2d, The pressure-slide, K, actuated by ropes and weights, in combination with the feed-box, I, substantially as and for the purpose set forth.

3d The guide-tube box, F, and its tubes, f2, the sieve, G, and check-sieve, H, substantially as for the purposes set forth.

4th. The boxes, I, and, F, in combination with the axle, i1, the shaking-lever, N, and pivot, n3, substantially as set forth

5th, The guide-slat frame, E, having longitudinal slats, e', in combination with the splint-frame, D, having transverse slats, d1, and the channel-plate, B, substantially as for the purposes set forth.

6th, The splint-frame, D, arranged with slats, d1, chamfered at ends, substantially as set forth.

7th, The spaces, c, in combination with the slats, d1, of the frame, D, constructed and operating substantially as set forth.

8th, The compresser device, C, acting upon the slats of the frame, D, substantially as and for the purpose set forth.

9th, The supporting-bar, L, in combination with the shaking-lever, M, and shaking-wheel, m1, acting substantially as set forth.

78,838.—APPARATUS FOR DAMPENING GRAIN.—I. Shellabarger, Decatur, Ill.

I claim the combination and arrangement of the cylinder, A, grain chute, B, and water pipe, C', when the whole is constructed so as to operate substantially as described.

78,839.—UMBRELLA AND PARASOL.—John Anderson Simpson, Liverpool, England.

I claim, as a new article of manufacture, an umbrella constructed as herein described, the joints or junction of the ribs and stretchers being covered, and protected from injuring the covering by rubber shields, as and for the purposes herein set forth.

78,840.—SOAP.—G. W. Slagle, J. L. Miller, and H. C. Hoy, Washington, D. C.

We claim the mode of manufacturing soap from the ingredients, and substantially in the manner set forth.

78,841.—WAGON-BRAKE.—James Harvey Smiley, Caroline, N. Y.

I claim the combination and arrangement, consisting of the slide, C, the cord or cords, F, levers, G, and H, and springs, P, and pulleys and rollers, and plates, as described, making a brake sliding out and against the wheels, and retracting out of sight, substantially as set forth.

78,842.—ARTIFICIAL IVORY.—Alfred Starr and William M. Welling (assignors to William M. Welling), New York city. Antedated June 2, 1868.

We claim the compound herein specified, prepared as set forth.

78,843.—COMBINED THRESHING MACHINE AND GRAIN-SEPARATOR.—Lorenzo P. Tweed, Lewisburg, Pa

I claim. 1st, The apron, F, consisting of a number of sheet metal strips, suspended above the shaker-frame, D, substantially in the manner and for the purpose herein set forth.

2d. The slats, y, having wires, y1, at their edges and adjustable upon a frame, substantially as and for the purpose described.

3d A plate or plates, k1, so hung, adjacent to an opening in the case of a fan, G, that the passage of air into the said case will cause the plate to be adjusted, substantially as and for the purpose described.

4th, The arrangement of the shaker-frame, D, platforms, H and K, bands, g and w1, with their bars or scrapers, and the sieves, t t1, all substantially as and for the purpose specified.

78,844.—DEVICE FOR RAISING AND LOWERING WINDOWS.—Elisha H. Tobey (assignor to himself and A. R. Hale), Bridgeport Conn.

I claim, as an article of manufacture. the socket, A, constructed with the internal flange or rim, a, and with or without the flush-plate, B, and so as to be applied to the sash, substantially as set forth.

78,845.—ELECTRO-PNEUMATIC APPARATUS FOR TRANSMITTING DISPATCHES.—Cromwell, Fleetwood Varley, London, England.

I claim, 1st, Operating the pistons and valves of the main compressed air and exhaust-pipes, o and n, by means of a series of auxiliary valves and pistons, and pipes connecting the exaust and compressed air chambers with the cylinder, and arranged to be operated by the keys or buttons, substantially in the manner and for the purposes herein set forth.

2d, The combination, with the valve-rods, M and l, and their detents, of the sliding-rod, 4, arm, 3, and piston-rod of the cut-off cylinder, V, substantially as herein shown and described.

3d, The combination, with the the cylinder V and its piston, of the cut-off mechanism herein described, arranged in such manner that either the depression of the stop or key, a', or the arrival of the carrier at the distant end of the message pipe, shall connect the said cylinder with the exhaust, substantially as and for the purposes herein shown and set forth.

4th, The use of the valves, x y, arranged in chest, N, so as to be operated by the movement of the arm, 3, for the purpose of destroying the vacuum in the chest and message-tube, as set forth.

5th The combination, with the message-tube, and mechanism for connecting the same with the air-compressing apparatus of the cylinder, F, and piston and slide-valve arranged to cut off communication between the message-tube and receiving-chamber, substantially as herein shown and set forth.

6th, Connecting the slide-valve. cylinder, F, with both the compressed-air and the cut-off mechanism, substantially in the manner and for the purposes specified.

