, the pavement cannot endure long unless it be thoroughly compacted. To do this well, by hand, is a slow and tedious process, for each stone must be rammed down with great power. No species of labor is more exhausting. The rammers commonly used consist of stout sticks of hard wood, shod at their lower ends with heavy masses of metal; these must be lifted up perpendicularly by the workman to the proper distance, and then thrust down with all his force. From this operation there is no change, no variety; stone by stone, one at a time, each must be powerfully embedded in the soil. The method is not only slow and hard, but it is expensive.

The engraving herewith presented illustrates the Street Paving Machine for which a patent was granted to Mr. Thomas Davidson, Jr., of Kensington, Pa., on the 8th of January, 1856. The design of the inventor is to employ steam power in ramming down the stones, and he expects, thereby, to do the work quicker cheaper, and better, than it can possibly be done by hand.

Referring to the engraving it will be seen that the machine consists of a four-wheeled vehicle, which moves over the ground, when at work, in the direction indicated by the arrow. A is the frame of the machine, B the wheels, the axles of which revolve; a locomotive steam engine connected with pinion G forms part of the apparatus, but is not here shown. Power is transmitted from pinion G, through gear wheels M, N, and O, to shaft P, upon which there are located a number of spoke wheels, Q, having radiating arms or spokes, *c*, as shown. As the spokes rotate they catch beneath projections, *f*, of the rammers, R S, and thus lift the latter; they fall by their own gravity. The rammers are shod with heavy metallic weights, T, and slide up and down between guides, *d e*.

On the front axles there are two large ratchet wheels, X, operated by pawls, which are connected by means of eccentrics and rods with the pinion G. At every revolution of G the pawls alternately catch in the ratchet wheel, and move the machine along a little, so as to bring the rammers over new stones. The connections between the ratchet wheels and driving pinion being easily understood, are not shown.

V is a shaft, upon which are mounted a series of arms, *m*, hooked so as to catch under and hold up, when desired, the rammer projections, *f*; shaft V is connected, by means of bar *n*, and rod *o*, to the lever handle, *p*, by moving which the arms are thrown in or out of play. There is a similar device, consisting of a swinging bar, Z, rod *q*, and lever *r*, for holding up the outer row of rammers.

When traveling from place to place, the various parts used in paving may be entirely disconnected from the engine, and its power be employed in rapidly propelling the machine along, after the manner of a steam carriage It is manifest that this machine ought to effect a great saving of labor over the present hard method of embedding paving stones, besides doing the work in a far superior manner. Driven by steam, the rammers will never get tired or lazy. The machines, we are told, can be constructed at no great cost; they will save the labor of from fifty to one hundred men, according to size. Mechanism of this kind is greatly needed in all our larger towns and cities; it must, ere long, find a very extensive employment. Address the inventor for further information.

The Compass and Iron Ships.

Dr. Scoresby is going out to Australia with an express view to make experiments relative to the variation of the compass in iron ships in the southern hemisphere. With great liberality, the directors of the Liverpool and Australian Navigation Company have granted the use of a state cabin in their splendid screw steamer, the *Royal Charter*, a vessel well adapted for scientific experiments. The masts are of wood. The compasses are so arranged as to check each other

California Quicksilver.

The produce of quicksilver has much increased in California. The exports for the past year were 28,917 flasks of 75 lbs., valued at one million of dollars.

Scientific American.

NEW-YORK, FEBRUARY 16, 1856.

Steam and Hot Air Condensers.

It will be evident to every engineer that the Regenerator of the hot air engine illustrated on the preceding page, is exactly the same in nature as heating the feed water of a high pressure steam engine, by exhausing the steam through a tube laid in the tank. The use of the same air over and over again, as it was employed in the *first* Ericsson engine, and as has been proposed for other hot air engines, is just the application of the old surface steam condenser to the hot air engine. Both of these principles, as applied to the steam engine, effect a considerable saving of fuel, but this cannot be the case, in the same degree, when applied to hot air. The use of the Regenerator, in the hot air engine, is ostensibly to catch the heat and save it, as it exhausts from under the piston. Well, let us ask what is the amount of lost heat by the exhausted air? "Just that of the temperature, 60°, 80°, or 100°, at which it escapes into the air" it has been said. "And if the air be used at 491° (15 lbs. pressure) the loss of heat will only be about 13 per cent., with the exhaust at 60°, which is very economical working." Very economical, we must respond, but not quite so much of a saving as if none of the heat at all were allowed to escape. To make a perfect economiser of all the heat in hot air engines, as has been attempted by the use of a Regenerator, all that has to be done is simply to save all the heat entirely by exhausting direct into the heater, and using the same air over and over again. By thus economizing all the heat. (saving the 13 per cent. lost at 60° of exhaust) a hot air engine can be produced, embracing all the *effective* qualities of the famous Static Pressure (stand still) Engine, upon the principle of exhausting the steam of a steam engine direct into its boiler. By placing the question in this light, it becomes evident that a perfect Regenerator to save all the heat is also a perfect "resister" to the action of the engine.

The reason why it is economical to condense steam in an engine, is owing to its peculiar quality of shrinking suddenly, by a small expense of power, from a great to a small bulk —from 1728 to 1—by condensation in the condenser, thus forming a vacuum (when perfect) equal to the pressure of the atmosphere. I. steam condensed gradually and uniformly and lost but a small part of its bulk as it parted with its heat, it would be folly to use a condensing steam engine, because it would work so sluggishly. One reason why surface steam condensers, with many excellent qualities, have been so unsuccessful is owing to their being so slow in condensing the steam, in comparison with direct condensers. Hot air, unlike steam, contracts uniformly when exposed to cold and to only half its former bulk by parting with 491° of sensible heat; it does not contract suddenly, like steam, but sluggishly, and is, therefore, in its very nature, unsuited for the application of the principle of surface condensing; and yet, it has been attempted to apply to it the very principles of the two old steam condensers to protract its exhaust, increase resistance to the feed, and thus operate *very economically.*

The best way to employ hot air as a motive agent appears to be in working it expansively, as far as this possibly can be done, then exhausting it into the atmosphere. A "regenerator" is neither a scientific nor common-sense adjunct to an air engine. It is an attempt to impose perpetual motion upon the engine, by making the same quantity of heat do repeated duty over and over again on fresh quantities of cold air, thus creating an infinite amount of power by a definite amount of caloric—a philosophical fallacy.

