

The Knowles Steam Pump Works, 113 Federal St., Boston, and 93 Liberty St., New York, have just issued a new catalogue, in which are many new and improved forms of Pumping Machinery of the single and duplex, steam and power type. This catalogue will be mailed free of charge on application.

Link Belting and Wheels. Link Belt M. Co., Chicago. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn.

Supplement Catalogue.—Persons in pursuit of information of any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

The Holly Manufacturing Co., of Lockport, N. Y., will send their pamphlet, describing water works machinery, and containing reports of tests, on application.

Curtis Pressure Regulator and Steam Trap. See p. 364.

No. 11 planer and matcher. All kinds of woodworking machinery. C. B. Rogers & Co., Norwich, Conn.

Iron, Steel, and Copper Drop Forgings of every description. Billings & Spencer Co., Hartford, Conn.

Cushman's Chucks can be found in stock in all large cities. Send for catalogue. Cushman Chuck Co., Hartford, Conn.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Hoisting Engines, Friction Clutch Pulleys, Cut-off Couplings. D. Frisbie & Co., 112 Liberty St., New York.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv., p. 28.

Quint's patent automatic steam engine governor. Correspondence solicited from manufacturers of throttle governor engines. Leonard & McCoy, 118 Liberty Street, New York.

Catarrah Cured.

A clergyman, after years of suffering from that loathsome disease, catarrh, and vainly trying every known remedy, at last found a prescription which completely cured and saved him from death. Any sufferer from this dreadful disease sending a self-addressed stamped envelope to Prof. J. A. Lawrence, 212 East 9th St., New York, will receive the recipe free of charge.

Pattern makers' lathe. Back knife gauge lathe for turning chair stock. Rollstone Machine Co., Fitchburg, Mass.

Patent Rights for Sale. Apparatus for building Concrete Buildings and Walls. County rights, \$50. State rights, \$500. See descriptive notice in SCI. AMERICAN, May 22, 1888. Send for circulars. Ransome, 402 Montgomery St., San Francisco, Cal.

Foreman Wanted.—Who can manage about twenty-five machinists and get out engine work at lowest cost of good work. Address J. S. & Co., lock box 25, Manchester, N. H.

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Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(1) Slip of Car Wheels.—Allow me to make the following remark as to your explanation in regard to the locomotive running over a curve, as question solved in your issue of 17th Dec. I claim that in every case the inner wheels will slip, for this reason: For instance, the locomotive is running over a short curve or long curve at their general speed, as whatever it may be, of course its tendency while it met with the curve was to go in a straight line. Now, the change of its direction is due to the curve of the rails in combination with the flanges on the driving wheels (that is, on the outer ones). Thereby more friction is created on them than on the inner ones, consequently the inner wheels will slip easier. The elevation of the outer rail is supposed to partially compensate for the centrifugal force tending to throw the flanges against the outer rail, and as only the flange of the forward driving wheel impinges against the outer rail, there is no reason for concluding that the inner wheels always slip. The whole weight of the locomotive is tended to go in a straight line, as before stated. Now, by meeting with the curve its tendency is being brought in a centrifugal motion, and hence the force being sustained by the outer rails and wheels, thus decreasing the weight of the locomotive on the inner ones, and adding equally as much on the outer. Consequently the inner wheels will slip easier. This is what is claimed in No. 10, Notes and Queries, for a locomotive when drawing. When running under momentum only, the tilting of the locomotive by the elevation of the outer track and the angular position of the track tends to prevent undue friction on the flange of the forward driver. When the locomotive runs on to a curve reversed, the slip necessarily takes place on the outer rail.

(2) W. H. D. asks how to make a canvas bag to hold hydrogen or oxygen gas under pressure for magic lantern use. A. Rubber bags are used for this purpose, and you can most conveniently make

a canvas bag air-tight by coating it with a layer of rubber cement or a solution of rubber in carbon disulphide.

(3) C. E. asks: What will be the best method to clear a waste pipe where mucus is forming or has formed from waste of beer or water, or what would be best to run through it in order to clear itself? A. Use a strong hot solution of soda.

(4) J. H. A. desires a receipt to stain white pine cherry and rosewood color. A. For cherry stain, take of rain water 3 quarts, annatto 4 ounces, boil in a copper kettle till the annatto is dissolved, then put in a piece of potash the size of a walnut; keep it on the fire for half an hour longer, and it is ready to bottle for use. For rosewood stain, take alcohol 1 gallon, camwood 2 ounces; set them in a warm place 24 hours, then add extract of logwood 3 ounces, aquafortis 1 ounce, and when dissolved it is ready for use.