7th, The combination, with the message-tube, of the herein described mechanism for connecting the same with either the compressed-air or exhaust-apparatus, and for cutting off the said connections, under the arrangement described, so that all the operative parts of such mechanisms shall be actuated by means of the button, A, a, and a', in the manner and for the purposes set forth.

78,846.—SEEDER, DRILL, AND ROLLER.—Luther R. Wallace, Adrian, Mich.

I claim, 1st, The employment of one hopper and one cylinder, or their equivalent, to supply both drill and broadcast-sower with the seed to be sown, the whole arranged in front of the rollers, B B, substantially as set forth and described.

2d, The hollow adjustable seed-cylinder, E, in combination with the concave, W, broadcast-tubes, L, and drill-tubes, N, substantially as set forth and described.

78,847.—BREECH-LOADING FIRE-ARM.—D. B. Wesson (assignor to Mason Fire-Arms Company). Springfield, Mass.

I claim. 1st, The metallic-block, b, and the recessed projection, E, upon the breech or loading end of the barrel or barrels, when constructed, arranged, and operating substantially as and for the purposes set forth,

2d, The described construction and arrangement, in reference to each other, of the block, b, and tumbler, f, whereby the hammers shall be raised to the half cock in the operation of releasing the breech from the frame, substantially as described.

3d, The projection, i, upon sear, h, in combination with the opening, j', in the plate, j', of the trigger, j, substantially as and for the purpose specified.

78,848.—SHACKLE JACK.—Jno. Whitlock, Birmingham, Conn.

I claim the combination of the hook frame, H H', with the slide, F, and the screw, G, or their equivalents, for the purposes above described.

78,849.—CATTLE TIE.—John Wiard, New Britain, Conn.

I claim, 1st, The socket, B. combined with the thumb screw, C, when the said thumb screw is provided with a head. having a perforation at one or both ends, so far to one side from the centre of the axis of the screw as that, when the tie is secured. the screw will be prevented from turning, substantially as herein set forth.

2d, The hook. G, formed upon the base, F, constructed with the lug, I, and seat, L. and provided with eye, E, or its equivalent, and combined with the snap, P, when the said snap is attached to its seat, I, and supported by the lug, I, substantially as herein set forth.

78,850.—BALL CASTER.—Lewis Wilkinson, Boston, Mass.

I claim a furniture caster having a ball, f, secured in a cup or socket a, by extensions, g, substantially as shown and described.

Also in combination with such socket, a, and extensions, g, the pins or projections e, against which the surface of the ball bears and rotates, substantially as shown and described.

Also in combination with the ball-containing cup or socket, the flanged plate or disk c, and screw spindle d, cast integral with the socket piece, substantially as described.

78,851.—CONSTRUCTION OF SAFES.—Francis H. Williams, Syracuse, N. Y.

I claim, 1st, So constructing and hinging the safe door A, and fitting it into the frame D, that this door shall be allowed to move bodily and squarely up to and from its seat without being rotated within the door casing, substantially as described.

2d, Fitting the door A to its frame D, by means of acute angular stepped faces h h' i i', substantially as described.

3d, Providing the double-leaf hinges b b, with a removable pintle c, when such hinges are applied upon the door of a safe or vault substantially as and for the purposes described.

78,852.—ANCHOR.—Frederick Wittram, San Francisco, Cal.

I claim an anchor having the shank A, with the openings B and C, and the two arms or flukes D and E, moving freely through the shank to either side, the whole constructed and operating substantially as and for the uses and purposes herein specified.

78,853.—STEAM ENGINE.—Devolson Wood and Stillman W. Robinson, Ann Arbor, Mich. Antedated March 31, 1868.

We claim the segmental pieces A A, to serve as a cylinder head, substantially as described.

REISSUES.

2,968.—PLATE FOR ARTIFICIAL TEETH.—Alfred B. Ely. trustee, Newton, Mass., assignee of L. R. Streeter. Patented Dec. 17, 1867.

I claim, 1st, The use of hard resins or resinous bodies, mixed with fibrous or textile materials, and shaped by means of heat and pressure, substantially as described.

2d. The use of thin plates of metal, horn, shell, gutta percha, wood, or such other suitable material, capable of being properly shaped, between or in combination with layers of the resinous and fibrous compounds, as and for the purposes substantially as described.

3d, As a basis for artificial teeth or gums, etc., the use of fiber or fibrous material, chemically or mechanically treated or prepared, and saturated or mixed with lac or other suitable substances, which, when heated and pressed, or pressed and heated, will assume the proper shape, and possess or acquire the proper hardness and elasticity, substantially as described.

2,969.—HEEL STIFFENER.—Alfred B. Ely, Newton, Mass. Patented Dec. 31, 1867.

I claim, 1st, The use of resinous bodies combined with fibrous materials, substantially as described.

2d, A heel stiffener made of the above described substances, and formed into shape by means of pressure, with or without heat, substantially as described.