There are two hot air engines now building at the Novelty Works, this city: one a huge locomotive, the other a small high pressure engine, to work at 100 atmospheres. Their authors are put upon their metal to make them successful. The locomotive is a large working engine capable of testing the principle fairly.

The Engineer.

One of our English correspondents, in a letter published in the last number of this journal, alluded to the publication in London, of two new scientific weekly papers, one of them bearing the above name. The first number of this work is now before us. In form it is somewhat like the SCIENTIFIC AMERICAN, has sixteen pages, is well printed, well illustrated, and contains a large quantity of very valuable and useful information. It is designed to occupy, in England, the same relative position as that held by our own paper in America.—Among the writers in the first number is Mr. James Napier, the eminent Scottish chemist. He furnishes an excellent article upon steam boiler incrustations. We extend the right hand of fellowship to our brethren of the *Engineer*, and most cordially wish them success in their enterprise.

Our correspondent alluded to the fact that the *Engineer* had made an extensive use of the columns of the SCIENTIFIC AMERICAN without giving us proper credit. For example, six engravings are taken from us without mention of the source whence they are derived. This, we suppose, arises from inadvertence. The SCIENTIFIC AMERICAN is the only weekly publication of its kind in the United States, and all its engravings of American inventions are original. It has been the common practice of a few monthly magazines, published in this country, whenever they want illustrations, to reproduce engravings from our columns; and this is often done without credit. This practice has perhaps confused our English cotemporary, and led him to suppose that our engravings were common property, for which the courtesy of acknowledgment was not due.—The statement we have made will, we presume, set him right on that score.

Speaking of engravings brings our attention to four diagrams, in the said number of the *Engineer*, illustrative of what is termed "Perry's Improved Printing Press." The invention consists in a method of notching the types, making them larger at one end than the other, and placing them around the periphery of a cylinder. It is stated to be the invention of Mr. T. J. Perry, of the Lozells, Birmingham, England. We presume that Mr. Perry is candid in believing himself to be the first inventor, and the editor of the *Engineer* is perhaps correct in presenting the cuts as illustrative of a new invention. For their information, however, we would state that the same invention was patented in England by an American citizen, some twelve years ago. We refer to the British patent number 9308, granted March 23, 1842, to Mr. Moses S. Beach, of New York, now proprietor of the New York *Sun* newspaper, who was then interested in the invention. The original inventor is Mr. Jeptha A. Wilkinson, now of New York, but an Englishman by birth. An American patent was granted to him for the same invention on the 4th of January, 1853. A working machine was constructed in this country some fourteen years ago, but for some reason was never publicly introduced. Within two years past some new machines have been made, but we have not heard that they were fully successful. They have not been adopted by any newspaper proprietor that we know of, although Mr. Wilkinson claims, as does Mr. Perry, that they can print from twenty-five to thirty-five thousand sheets per hour—a rapidity which exceeds, by far, any steam printing press now in use.

Exhibition of Inventions in London.

We have received a circular from the London Society for the Encouragement of Arts, inviting us to contribute to its annual exhibition, which takes place in that city on the 24th of March next. We suppose the invitation is open to all American citizens who choose to become exhibitors. The exhibition is intended for the display of machines, models, drawing, and descriptions of new inventions. They must be delivered, at the cost of the owner, on or before March 8th, at the House of the Society, Adelphi, London. The Secretary, Mr. P. Le Neve Foster, should be immediately advised by all who intend to exhibit.

If it were not for the expense of freight, we should ourselves be tempted to become exhibitors, and our show would be no mean one. We have a ship load of models of new inventions on hand in our establishment, that we should only be too happy to get rid of in the way proposed. As for drawings, we could send the last volume of the SCIENTIFIC AMERICAN. That valuable work contains about five hundred original *delineations*, and above *two thousand descriptions* of new inventions. In addition to the foregoing, we could furnish a hundred or so Letters Patent of the United States, now stored in our iron safes. Each of them contains a splendid steel plate view of the American Patent Office, and a drawing and description of some new invention.

We hereby give notice to European Scientific Societies, and Governments generally who are concerned in expositions, that whenever they wish for contributions of a nature similar to those called for by the London Society, they have only to apply to us. We will engage to give them a full dose, on the shortest notice—they paying the expense of transportation.

Copper and its Uses.

There are copper smelting works in the United States, situated at Cleveland, O., Pittsburg, Pa., Baltimore, Md., Detroit, Mich., Boston, Mass., and one in Georgia (the name of the latter place we have not obtained.) At these works the quantity produced last year was about 13,000 tuns; or the fifteenth part of that smelted in the valley of Swansea. The Lake Superior ores are smelted at Detroit, Pittsburg, and Cleveland, and are said to yield a great quantity of silver, which makes the smelting of them very profitable. This business has been steadily and rapidly increasing during the past ten years, and it must increase until the United States becomes *the* great copper smelting country. Two things only are required for this, an abundance of good ores, or native metal, and plenty of cheap coal. The native metal and ores are found in exhaustless quantities, and our coal fields are the largest on the globe. As there is no coal in the Lake Superior region, ore will have to be exported thence to the nearest navigable point where coal can be obtained cheapest. The city of Erie, Pa., may yet become a great copper smelting place, because it has a convenient harbor, and anthracite and bituminous coal—both of which are used at Swansea—could easily be obtained by railroad from the Pennsylvania mines. An improvement in smelting copper ores is said to have lately been introduced into the "Eureka Mining Co.," Georgia, by which, from a small furnace, using about 5 cords of wood per day, two tuns of pig copper, containing 60 per cent of pure metal, are obtained from ores containing only 14 per cent of metal.

East Tennessee is a great copper region; no less than 14,191 tuns of rough ore being mined there last year. About two-thirds of the copper used in our country is the product of our mines; the remaining third is imported chiefly in pigs from Chili.

Copper can be obtained pure for experimental purposes by exposing it to a stream of hydrogen in a gun barrel heated to redness. By taking 100 parts of common copper, 10 parts of the oxyd of copper (common copper scale) and 10 parts of green bottle glass, ground fine, and fusing them for half an hour in a crucible, the copper will be found at the bottom, in an exceedingly pure state. This is a very simple way of producing purified copper for experimenting.