(5) H. M. P. asks: 1. What battery, what size, and how many cells will it require to run Edison's incandescent 6 candle power lamp, resistance 6 to 7 ohms, requiring 9 to 15 volts E. F. and 1.40 amperes current? A. A series of twenty bichromate cells would give you voltage enough for your lamp. Taking a quart battery, you might allow 1/4 ohm to each cup. This would give ten ohms internal resistance and would give through a 60hm lamp a low lighting current, say 1.25 amperes. 24 square inches of zinc in a porous cup cell are allowed by some per ampere on short circuit. 2. Would this lamp be sufficient candle power to light a room 17 by 17 feet? A. The light would be quite insufficient for the room. 3. How should the batteries be connected? A. The batteries in above calculation are connected in tension. The more you use in parallel, so as to bring down the resistance, the less acid and zinc will be used. See SCIENTIFIC AMERICAN, vol. 57, No. 2, page 16, for article on this subject. 4. What would probably be cost of maintenance per hour? A. The cost per hour depends on so many factors that it cannot be given. It will cost probably one or two cents an hour in chemicals and zincs, irrespective of the trouble. 5. Is it possible to run the lamp with gravity battery? If so, how many cells? A. A gravity battery is not available for this work. 6. Will these lamps develop the power as given by manufacturers? A. The lamps can be run far over the rated power, but they wear out sooner. 7. If this lamp is too small for practical purposes, please give battery, etc., required for 16 candle power lamp. A. For a 16 candle lamp 40 cells in series would answer.

(6) F. M. W. writes: Describe the process of polishing horn. A. It must be rubbed first with fine glass paper and then with a piece of wet linen cloth dipped in powdered pumice stone. This will give a very fine surface, and the final polish may be produced by washed chalk or fine whiting applied by a piece of cloth wetted with soapsuds. Care must be taken in this, and in every instance where articles of different fineness are used, that, previous to applying a finer, every particle of the coarser material is removed, and that the rags are free from grit.

(7) J. G. M. writes: I have recently fitted my main building, 100 x 40 feet and 35 feet high, with lightning rods, having 4 points 8-feet high and having two connections to the ground. Will you kindly tell me the required size and thickness of copper plate for ground connection, whether it should be soldered to the rod or not and whether it should be put at lower end of rod, 6 feet down, or higher up? A. Use a copper plate having about 20 square feet area. Ordinary sheet copper, such as is used for roofing, or in the manufacture of culinary vessels, will answer. The lower end of the rod should extend across the plate and be soldered. The plate should be buried in earth that is always moist. Another way to make a good ground connection is to dig a trench 10 feet long in earth that is constantly moist. Put a layer of coke on the bottom of the trench; loop the rod and lay it on the coke. Cover the rod with a layer of coke and fill in the trench with earth. The trench should extend away from the building.

(8) H. W. K. asks for a cement which can be used to stick art tile to iron. A. Try a gutta percha cement, made by melting together in an iron pan 2 parts of common pitch and 1 part of gutta percha. Stir them well together until thoroughly incorporated and then pour the liquid into cold water. When cold it is black, solid and elastic; but it softens with heat, and at 100° Fah. is a thin fluid.

(9) C. A. F. desires a receipt for preparing white linen cloth so that it can be written on without blotting, at same time making it stiff and glossy and to cut without fraying. A. Varnish the cloth with Canada balsam dissolved in turpentine, to which may be added a few drops of castor oil, but do not add too much, or it will not dry. Try a little piece first with a small quantity of varnish. The kind of cloth to use is fine linen. Don't let the varnish be too thick.

(10) J. H. R. desires a receipt for a wash or any other preparation for the hair that will make it curl. A. Take borax 2 ounces, gum arabic 1 drachm, add hot water (not boiling), 1 quart; stir, and as soon as the ingredients are dissolved add 3 tablespoonfuls of strong spirits of camphor. On retiring wet the hair with the above liquid.

(11) E. H. D. desires (1) recipes for making purple, green, and black copying typewriter inks. A. Take any desired shade of aniline dye 1/4 ounce, dissolved in 15 ounces pure alcohol, and 15 ounces glycerine, then apply to the ribbon. 2. Do strong electric or calcium lights produce sensible effect on photographic preparations? A. Calcium light has little effect, but electric light has an effect which, under sufficient exposure, is as great as sunlight.