3d, A heel stiffener made of felted or woven fabric, saturated with resinous or other gums or analogous substances, which, when properly heated and pressed in molds, will assume the proper shape, and acquire or possess the proper hardness and elasticity, substantially as described.

2,970.—CHARGING WATER WITH CARBONIC ACID.—Robert Grant, Brooklyn, N. Y. Patented Jan. 28, 1868; antedated Jan. 17, 1868.

I claim, 1st, The charging of water or other liquid with carbonic acid gas, by the use, in combination, of two vessels, one containing the water or other liquid to be charged with carbonic acid gas, and the other containing carbonic acid gas, at a pressure greater than that of the atmosphere, the gas-holding vessel being separated from and not connected with the apparatus, by means of which the gas was generated or compressed.

2d, The combination with two vessels, one to contain water or other liquid, the other to contain gas at a high pressure, but disconnected from the gas generator, of pipes and coupling, and suitable stop cocks, for connecting and disconnecting the said vessels, as herein described, so that the gas holding vessel may be readily replaced by others at pleasure.

3d, In apparatus such as herein described and claimed in the preceding clause, the use of a gage for indicating the pressure in the water vessel of the liquid charged with gas, substantially as and for the purposes set forth.

4th, The combination with an independent gas holding vessel, of a water vessel provided or connected with a pump or other means of supplying the same with water or other liquid, substantially as herein described.

5th, The combination of the water and gas holding vessels, as herein described, with an injector, whereby the liquid from the water vessel may be more highly charged with gas from the gas holder, substantially as set forth.

6th, In combination with a gas holder, disconnected from the gas generator, a water vessel provided with means of agitating and thoroughly mixing the water and gas which it may contain, substantially as herein specified.

7th, In apparatus for charging water or other liquids with gas, as herein specified, the use of a regulator such as described, for the purpose of regulating the flow of gas and maintaining a uniform pressure in the mixing vessel, as shown and set forth.

8th, The combination with the gas holder of an injector, connected with a water reservoir as herein described, so that the water as it flows through the injector chamber shall be charged with gas, substantially as set forth.

2,971.—MANUFACTURE OF GLUE.—George Guenther, Chicago, Ill. Dated June 4, 1867.

I claim the mode of drying glue by revolving or rotating surfaces, having their temperatures raised either by steam or hot air, substantially as described.

2,972.—ARTICLE OF GLUE.—George Guenther, Chicago, Ill. Dated June 4, 1867.

I claim scale glue, produced as herein described, as a new article of manufacture.

2,973.—LAMP.—P. Hannay, Washington, D. C., and Hudson Taylor, Poughkeepsie, N. Y., assignees by mesne assignment of Pascal Plant, Washington, D. C. to Hudson Taylor, trustee. Dated April 6, 1858. Div. A.

I claim 1st, Causing a current of air to impinge upon or commingle with the lower or blue part of the flame of a hydrocarbon lamp, through the instrumentality of a cap piece or burner, without the aid of a chimney, substantially as described.

2d, A cap piece or burner combined with and applied to a hydrocarbon lamp, for the purpose of producing combustion without the aid of a chimney, substantially as described.

3d, Making the cap piece or burner adjustable relatively to the wick and wick tube, substantially as described.

4th, The combination of a flat wick tube with a cap piece or burner and arms or frames, whereby the burner is held on the wick tube, substantially as described.

5th, The combination of the burner, with devices for attaching and supporting the same, with the wick tube, substantially as described.

2,974.—LAMP.—P. Hannay, Washington, D. C., and Hudson Taylor, Poughkeepsie, N. Y., assignees by mesne assignments of Pascal Plant, Washington, D. C., assignors to Hudson Taylor, trustee. Dated April 6, 1858. Div. B.

I claim 1st, Combining a cap piece or burner, substantially as and for the purposes set forth, with the wick tube or top of a hydrocarbon lamp, so that the burner may be thrown back from the wick tube, substantially as and for the purposes described.

2d The combination of a hinged cap piece or burner with the means of adjusting the same relatively to the wick tube, substantially as described.

3d, A hinged burner or cap piece for a hydrocarbon lamp, when constructed and arranged with reference to the wick tube, wick or flame, and the admisson of air, substantially as described.

2,975.—STEAM BOILER FURNACE.—Henry McClure and Jas. Ellis, Terre Haute, Ind., assignees of Henry McClure. Dated Oct. 2, 1866.

We claim the arrangement of a series of steam boilers within a furnace, so that they shall lie transversely with respect to the direction of the draft, so that the products of combustion on their way to the chimney shall be directed against the sides and bottom of the boilers, substantially as described.

2d, Transversely arranged boilers in combination with an inverted arch flue, arranged beneath the boilers substantially as described.

3d, The ash troughs N, with end openings for the removal of ashes from an inverted arched flue which is beneath steam boilers, arranged substantially as described.

4th, Regulating plates O, when applied beneath the spaces between transversely arranged steam boilers, substantially as described.