The alloys of copper are very common, indeed it is the metal which forms almost every metallic alloy. Those alloys are too numerous to name. Good common brass is made by a mixture of 65 per cent. of copper added to 35 per cent. of zinc. The bearings for machinery are made of an alloy of 14 per cent. of tin added to 100 of copper. Bell metal is made of 20 parts tin and 100 copper. Speculum metal for telescopes is made of 50 per cent. of tin added to the copper. The bronze for statues is an alloy of copper containing 10 per cent. of tin. Cannons are made of the same alloy. Bell metal may be made of 78 parts copper and 22 of tin. This alloy is very brittle when cast into a thin plate like a gong, but if heated, when cast, to a cherry-red heat, held between two plates of iron, and plunged into cold water, the gong will become malleable. Cymbals may be made in this manner. The best way to make tin and copper bronze alloys, is to melt each metal separately, then pour the tin slowly into the copper, and stir well. Many of the alloys of copper are not chemical, but simply mechanical mixtures.—The speculum of Lord Rosse's famous telescope is composed by weight of 126·4 of copper, and 58·9 of tin, and is said to be a true chemical compound, brilliant, and nearly as hard as steel, and brittle as sealing-wax. It is 6 feet in diameter, and 5 1-2 inches thick. It was ground down with emery, and polished with crocus—red oxyd of iron. Muntz metal for ships' sheathing is composed of 62 per cent. of zinc added to 100 of copper. Soft spelter solder for brass is composed of equal parts of copper and zinc. A very strong alloy is made of tin 1 1-2 ounces, zinc half an ounce, and copper one pound. This is a good compound for engineering purposes. 1 1-2 ounces of tin, two ounces of brass, and a pound of copper make a good alloy for fine wheels. Three ounces of copper, one of zinc, and half an ounce of tin melted in a covered crucible, makes a beautiful alloy. There is no end to the alloys that may be made of metals by using them in different proportions — The following is a new metallic alloy, of which copper forms a prominent part, and for which a patent has but recently been obtained in England, by F. J. Anger, of London:—In a crucible the patentee first melts 100 parts of good copper, and while in a perfect state of fusion, he adds 17 parts of zinc, 6 parts of magnesite, 3·60 parts of ammonia or salt of ammonia, 1·80 parts of quick-lime, and 9 parts of crude tartar. The crucible is then covered, and the whole allowed to come to a complete state of fusion; when it may be poured into molds of the necessary shape, or into ingots or bars, to be afterwards shaped into articles of use. If the metal be required of a more tenacious character, tin may be substituted for zinc. According to the ductility or shade of color of the metal that may be required, the proportions of zinc, tin, magnesite, ammonia or salts, quick-lime, and crude tartar, are varied. This alloy is stated to resemble gold, not changing color by use, and being dense, malleable, ductile, homogeneous, and sonorous, to a marked degree.

Recent American Patents.

Improvement in Weighing Scales.—By S. S Mills and M. Bissell, of Charleston, S. C.—Instead of one arm or lever as employed in the common weighing apparatuses, the inventors provide three arms, with a sliding weight upon each. This arrangement, although simple, possesses several advantages. It permits the permanent attachment of the weights to the arms, and thus prevents the inconvenience that often occurs in shops from the loss or misplacing of the weights. It also affords great convenience in ascertaining the tare of the article, for one of the weights may be moved so as to indicate the tare, while another will show the gross sum. This improvement is cheap in construction, is much superior to the single lever scales, and is adapted for use in connection with nearly all kinds of weighing contrivances.

Improvement in Reaping Machines.—By Alexander H. Caryl, of Sandusky, Ohio.—This improvement relates to the raking apparatus of reaping machines. The platform is composed of wooden slats slightly separated. The rake teeth project up through the slats, and the head to which the teeth are attached is moved back and forth beneath the platform, by means of peculiar mechanism. The teeth in their forward movement project through the slats and sweep the straw that may have accumulated on the platform off on to the ground. On their return movement the rake teeth turn down below the slats so as not to touch the straw, but they suddenly rise again, when the forward movement commences. This sudden rise and fall of the rake teeth is accomplished by means of a weight, which is alternately wound up and discharged by the movement of the machine. This is a good improvement.

Machine for Bending Iron Hooks.—By Elisha Harris, of Providence, R. I.—Iron hooks of various forms are extensively used in the rigging of ships, and for many other purposes. They are usually bent into the desired form by hand, upon the horn of the anvil. The present improvement consists in an ingenious combination of two metallic rollers, whereby hooks

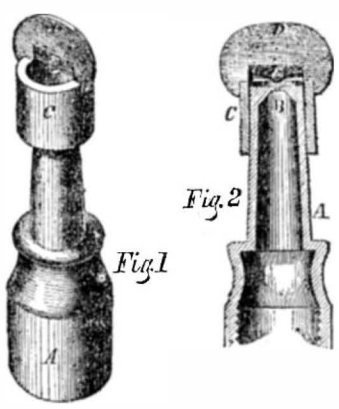
of all kinds may be bent up as fast as the straight bars from which they are forged can be placed in the machine. The apparatus is quite cheap and simple; by its use one man can bend twenty hooks where he now fashions one. When the rollers ar set to bend a given size or form of hook, all that are turned out will be exactly alike. This is an excellent in-tion.

Three-Wheeled Vehicles.—By S. French, of Binghamton, N. Y.—This invention consists in a peculiar method of attaching and connecting the third wheel, which is placed behind an ordinary pair of wheels and shaft. It is alleged that vehicles of this kind while possessing nearly all the advantages of four-wheeled carriages, are less expensive in construction, require less space in turning, &c.

Breech-loading Cannon.—By C. C. Terrel, of Shullsburgh, Wis.—In this improvement there is a sliding breech piece which moves at right angles to the direction of the cannon barrel. This breech piece is furnished with several chambers, into which the ball and powder are placed, the arrangement being such that while one charge is brought in line with the barrel and fired, the other chambers can be reloaded and prepared. The breech piece is moved by a suitable lever, and there are other contrivances for facilitating the working of the piece. There is a small water tank and perforated pipe so arranged as to wet the exterior of the cannon barrel at each discharge, and thus prevent it from becoming unduly heated. The inventor alleges that a cannon of this description may be fired ten times faster, and will not require any more men to work it than a common piece of ordnance.

Wood's Patent Oscillator—We learn that this excellent invention, noticed and illustrated by us on page 217, last volume, has been put into operation, with great success, at Russell's Commercial Iron Works, Auburn, N. Y. Mr. Russell speaks of it in high terms, and regards it as one of the most valuable improvements in steam engines that has been made for a long time. He believes it to be admirably adapted to locomotives. Mr. Geo. F. Wood, of Ulysses, N. Y., is the inventor.