(12) H. B. asks (1) for directions for making effervescent solution of citrate of magnesia. A. Dissolve citric acid 400 grains in water 2,000 grains, add carbonate of magnesia 200 grains; stir until dissolved. Filter into a 12 ounce bottle containing sirup of citric acid 1,200 grains. Add boiled and filtered water to fill bottle, drop in bicarbonate of potash in crystals 30 grains and immediately cork. Shake until

bicarbonate of potash is dissolved. The sirup of citric acid is made from citric acid 8 parts, water 8 parts, spirit of lemon 4 parts, sirup 980 parts. 2. How much power should I get from a bichromate of potash battery with a zinc plate 3 inches long, 2 inches wide, and 4 arc light carbons 3 inches long and 1/8 inch in diameter, two on each side of zinc, and what is its resistance? A. Your battery would give about 1/2 ampere, with resistance of 4 ohms.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patentseverywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., OFFICE SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

January 10, 1888,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions with their respective patent numbers and inventors. Includes items like Advertising frame, Air compressor, Ammonium sulphate apparatus, Animal trap, Animals from jumping fences, Annunciator, Band cutter, Barrel head, Barrel holder, Battery zinc, Bedstead, Belt shifter, Belting machine, Bench dog, Bench hook, Bevel, Bicycle, Bit, Block, Blowers, Boiler, Bolt, Bookmark, Boot and shoe box fixture, Boot or shoe, Boots, Boots or shoes, Box, Brake, Brick sanding machine, Bridge, Bride bit, Brush, Brushes, Buckle, Buckle, Buildings, Bustle, Button, Buttonhole finishing machine, Cake or bread beater, Calendar, Can, Can filling apparatus, Can filling machine, Can for molasses, Car brake, Car coupling, Car coupling, Car coupling, Car coupling, Car starter, Cars by electricity, Cars, track brake for, Cars with hot air, Carburator, Carriage body, Carriage, child's, Carriage spring, Carriage top, Carrier, Cartridge shells, Casehardening and cementation compound, Cash carriers, Cash carrier apparatus, Cash indicator and register, Casting apparatus, Chain, drive, B. A. Legg, Chair, See Railway rail chair, Reclining chair, Chair, D. Parks, Chair attachment, rocking, W. Seng, Check hook, Check rein attachment, Chisel, J. R. Bailey, Chopper, Cigar fillers, Cigarettes, Clamp, Clock striking mechanism, Closet, Closet flushing and regulating device, Cock, sea, Cock, water, Cocks, etc., Coffee pot, Coffin handle, Coin operated lock, Color, production of a new red azo, Combination table, Coop, chicken, Core machine, Corn removing knife, Cotton chopper, Cotton chopper, Cotton, etc., Crate, T. W. Lankford, Cultivator attachment, Curtain fixture, Cutter, Dial, indicator, Die and die holder, Digger, Display rack, Ditching machine, Door check, Draught equalizer, Drawing knife, Drilling machine, Electric circuit breaker, Electric conductors, Electric lock, Electric machine, Electric machine or motor, Electric machines, Electrical circuit breaker, Elevator, Elevator safety device, End gate, Engine, Envelope for newspapers, Envelopes, Eraser, Explosive derived from phenol, Fan, power, Fan, toilet, Faucet, Feed mill, Feeding salt to live stock, Fence, W. Van Horn, Fence machine, Fence, portable, Fences, clamp for wire and picket, Fifth wheel for vehicles, File, bill, C. C. Chamberlain, File, bill, S. Ely, Filter, rotary or oscillating, Fire alarm, Fire engines, Fire engines, speaking tube, Fire escape, Fire escape, folding, Fire extinguisher, Fire extinguishing attachment, Fire proof structure, Fishing reels and rods, Flier frame, Flier frame, Furnace, Gauge, Garment or coat hanger, Garment protector, Gas engine, Gas pressure regulator, Gate, Generator, Grader, Grain binder, Grain cradle, Grain separator, Grate, Grooving machine, Guard, Guns and ordnance, Hammer, Handle, Hanger, Harrow, Harvester, Harvesting machine, Hay carrier, Hay rake, Heel burnishing machine, Hog trap, Holder, Horse detach, Horse tail tie, Hot air furnace, Hub boring machine, Hub, self-lubricating vehicle, Indicator, Injector, Injector, Inkstand, Iron or steel, treating, Jar fastening, Joint, Knife, Knitting machine, Ladder, Ladies, machine for making, Lamp, electric, Lasting machine, Lead traps, Lock, See Coin operated lock, Loom, F. Kesslering