5th, While not claiming broadly the introduction of air into furnaces for facilitating and rendering more complete combustion of inflammable gases we do claim air inlet pipes, a a, applied to the ridges of the arched flue beneath spaces left between boilers, which are arranged substantially as described.

6th, Transverse or cross ducts longitudinal draft passage and steam generators, substantially as and for the purpose set forth.

2,976.—DOOR AND GATE LATCH.—James A. Park, White House, N. J. Dated Feb. 12, 1867.

I claim the annular latch C, constructed substantially as described, secured upon a suitable rock shaft B, and operated in one direction either by means of a weighted handle upon said shaft, or by means of a spring, as and for the purpose herein specified.

2,977.—FRUIT JAR.—S. B. Rowley, Philadelphia, Pa., assignee by mesne assignments of Thomas G. Otterson Millville, N. J. Dated Nov. 4, 1862.

I claim the within described recess, formed on the exterior of the jar beneath the mouth of the same, the bottom of the recess forming a continuation of the shoulder on the neck of the jar, all substantially as and for the purpose herein set forth.

2,978.—STEAM DRYING APPARATUS.—Wm. Ryner, Philadelphia, Pa., and John C. Hopewell, Flemington, N. J., assignees of Wm. Ryner, Philadelphia, Pa. Dated Aug. 27, 1867.

We claim a drying kiln in which are an upper and lower series of pipes, for the passage of superheated steam to, and the introduction of the same into, the kiln, so that the material to be dried (situated between the two sets of pipes, may be subjected to the combined action of the heat from the said pipes, and that of the superheated steam, as set forth.

2,979.—PULVERULENT ACID FOR USE IN THE PREPARATION OF SODA POWDERS, FARINACEOUS FOOD, AND FOR OTHER PURPOSES.—The Rumford Chemical Works, Providence, R. I., assignees by mesne assignments of Eben Norton Horsford. Dated April 22, 1856.

I claim 1st, As a new manufacture, the above described pulverulent phosphoric acid.

2d, The manufacture of the above described pulverulent phosphoric acid, so that it may be applied in the manner and for the purposes above described.

3d, The mixing in the preparation of farinaceous food, with flour, of a powder or powders, such as described, consisting of ingredients which phosphoric acid or acid phosphates and alkaline carbonates are the active agents for the purpose of liberating carbonic acid, as described, when subjected to moisture or heat, or both.

4th, The use of phosphoric acid or acid phosphates, when employed with alkaline carbonates, as a substitute for ferment or leaven in the preparation of farinaceous food.

2,980.—GRATE BAR.—Samuel Vansyckel, Titusville, Pa. Dated October 31, 1864.

I claim constructing grate bars with pins or projections on one of the sides of the bar and with corresponding mortises or recesses in the other side whereby the bars can be interlocked and held together and made self-sustaining throughout their entire length substantially as described and specified.

2,981.—VESSEL FOR HOLDING LIQUIDS.—Julia M. Colburn, Baltimore, Md., administratrix of the estate of James Stimpson, deceased. Dated October 17, 1854. Antedated April 17 1854. Extended seven years.

I claim 1st, A pitcher for preserving ice water cool combined with double walls inclosing between them air or equivalent non-conducting material so arranged as not to impair the portability of the pitcher and its capability of discharging its contents by pouring, nor its capacity for holding water.

2d, In combination with a double wall ice pitcher a nose, lip, or spout, through which the water is discharged, and a movable cover across the discharge way which prevents access of air into the pitcher thereat except during the act of pouring.

2,982.—HARVESTER RAKE.—Owen Dorsey, Newark, Ohio. Dated March 4, 1856. Reissue 1,067. Dated October 23 1860.

I claim 1st, A continuously-revolving rake attached by a pivotal connection to the shaft on which it revolves so as to allow it to describe the proper path to gather or discharge the grain and to clear the frame.

2d, The combination of a platform, a vibrating cutter, and a continuously-revolving gathering and discharging rake so arranged as to enter the uncut grain in front of the cutter and to discharge the cut grain in the arc of a circle.

3d, A continuously-revolving gathering and discharging rake which enters the uncut grain in front of the cutters and discharges the cut grain in the arc of a circle in combination with one or more intermediate revolving gathering heads or beaters.

4th, The combination of a continuously-revolving gathering and discharging rake which discharges the grain in the arc of a circle and the cam way or guide for regulating the course of the rake.

5th, The combination of a continuously revolving rake which discharges the grain in the arc of a circle with a platform having a fender conformed substantially to the path described by the outer end of the revolving rake in passing over the same, substantially as described.

6th The combination of a continuously-revolving gathering and discharging rake which discharges the grain in the arc of a circle with a vibrating cutter

7th, The combination of a continously-revolving gathering and discharging rake, a cam way or guide, and friction rollers attached to the arms of said revolving take.

2,983.—OBTAINING CANE FIBER FROM CANE.—Sydney C. Long and F. Schumacher, Baltimore, Md., and Jackson Warner, Cincinnati Ohio, assignees by mesne assignments of B. A. Lavender and Kate Lowe, administratrix of estate of H. Lowe, deceased. Dated April 4, 1851. Extended seven years. Reissued June 9, 1868.