Improvement in Gas Burners—By Cummings and Douglass, New London, Ct.—This invention is designed to be used in connection with burners where the flame is produced by the combustion of two jets of gas issuing simultaneously from the top of the burner. The common "fish tail burner" is an example of this kind. The improvement consists in placing a small blade of metal on top of the burners, between the gas orifices, so as more fully to separate and spread the two jets, and cause the flame to be broader; the metallic blade is also alleged to act as a heat receiver, and by becoming itself highly heated to impart additional caloric to the gas, and thus produce better combustion.



In the engraving, fig. 1 is a perspective view. and fig. 2 a section of the same. The burner, A, is made in the usual manner, having orifices at B for the escape of the gas. The improvement comprises a ring cap, C, which is slipped on to the tip of the burner, the ring being attached to the vertical dividing blade, D. The central portion of this blade is sharpened into an edge, E, having a pointed tongue, as shown. The tongue extends down between the two apertures, and serves to assist in separating the jets. The blade, it will be observed, is quite small, and the two jets unite above it into one flame, in the common manuer, the only difference being, that the flame produced when this contrivance is applied, is larger and broader than it otherwise would be.

This invention is applicable to nearly all the burners now in use; it is alleged by the inventors to effect an important purpose, viz.: that of increasing the illuminating power of the gas, without augmenting the consumption. The contrivance costs only a few cents, and may be slipped on to any burner in a moment; it is not even necessary to unscrew the burner. The inventors and patentees are Messrs. Cummings and Douglass, New London, Ct. Patent bears date Jan. 15, 1856. Mr. N. P. B. Curtiss, No. 447 Broadway, N. Y., is the agent who furnishes the improvement in this city and Brooklyn.

Recent Foreign Inventions.

Oil Colored Paper Hangings—P. Trumble, of Huddersfield, England, has obtained a patent for an improvement in paper hangings, and in his specification he points out certain objections to the use of water colors in the manufacture of paper-hangings, such as, that the expedition with which they are obliged to be printed—the paper being necessarily wet, and each color printed separately—does not admit of the proper working and classification of the colors employed; and that though when dry they may look rich and sightly, yet when varnished the colors sink, and present a harsh appearance. The patentee, therefore, though using the ordinary paper, double coats it with composition made with a solution of india-rubber, tallow, japan, soap, and size, in certain proportions, rendering the paper impermeable, strong, elastic, and durable. The paper thus prepared and dried is then (in the manner usually practiced by grainers in wood) marbled, or otherwise ornamented with colors composed of the following ingredients:—Oxychloryd of lead or zinc, japan, turpentine, and raw linseed oil, mixed in the ordinary manner to produce the desired colors. When dry they will have a gloss almost equal to one coat of varnish. Varnish can be applied to enhance the beauty of the paper, which does not require any preparation to receive it.

Coating Sheet Iron with Varnish—Messrs. Morewood and Rogers, of Enfield, England, have taken out a patent for covering sheet iron with a varnish, so as to protect it in a superior manner from the action of the atmosphere. They first take clean sheet iron plates, and dip them in a solution of the chloride of tin, by which they become covered with a thin scale of tin. They are then washed well in warm water, and dipped into a melted composition of two-thirds resin and one-third tallow, heated to 240° Fah. They are then allowed to dry, and afterwards dipped in a hot solution composed of three-quarters of a pound of shellac and one-fourth of a pound of resin dissolved in two gallons of alcohol. Any quantity may be made from these proportions.—They are then taken out and dried in an oven. Common tin plates for roofing, exposed to sea winds, where tin is liable to rust, if coated as described, will stand exposure to the weather well.

Reverberatory Furnaces for Smelting Metals—Mr. W. H. Nevill, of Llanelly, Wales, has obtained a patent for the construction of reverberatory furnaces for the collection and condensation of volatile metals. It is well known that in submitting metals that are volatile at high temperature, such as lead, zinc, silver, &c., or minerals containing substances that are similarly volatile to heat in common reverberatory furnaces, a considerable loss of such metals or substances is experienced, in consequence of the great rapidity of the current of heated air passing through the flues and chimneys leading from such furnaces. The object of this invention is to prevent, or, as far as possible, to diminish this evil by the use of the following means:—To the fire-place of an ordinary reverberatory furnace currents of air (either cold or heated) are forced, by a blast cylinder or fan, through tuyeres placed nearly at right angles to and above the fire bars. It is found that a column of blast acting with a pressure of 1 3-4 lb. per square inch, and supplied through three pipes or tuyeres of 2 1-2 in. diameter, is quite sufficient for carrying on the operation required in the treatment of metallic ores in a furnace of 45 square feet of melting surface. The main pipe, by which the blast is supplied to the tuyeres, is provided with a proper valve or stop-cock for the purpose of regulating the quantity of air supplied to the fire grate; whereby the degree of heat in the furnace may be increased or diminished at will. It is desirable to have a layer of clinkers on the fire bars, to prevent, as far as possible, the heated air from escaping downwards through the fire bars into the ash pit. By employing artificial instead of natural currents of air for keeping up the required amount of combustion, it is only necessary to maintain a current of sufficient rapidity in the flues to clear the furnace of the fumes and gases generated during the operation; or in other words, taking care to observe this last condition, the patentee is enabled to make use of any well-known flues, dampers, or collecting chambers, in connection with water, coke, and other substances, in combination with such furnace, for the purpose of collecting the fumes that would otherwise escape. Where a number of furnaces are in operation, it would, of course, be necessary to collect the flues from each into one main culvert leading to a chimney.

The Parker Water Wheel.

A correspondent writing to us from Chillicothe, O., inquires if the patent on "Parker's Water Wheel," has expired, or is still in force, and also its peculiar features. He has received a summons to attend the U. S. Circuit Court, at Cincinnati, to answer charges for infringement of the patent, the suit being brought by a professed agent of Mr. Parker. About two years ago he received a notice of the same character, from a person also calling himself an agent of Mr. Parker, and he prepared himself to stand a trial at Columbus, O., but after being at great expense, and employing counsel for the suit, the prosecutor did not appear, and the matter then dropped. Many millers in that neighborhood who had received like notices of suits, paid large amounts to the Agent rather than stand a trial. Our correspondent states that his wheel was put in by a millwright who was not aware whether it was built on the principle of Parker's or not, and that he is ignorant himself of that principle, and wishes to get light on the subject.