We claim 1st, Obtaining the fiber from the cane or reed (*Arundinaria Macrosperma of Michaux*), for the purpose specified.

2d, Cane cotton or hemp, as a new article of commerce and manufacture, for the purpose specified.

3d Breaking down woody fiber of cane and other like plants and dissolving the gummy and other foreign matters therefrom by means of muriatic or sulphuric acid of the strength of 10° Baume or thereabout preparatory to making hemp or cotton for bagging, rope, paper pulp, etc., in the manner substantially as set forth.

KING'S PATENT SOLID STEAM PACKING RING.

It is a well-known fact among mechanics that a properly-fitted solid piston without rings, especially when supported in place by a piston rod running through glands on each end of the cylinder, will keep tight for a long time and do good work. Such a piston has less friction than those which are held to place by springs, and while it fits, works very smoothly, but when worn must be replaced by a new one or turned down and reenforced. The rings of ordinary pistons, although turned very true, are apt to spring and warp when cut, and are difficult to keep true. To overcome these objections is the intention of the inventor of the piston packing herewith illustrated. It requires but one set of rings, and their inner surfaces need not be turned, as they fit neither inner rings nor the periphery of the spider; thus much time, labor, and expense are saved in fitting up the piston.

A is the piston rod, and B the spider. C represents a section of the steam cylinder, and D the packing rings. These rings are whole and two or more are used, although for

Fig. 1

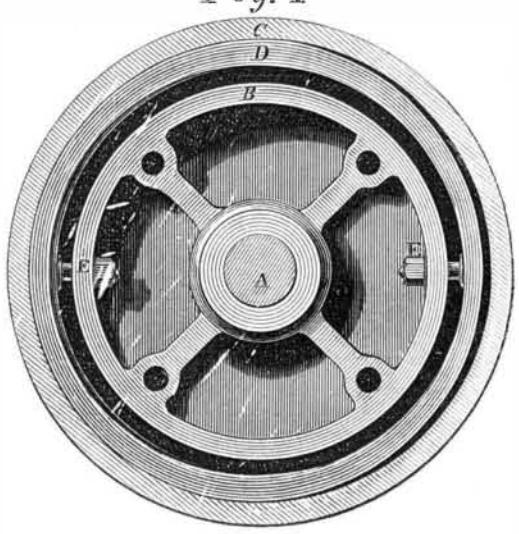
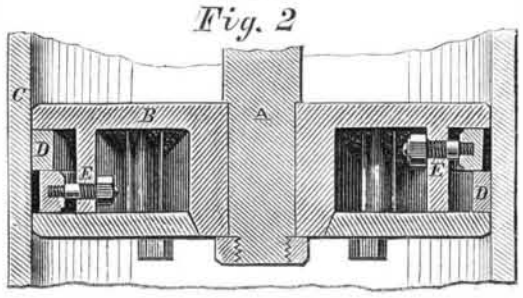


Fig. 2



most cases two are sufficient. A portion of each ring forms a spring, a bolt. E, on the opposite side passing through the periphery of the spider and engaging with the ring. This, as seen in the engravings, forces the ring for one half or two thirds its circumference against the internal surface of the cylinder, and as the two rings—if only two are used—are compressed on opposite sides, the result is a perfectly steam-tight joint. It may be advisable to make that part of the ring which receives the screw bolt, or its equivalent, thinner than that portion which bears against the cylinder; the thinner parts will thus be more elastic while the thicker or bearing parts will be more rigid and less liable to wear the bore of the cylinder oval. It appears to us that this piston has real advantages over the common split ring piston, and would prove economical not only in first cost, but in use, particularly for cylinders of moderate diameter. Its cost, the inventor says, is only five eighths of that of common ring piston packings, and one third of those having two sets of rings, saving sixty-six per cent of friction.

Patented through the Scientific American Patent Agency March 24, 1868. Shop, county, and State rights for sale for less than the difference of cost between it and steam or spring packing. Address H. J. King, 47 Hudson street, Hoboken, N. J.

The English Iron Trade.

AT the present moment the iron trade of England is very much depressed, owing, it is said, to the fact, that the co-operative trade movement has disorganized the labor.

The consequence has been to transfer the trade to Rhenish Prussia and Belgium. The works at Essen produce 60,000 tuns of steel annually, which is more than twice the entire export of the United Kingdom; and the Terre Noire Company in France are now supplying one of the great French railway companies with 20,000 tons of steel rails at a price below their prime cost in England, in spite of comparatively dear fuel and ores. These are awkward facts to be well pondered both by masters and men, if haply, for their own sakes, they can find a remedy for their disagreements.

Cast and Sheet Iron Stoves.

A FRENCH philosopher holds the opinion that cast iron stoves cause headache, nausea, and dryness of skin; while stoves made of sheet iron produce none of these effects, and, on the contrary, excite perspiration, and encourage appetite. He thinks it possible that the persistent disease of the silk worm in France, may be traced to the use of cast iron stoves in hatching and rearing the insect.

We have no means of verifying the above theory, but we well remember that, when the sheet iron air tight stove was first introduced "to save one-half the fuel," a statement was also put forth, that they were more healthy than cast iron.

Improvement in Machines for Developing Gas from Hydrocarbons.

The manufacture of illuminating gas by carbureting the atmosphere with liquid hydrocarbons, has long been known and used, but its general introduction was greatly retarded by the cost of the hydrocarbon liquid before the discovery of petroleum in this country, and the absolute inefficiency of the different kinds of apparatus used to make the gas. A great many patents have been taken out to make gas from the volatile portions of crude petroleum, but they have been defective by reason of their being automatic, that is, they manufacture gas only as fast as used; therefore a constant evaporation is taking place while the gas is burning. The objections to this class of machines are these: In proportion to the rapidity of the evaporation of the liquid is the reduction of temperature or loss of heat; now, as the quantity of hydrocarbon vapor which will unite with the atmosphere depends upon the temperature of the liquid and atmosphere, it of course follows that unless a uniform temperature is preserved gas of a uniform quality will not be produced. In order to obviate this difficulty of refrigeration, heat has been applied in many ways to keep up the temperature. Now if a little too great heat is produced the atmosphere will become supersaturated with the vapor, and, most certainly, condensation of the vapor into a liquid will follow. The danger of such a condition need not be dwelt upon; every pendant and chandelier becomes filled with liquid gasoline, and, of course, as soon as the gas stops are opened the gasoline would be ignited by the match applied to light the gas. By Rand's process these dangers and difficulties are overcome by the utilization of the earth heat.

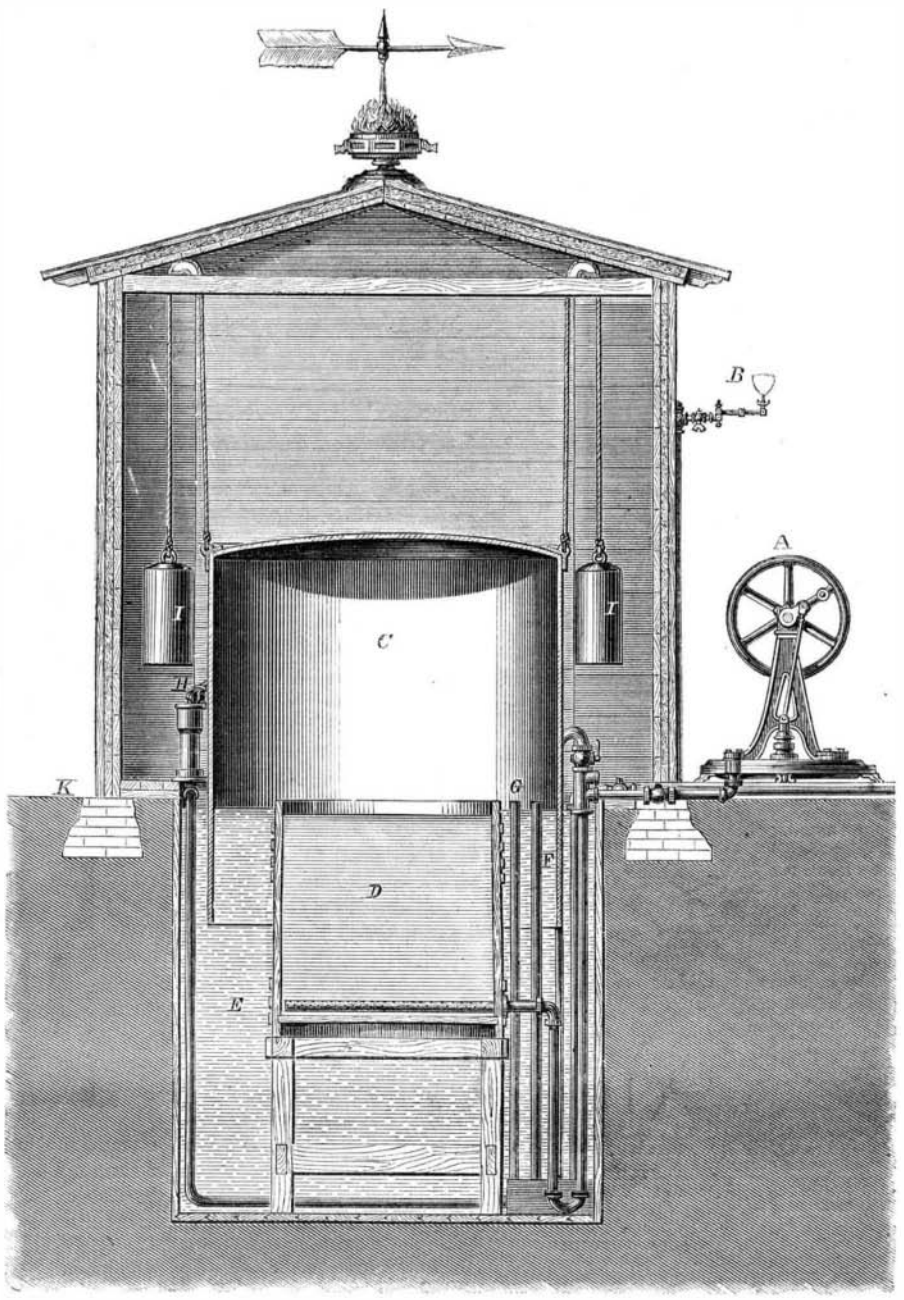
The *modus operandi* is simply this. A cistern is placed in the ground, and inside of this cistern is firmly secured a small tank, D, to hold the liquid from which the gas is made. Outside of this tank is the water bath, E, so it will be observed the sides and bottom of the hydrocarbon tank are covered by water. The air pump, A, supplies the air to the bottom of the tank, D, from which it issues in fine streams from a perforated horizontal pipe into the gasoline, up through which it passes into the holder, C; there it remains during the day and is drawn off through the usual exit pipe, G, into the pipes leading to the burners. If by reason of the very light specific gravity of the gasoline the gas should smoke, the diluting pipe, F, with the air pump, is so arranged that the air is driven at once into the holder without entering the gasoline tank. By the use of this pipe the gas can be made of any quality desirable. The objects of placing the tank in the ground are, first, its safety from accidents by fire; next, the uniformly low temperature maintained in the gasoline storage tank, and lastly, the heat known as sensible heat of the water, and latent heat in the earth, are utilized in this manner. As the gas for a large house is made by these works in five minutes, the evaporation of course is very rapid and the loss of heat consequently great. Now as soon as the temperature of the gasoline becomes lowered by evaporation, the heat from the water and earth acts upon the fluid, and before the next batch is to be made the gasoline has absorbed enough heat from the earth to bring its temperature up to the point where it was before evaporation commenced.