The "Parker Water Wheel" obtained its name from the improvements made on the old fashioned re-action wheel, by Zebulon and Austin Parker, and for which they secured a patent Oct. 19, 1829, which patent was extended for seven years in 1843, and has therefore been on the expired list since 1850—a little over five years. The great improvement claimed in the Parker patent was "percussion and reaction," in one wheel, by producing a vortex within the reaction wheel, in other words—as we understand it—giving a whirling motion to the inlet water in the direction of the wheel's motion. This patent covered three claims, but these are now public property.

On the 27th of June, 1840, a patent was granted to Zebulon Parker and Robert McKelvey—the executor of Austin Parker—for an improvement on their water wheel, which consisted in placing a wheel or wheels within air and water tight cases, commonly called *drafts*. This patent expired in 1854. We do not know which of these patents the agent of Mr. Parker asserts has been infringed by our correspondent, but as his wheel was put up in 1852, he is not liable for damages for infringement of the first patent, and perhaps he is not for the second, which merely relates to the draft boxes.

We understand that Mr. Zebulon Parker has never obtained sufficient remuneration for the valuable improvements made by him on reaction wheels; these date back beyond those set up for Fourneyron, of France, who has been called the inventor of the *turbine*. But some of the agents of Mr. Parker, we are convinced, have done wrong by the *means* they have used to *extort* (we cannot call it by any other name) "capitation taxes," from persons using water wheels in perfect ignorance of violating any patent.

Explorations in the Western Deserts.

The St. Louis *Republican*, in discussing the practicability of the Pacific Railroad, says:—"The idea generally entertained that the immense arid plains lying between the Mississippi and the Rocky Mountains must remain forever unsettled and uncultivated, on account of the scarcity of water and fuel, is likely to undergo a change. Scientific men are now exploring these plains or prairies, and from the little we hear of their researches, the prospect appears good that an abundance of coal and water can be obtained at a small outlay of money and labor. Successful experiments have been made in testing the practicability of boring Artesian wells, and the result is most satisfactory. In one instance, near the Pecos river, at the depth of six hundred and fifty feet, the greatest abundance of perfectly pure water was obtained. Besides this, the operation developed the existence of coal beds, easily accessible, and, as far as the experiments have progressed, evidently underlying the whole of that immense country.

The expedition for making these observations and experiments on the great Western prairies, was sent out by the Government only a short time since."

The Coal Trade for 1855.

The Pottsville *Miner's Journal* publishes its annual tables of the coal operations in the Schuykill region. The total amount of coal of all kinds sent to market from the Schuykill, Lehigh, Wyoming, and the semi-anthracite and bituminous regions, during the year, was 7,587,502 tuns, an increase of 684,004 tuns over the amount the previous year. There has been an increase from every region engaged in mining, during the year, the largest from the Pittston, Wilkesbarre, and Nanticoke portion of the Wyoming coal region, lying below Scranton and the Lackawanna region. The Schuykill region is prepared to increase its production 300,000 tuns this year, should there be that demand for it. The Lehigh region is prepared to furnish a considerable increase this year, as well as the Scranton region, with the new branch of their road completed leading to New York. Both these roads now open the coal region directly to New York city. The Wyoming region will also have a new outlet with the completion of the North Branch Canal and the improvement of the Whitehaven Railroad, leading from Wilkesbarre to the Lehigh. The Shamokin region has also another outlet, via the Sunbury and Erie Railroad, leading to Williamsport, and from thence into the interior of New York.

The number of engines used for mining purposes in Schuylkill County is 315, with an aggregate power of 10,653 horses. The number of miles of railroad in the county is 430. The number of locomotives running on the lateral railroads is 42, independent of those on the Reading railroad.

Singular Railroad Accidents.

Curious railroad accidents have been occasioned by the cold this winter. The Albany and Rochester papers tell of two cases. One of the best locomotives on the Central Railroad came in with the Cincinnati Express train in charge, which was safely deposited in the depot, one of the huge driving wheels of the locomotive suddenly fell to the ground, having parted from the axle close to the hub (so to speak) of the wheel. There was no unusual strain upon either the wheel or axle, and why it should break at that time is wholly unaccounted for. So, too, with a train which arrived at Rochester from Buffalo. The train was drawn by two locomotives, and after its arrival in the depot it was discovered that the hindmost engine had lost the hind part of the forward trucks somewhere on the road, but where, it was not known, and great was the mystery how they became detached from the car. Such a circumstance never before occurred on the road, and the like has never before been heard of without the train being thrown from the track. Subsequently the wheels were found three miles west of the city. They were lying against the fence, some distance from the track. How they became detached from the car is still a mystery, as the shaft was not broken, and all was in good order, with the exception of the flange to one of the wheels, which was broken off.

Lieutenant Maury.

The merchants of Boston are circulating petitions praying Congress to reverse the action of the Naval Board, which placed Lieutenant Maury, of the U. S. Navy, on the Retired List. The petitioners ask that he may be restored to the active list in consideration of his eminen services to commerce and navigation.

A bed of anthracite coal has been discovered n the Patterson Creek Valley, Va.

TO CORRESPONDENTS.

D. H. B,, of Mass.—Your new fertilizer is invaluable if it is as effective and cheap as you have stated. You are doing a great work for the advacement of Agricultural science.

J. C., of Tenn.—We intend to puilish your article on flying, but we cannot state the precise time at present.

I. Z. A. W., of Phila.—The engraving which we published of your sawing machinery illustrates so nearly every feature contained in your last model that we decline g:t ing up another engraving to publish. Your model and the papers have been lodged in the Patent Office.

H. M. P., of Ill.—We should not feel willing to make the investment you propose, as it is out of our line of business.

W. R. A., of Ohio—The sketch of your apparatus for drawing molasses from a cask, has been examined. It is on the principle of the well known Archimedian screw and has been employed for raising water. Applying it to another purpose, could not be patented, no matter how useful the application might be. A patent must rest upon a contrivance for effecting a certain purpose, and not upon a mere change of use.

J. A. H., of Ill—We do not know of any published work on street architecture, neither do we know the price of Pugin's work. Address Appleton & Co., New York City.

T. D., of Ala—You may rest assured that the atmospheric telegraph could not be operated on such long lines as the electric telegraph; but for short lines it might work economically.