The tank, D, is always made of sufficient capacity to hold liquid enough for at least one year; thus the danger of filling often is avoided. This gas is practically incondensable, the gas having its birth at a low temperature, will not condense in the pipes leading to the burners. If it was possible at such a low temperature to surcharge the air with hydrocarbon vapor, the gas standing a number of hours over water would part with its excess of heat and precipitate the excess.

In the engraving, B represents a gas burner, placed in this instance in close contiguity with the works, but which may be at any required distance from the tank. H is a drip pump; I, the balancing weights, and K, the surface of the ground. The apparatus may be placed at any distance required from the point where the gas is used, and it may be covered by an ornamental structure, as seen in the engraving.

This method of utilizing liquid hydrocarbons is the subject of two patents, bearing date, Feb. 26 and Dec. 25, 1867. It has received the commendation of many competent judges, including persons who are using the apparatus, and has been adopted by the Metropolitan Gas Company of New York, who submitted the plan during the past winter to the severest tests of low temperature of the atmosphere, with such success that the company has purchased the right for their lines.

The New York office for these patents is at 16 Nassau street, where working models are on exhibition. Address A. C. Rand & Co., as above, for further information.



RAND'S PNEUMATIC GAS GENERATOR.

Transfer Composition.

Patented by Max Rosenthal, of Philadelphia, Pa :—

I use the cheapest kind of unsized paper; I use one pound of fine starch; half an ounce of common washing soap; one ounce of rock candy, dissolved in water, and about twenty drops of glycerin. Mix the ingredients warm, and let the mixture stand until cold. I then apply this mixture to the paper with a brush, coating the paper on one side only, and leave it to dry. After it has thoroughly dried, I apply on the top of the dried surface another mixture, composed of gum-arabic and rock candy, one ounce of each, dissolved in a pint of water, and coat the same prepared surface again with a clean brush, and let it dry, when the paper is ready for use, and the prepared side of the paper to be printed upon by the usual mode of printing. After the printing is done, the printed side is instantly transferred upon any smooth surface of any material, by merely moistening the back of the paper with clean water, and the paper can be instantly removed by raising it up, and the impression is thus easily, quickly, and permanently transferred.

DOWNING'S PATENT IMPROVED RAILWAY CHAIR.