L, G. E.. of Ala.—It would cost too much to send your model by mail. You had better send by some friend for it who may be visiting the city.

E. H., of N. Y.—We will send you four patent laws as soon as we have any. We are obliged to you for the remittance of two dollars.

S. P. F., of N. B.—Your subscription expires at No. 26 present volume.

A correspondent from Greenfield, Ill., writes us that the Osage orange hedges are flourishing remarkably on the prairie land in that State. The Osage orange was introduced extensively in that region, at our suggestion, published some years ago.

L. W. S., of Ohio—We believe the gas engines alluded to by you are still in the Crystal Palace. By reference to the articles published in this Vol. on the American Institute Fair, you will find our views in regard to such engines. Spelter for soldering brass, is an alloy of zinc and copper in nearly equal parts.

D. H., of Wis.—A machine that has been in public use for more than two years prior to the application for the patent cannot be secured by valid patent. A patent could not be procured on a two edged mortising chisel with a space between the edges in the form of an inverted V. It is not sufficiently novel to justify an application for a patent.

D. C. T., of N. Y.—Throw two pounds of sal ammoniac into your steam boiler, and try if it will remove the scale. It is the best substance for this purpose that we are acquainted with.

M, B., of Md.—Ten-horse power should drive two run of stone, and grind one barrel of flour on each run per hour with ease.

H. S., of Va.—We do not believe a patent would be granted for bleaching the articles described by you, because various vegetable substances are now bleached by it; and the method of doing so is known to every chemist.

A. C., of Ohio—There is no positive rule for the hight of chimneys to boilers. The higher the chimney the better the draft. If you make the throat of your chimney of equal area to the flues you cannot go wrong. We would use for your boiler—48 inch diameter and 30 feet long—a chimney 70 feet high, with a throw of about 24 inches.

J H. C., of Phila.—You can cast iron pulleys in iron molds, but this will chill their surface, so that you will not be able to turn them in a lathe. Soft metal pulleys, however, will answer very well to be cast in iron or brass molds.

J. J, G., of Mass.—Some fusible plugs in boilers have become hard and infusible. It is believed that they became porous, and absorbed scale and oxyd of iron, and thus acquired a strong infusible character. Safety plugs are still objects of solicitude by our steamboat inspectors.

M. H., of Pa.—Admitting a current of cold air into a room from the outside, to be heated as it comes in contact with the stove or furnace, is not a new idea. We have had it very often proposed for our consideration. There may perchance be something new in your *arrangement* for heating. We could better decide this point upon being furnished with a sketch and description of your contrivance.

G. W. R., of Wis.—If you will refer to Vol. 8, Sci. Am., page 272, you will find an engraving of a divided car axle which fully covers yours. We cannot tell how many times we have had the same device presented to us. We presume more than one hundred. Dividing a car axle in its center, or at any other point, or using one fixed and one loose wheel, for facilitating the turning of curves, is a well-known contrivance.

T. McG., Jr., of Ohio—It would require a large amount of space to answer all your questions in relation to steam boilers, their size, horse power, heating surface, &c. In Vol. 7, Sci. Am., we published a series of illustrated articles touching on the different points on which you request information. These will give you the desired information Ten square feet of heating surface is allowed for each h rse power. Eight-horse power will drive one run of stones at a high velocity.

J. G., of Ohio—Agreeable to your order, we remitted you $30 in bills by mail on the 5th inst., to pay the 9th prize, which was awarded you.

J. A. R., of N. H.—Your engraving of the cultivator is not suitable for our columns. We could get one up from your letters patent that would answer our purpose for ten dollars. If you wish a handsome engraving to appear in our columns send us your patent, and the above amount, and we will get up one that will be a credit to your invention.

F. D., of Vt.—You are mistaken in your supposition—the receipts on perfumery, etc., over the signature of Septimus Piesse, are not extracts from any book, but furnished to us direct by the author.

C. B. H., & others, of N. Y.—We regret it, but we have not a copy of the Patent laws on hand to send you. In hopes of having the existing patent laws amended this winter, we have delayed issuing another edition of the laws. A copy of the official edition of "Information to parties about to apply for patents," we will send you gratis in a few days, and when our edition is published we will forward you a copy for the remittance you have made.

W. H., of Pa.—Mr. Burdon, whose advertisement you will find on another page, makes such presses as you want. The artificial stone which you have made cannot be patented, because the same ingredients are now used for making such stone in this city, and have been secured by patent.

M. R.'s communication on coke and coal burning for locomotives is refused because it has no responsible owner to father the production. It is unmanly to write to a news paper without giving your address.

N. C., of Ala.—Iron soda fountains are preferable to those made of copper. They can be obtained of Wm. Gee, Soda Fountain maker, Fulton st., this city, who will inform you of the price, if you communicate by letter, stating what you want.

Marcus Pratt, Brattleboro, Vt., wishes to correspond with a manufacturer of small tin boxes.

G. G., of N. Y.—We think very favorably of your improvement in harness buckles, but we do not think a patent could be procured for it. Buckles having an independent bar for supporting the tongue, have long been used for suspenders, and the mere change of use would not be regarded as patentable in the law's eyes. It would be useful for harnesses as it would prevent the necessity of cutting away the leather for admitting the buckle tongue.

M. R., of Wis.—Your model we will preserve for you until next May. We do not think your interests will be very much jeopardized by the delay. Still that is a risk you must run.

H. C. G., of Wis.—Your letters patent are received, and the engraving is in progress of execution. The cuts wil appear in the paper in about three weeks.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Feb. 9, 1856:—

S. H. P., of Ct., $30; C. W. P., of N. J., $10; D. T., & Co., of Del., $30; S. & B., of Mich., $15; I. A. H., of Mass., $25 C. F. B., of O., $30; W. H. H., of Mass., $30; W. S., of Pa., $10; J. M., of Pa., $25; J. N., of Ct., $30; F. W. T., of Ct., $15; A. L., of Pa., $30; G. W. F., of Mass., $30; S. B. D., of Mich., $250; J. M., of Pa., $100; O. W. S., of Ct., $30; T. S., of N. Y., $25; R. U., of Mich., $13; M. N., of Pa., $30; C. F. H., of L. I., $20; W. B., of L. I., $25; J. S., of N. Y., $25; C. A. VanD., of Ala., $25; S. B., of N. Y., $25; J. D., of N. Y., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Feb. 9:—

I. A. H., of Pa.; I. Z. A. W., of Pa.; J. M. of Pa.; H W A., of N. Y.; F. W. T., of Conn; W. W. A., of N. Y.; M. & C. P., of Md.; W. B., of L. I.; J. S., of N. Y.; T. S., of N. Y.; C. A. Van D., of Ala.; C. E. & C. D. A., of N. J.; S. B., of N. Y.; J. D., of N. Y.; M. P., of N. Y.; J. H. B., of Vt.; R. U., of Mich.; S. W. & R. M. D., of Mass.; I J. W. R., of N. Y.