Double rails, made in two pieces as though divided vertically, have been used, but the two sections were secured, to make a whole rail, by means of rivets or bolts, which were seated in place as the rails were laid. This made a smooth roadway, breaking joints, but the strain on the connecting bolts or rivets proved to be too great, and the halves of the rails tended to separate by the breaking of the connecting bolts. By the adoption of an improved chair, having only a single head, as at A, Fig. 1, the ends of these compound rails are intended by the inventor to be firmly held. These double rails may be turned to present one face when another is too much worn. The spike on the low side of the chair is driven, as usual, vertically, the rail put to place, and then the spike on the side of the chair head driven at an angle, as seen firmly locking the rail. This peculiar action of the angularly driven spikes with the double or single-headed chairs, is seen at B and C, Fig. 1. A top view of a double rail with single chairs is seen in Fig. 2. The third figure presents a a modification of the ordinary solid rail, only having a scarf joint, secured at D and E, by the single-headed chairs. By the use of this chair, with the angularly driven holding spike, all wedges are dispensed with, and the rails, either at their joints or at any other point, firmly held. The chair seen at B, Fig. 1, is considered by the inventor as well adapted to the present style of rails with butt joints, as two will take the place of three single ones. The saving in amount of spikes—as only one is used with this chair where two are used with the ordinary chair—and the dispensing with wedges, apt to work loose, would seem to recommend this device to the attention of railroad men. It was patented by John H. Downing, Dec. 10, 1867, who may be addressed relative thereto at Salem, Mass.

Fig. 1

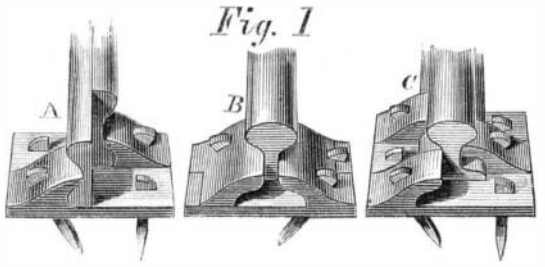


Fig. 2

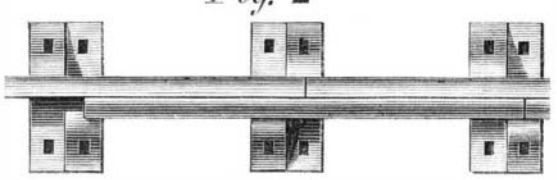
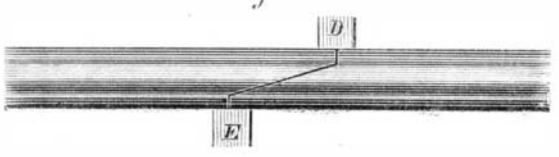


Fig. 3



Silk Manufactures of Lyons.

France possesses within her own bounds three out of the four fibrous substances from which clothing is made—she has flax, wool, silk. The latter, which employs so many people at Lyons, is grown further south. The silk is separated from the cocoons, and is spun in other districts. The trade of Lyons consists of weaving cloth from the thread which is brought into the town. The silk grown in France is not sufficient to supply the demand, and she imports raw silk from Italy. The culture of silk receives considerable attention in France, where the Government seems to act upon the idea expressed in the China laws, which point out two classes as deserving the gratitude of all—the grower of corn and the grower of silk, the former supplying food, the latter clothing. Lyons has none of the peculiarities which we usually connect with a manufacturing town. There are no tall chimneys, no dingy warehouses, no immense factories, no smoke. The looms are light, and are erected in the houses of the people. They are worked by hand. Thus you do not see at certain hours busy masses of people flowing to and from the same spot. The work goes on quietly. A good deal of it is, as the silks are narrow and the throw of the shuttle short, done by women.

The price paid for weaving plain silks is about fourteen cents per yard; for rich and flowered silks it is more. This trade suffered much from the American war, which greatly lessened the demand, and the people are not now working more than half time. The silk manufacture of France originated in the luxury of the Court of Francis I. In addition to that grown in France, the imports of raw silk were, in 1792, 136,000 lbs. The manufacture had increased so much that the quantity imported in 1851 had increased to 2,291,500 lbs., or about seventeen fold. Lyons has on several occasions been the scene of trade outbreaks, in consequence of attempts to introduce machinery or to alter the rate of wages. The cost of carrying coal will always operate in favor of manual labor. Great Britain offers a large and increasing market. She used to import raw silk and manufacture it in England, but the importation of raw silk has decreased, and silk manufacturing has lessened. The imports of raw silk have lessened to one half, of silks from India to one fourth, while the import of silks from Europe has increased nearly tenfold, and that of ribbons has doubled. The Lyonese silk weavers comprise about 120,000, out of a population of 300,000.

Estimation of the Quality of Soap.

The quality of soap may be properly estimated from the amount of fatty acids which any given specimen contains. The following simple analysis may be performed by any one, and may be relied upon as giving good results.

The soap to be examined should be dissolved in water. If distilled water cannot be readily obtained, rain water will answer well enough. When a perfect solution is obtained, add hydrochloric acid. After a little while the fatty acids will be found to be separated from the other constituents of the soap. These should be collected, and their relative weight for any given quantity estimated. The relative weight thus found will be a sufficiently just indication of the quality.

The *Amelia* steamboat, at San Francisco, Cal., is being fitted to burn petroleum. Anthracite coal being worth $20 a tun, and oil $5 a barrel, it is expected that the liquid fuel will prove exceedingly economical. In back number of the Scientific American we have given the comparative fuel values of oils and anthracite, to which those interested in the subject may readily refer.