Important Items.

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.

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

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

Literary Notices.

Railroad and Civil Engineers Pocket Book.—We have examined the above-named book, which was advertised in our columns last week, and find it crammed with useful information, got up with great care by its author, Oliver Byrne, C. E., and neatly printed and bound for pocket use. It contains a great number of tables to shorten calculations, and contains much new matter on civil engineering, which, its author says, is derived from personal experience. Published and for sale by C. Shepard & Co., No. 154 Fulton St., this city.

Leslie's Gazette of Fashion—The February number of this monthly contains illustrated descriptions of the fashions, ball dresses, riding dresses, head dresses, &c., Published by Frank Leslie, No. 12, Spruce street, N. Y.

Terms of Advertising.

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

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

☞ All advertisements must be paid for before inserting.

Science and Art.

Vaporgraphic Glasses.

An ingenious person may afford no end of amusement to himself and friends by the aid of a few dozen vaporgraphic glasses, on which are invisibly delineated a variety of questions and answers of an appropriate character, such as love questions, conundrums, &c. Real "dissolving" views may also be depicted on these glasses, possessing an interest according to their artistic value. Glass valentines may also be made in the same way, which may have invisibly impressed upon them any written theme, poetry, or initials—

Breathe on this glass, and you'll divine
The portrait of your Valentine.

These vaporgraphic glasses are very easily made, and at a cost not worth mentioning. When finished they have nothing peculiar in their appearance to indicate their latent graphic powers; hence, to a stranger to the mystery, they only appear like ordinary glass.—The secret is this:—Procure a few pieces of window glass, about the size of an ordinary playing card; then write or draw on them whatever may be thought proper with a quill pen that has been dipped in hydrofluoric acid, using this watery liquid just as you would ink. After the design has thus been depicted upon the glass for about two minutes, the glasses are to be washed in clean water, and polished with a silk handkerchief, or a dry soft cloth. The drawing or writing will now be perfectly invisible, but if breathed upon the pictures or letters become "as clear as noonday." The same effect is observed if the glasses be held over the steam of hot water; hence their name, *vapor*, or steam; *graphic*, relating to writing. Hydrofluoric acid, as it eats into glass, is sold in leaden bottles by the laboratorian chemists.

SEPTIMUS PIESSE.

Encroachments of the Ocean.

The New Jersey Geological Report shows that the Atlantic is steadily, and rather rapidly, encroaching upon the land on its coast.—At Cape Island the surf has eaten inwards full a mile since the Revolution. Along the Bay Shore in Cape May the marsh wears away at the rate of a rod in two years. One of the beaches upon the coast is mentioned as having moved inward one hundred yards in the last twenty years. It is also the opinion of the oldest observers that the tides rise higher upon the eastern New Jersey uplands than formerly. Prof. Cook, of the Geological Survey, is confident that the shore is now settling at the rate of about two feet in a hundred years. The sand beaches on the coast are drifting inward every year. Egg Island, the western point of Maurice River Cove, which in the year 1694, covered three hundred acres, now contains at low water from a half to three fourths of an acre, and at high water it is submerged.

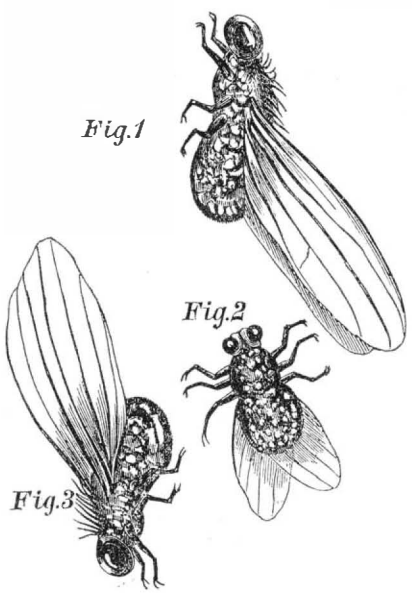
British Porcelain.

At a recent meeting of the Burslem School of Design, in Staffordshire, England, H. Minton made a speech, in which he stated that in the manufacture of china and earthenware England surpassed France, but great efforts were required to maintain their present position. It is a singular fact that the British porcelain manufacture may be said to be the product of one ingenious working man, and he lame and enfeebled—the well-known "Wedgewood," who, from a journeyman potter, elevated the porcelain manufactures of England from a rude to a most elegant art, was elected a member of the Royal Society, and died wealthy and in the esteem of his countrymen.

Tobacco Packed in Lead.

The *American Journal of Medical Science* calls attention to the evil of packing tobacco in lead. It states that recent researches establish the fact that the moisture of the tobacco oxydizes the lead, and produces a poisonous salt, and that from six to thirty grains of this salt has been found in half a pound of tobacco. We cannot credit this; and, besides, it is well known that very little tobacco is packed in lead. It is put up in foil made with lead and tin. A lead ingot is placed between two tin ones, and these are rolled out into foil. The tin is therefore always next to the tobacco, and the lead in the center.

The Cause of Cholera, and its Remedy.



When the Cholera first visited our country in 1832, it created universal fear, because the destroyer who struck down the old and young, the bold and strong, dealt his terrible blows suddenly and unseen, and could not be resisted. At that time many persons also feared that, like some modern fevers, cholera would never leave the country after having found a foot-hold in it. These fears have been confirmed by repeated outbreaks of this scourge since. It was believed by many, however, that even if this plague became a permanent disease among us, physicians would either discover a preventive for it, or else find such remedies as would, in a great measure nullify its fatal effects. But until the cause of this fatal disease is known, neither a sure remedy nor a certain preventive by any possibility can be discovered. To ascertain its cause, then, is the grand desideratum. Cholera has been attributed to various causes, and two theories have been put forth regarding it. One called the "geological theory," which assumes that it is connected with the geological character of a country, and the other called the "insect theory," which assumes that it is caused by small poisonous insects, inhaled during respiration, taken with food, or drank in water.—Our readers will remember that on page 30, this Vol. SCIENTIFIC AMERICAN, we presented a summary of the views of J. Franklin Reigart, Esq., on the insect theory of cholera, taken from his manuscript. He has just published those views in a neat pamphlet, which is now before us, in which he claims to be the discoverer of the cholera insect, three microscopical views of which are now given, and are here represented by figs. 1, 2 and 3. This insect is of a dull yellow color, and quite small, being only one-fortieth of an inch long, and the one-eighth of an inch across the spread wings. Mr. R. believes it to be not only the cause of cholera, but also yellow fever; and says, "the cause of these diseases being discovered, scientific men may be enabled to stay its ravages," (the insect's.)

We would like to see these insects tested upon some animals, in the same manner chemists test poisons, in order to witness their effects upon the animal economy. Until this is done, their poisonous nature, to which the cholera is attributed, may be disputed. The views of Mr. R., however, find support in an able article on the subject by Dr. Hartshorne, a contributor to the *Medical Examiner*, Philadelphia, who asserts that "cholera is generated only in the presence of a certain unknown contingent, whose capriciousness of migration, and partial subjection to temperature and other habitudes, suggest the probability of the animalcular hypothesis."

A short period after we published the views of Mr. Reigart, on the page referred to, we received a communication from John Lea, of Cincinnati, the author of the "geological theory of Cholera," his discovery dating as far back as 1832. He attributed the cause of cholera to lime water, which Mr. Reigart believes is an antidote. Their views are therefore antagonistic. He asserts that it has always been most virulent in the limestone districts, while it passes over the primitive formation of New England. He believes that rain water as a drink is a preventive, and that the inhabitants of every city supplied with rain water will never suffer from ita ravages. Dr. Hartshorne and Mr. Reigart believe that cholera is connected with the decay of organic matter, in which the poison is generated, and that by preventing such decomposition taking place in exposed places, the cause of this disease will be removed.

As the cholera in past years has visited a number of places in the south-west and west early in the spring season, the foregoing views should now claim the attention of persons living in those parts of our country. They should be very careful to bury underground organic matter left on its surface during cold weather, which is liable to undergo a rapid change when the warm season opens. They should also be very careful to use no impure water, for the purposes of cooking and drinking. Great good may result, and no harm can arise from following these precautionary measures.

The cholera has not been strictly confined to the limestone formations, nor have districts on the primitive formations been exempt from it; at least, this was the case in New York State during the year 1854. The experience of that year was not favorable to the "geological theory." The experiments of Dr. Thomson, of London, in St. Thomas' Hospital in 1854, seem to be in favor of the insect theory. He weighed a cubic foot of air in August, 1854, when the cholera was raging, and its gravity was 525·6 grains; the same quantity of air in August, 1855,—a healthy month—weighed 523·5 grains. Thus the air was heavier in London when the cholera prevailed, and this was also the case in other places; it also confirmed the experiments made in the cholera season of 1832 by Dr. Prout. Dr. Thomson then took a blower and forced a great quantity of air from a large room in the Hospital, filled with cholera patients, through Woolf's bottles, containing distilled water, so that he was able to retain matter suspended in the atmosphere, and then examine it. It was examined with a microscope, and found to contain fibres from the clothes of the cholera patients, hair, fungi, sporules of fungi, and an abundance of vibriones, or lower forms of animal life. When the same room was but partially filled with cholera patients the atmosphere was treated in the same manner; then the vibriones were very few; and when the room was empty no vibriones could be detected in the air. By applying the same means to force air from a neighboring sewer through distilled water, it was found to swarm with vibriones, in various stages of advancement. The following are Dr. Thomson's conclusions on the subject:—

"These experiments render it obvious that organic living bodies constantly surround us in close apartments. They fail to point out any matter capable of communicating cholera from one person to another through the medium of the air, (not infectious by the air,) and so far, are important to the public; but they show that foreign animal matter, injurious to health may speedily be concentrated in certain localities which will, undoubtedly, assist in the production and propagation of the disease, in conjunction with meteorological conditions."

A chemical examination of the atmosphere during epidemics, in many places, has failed to detect any cause of disease. The only proper method to examine the atmosphere is that pursued by Dr. Thomson. Our physicians would do well to follow up his investigations.

The Effects of Cold on Machinery.

The intense cold, this winter, has increased the working expenses of our railroads, for breakages, in a most extraordinary manner. It is well known that during frosty weather a thick bar of cast-iron can be broken with great ease, by a smart blow from a mallet; and the same can be done, but not so easily, with a bar of wrought iron. On this account, the locomotives on all our railroads have had a serious time of it, by breakages from frequent concussions while running. The machine shops at the stations have been working day and night. Pumps have been frozen and bursted, slide rods and connecting rods and axles broken, and wrought-iron tyres, three inches thick, of wheels, have snapped like rings of glass.

Philadelphia Locomotives.

The *Ledger* states that at the works of Baldwin, and those of Norris, Philadelphia, there are employed 1000 men who make on an average about 130 locomotives annually; the average weight of each being in the neighborhood of 23 tuns. The iron used in their manufacture will weigh between 3000 and 4000 tuns, the balance being of brass, copper, wood, &c. When orders are received for locomotives, a mechanical engineer prepares the drafts, and all parts to be forged are sent in a detailed form to the blacksmith shop, and the portions to be cast are given in charge of the molder. The entire force, consisting of boiler makers, blacksmiths, coppersmiths, machinists, pattern makers, molders, carpenters, &c., are set to work to finish the portion of the locomotive given to them in accordance with the plans of the designer and draftsman. When each part is completed, the finishers put them together, after which steam is placed in the boiler, and a trial takes place.

Brittle Annealed Iron.

We have received from A. Hotchkiss, of Schenevus, Otsego Co., N. Y., a piece of iron which is a curiosity. The piece is part of a quantity that was brought to that place for malleable iron from certain Malleable Iron Works in this State, and was found to be more brittle than common cast and gray iron. When a piece of it is struck with a hammer, it flies into numerous pieces like glass. This iron was heated with wood, and was also annealed, which makes its brittleness still more surprising. It has no fiber, but is crystaline, the crystals of the broken edges being long and and glassy, having the appearance of some galena that we have seen. How this iron is so crystalline, and consequently brittle, after undergoing processes designed for the very purpose of making it malleable and tough, is something we cannot explain. Who can?