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Curtis Pressure Regulator and Steam Trap. See p. 93.

Woodwork'g Mach'y, Rollstone Mach. Co. Adv., p. 94.

Drop Forgings. Billings & Spencer Co., Hartford, Conn.

Munson's Improved Portable Mills, Utica, N. Y.

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Brass & Copper in sheets, wire & blanks. See ad. p. 92.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 20,000 Crank Shafts and 5,000 Gear Wheels now in use, the superiority of their Castings over all others. Circular and price list free.

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

Friction Clutch Pulleys. D. Frisbie & Co., Phila.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 93.

Lane's Patent Self-measuring Faucets for molasses, oil, varnish, etc. Lane Bros., Box 276, Poughkeepsie, N. Y.

Stay bolt taps, true in pitch and straight. Pratt & Whitney Co., Hartford, Conn.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 62.

Catalogue of Books, 128 pages, for Engineers and Electricians, sent free. E. & F. N. Spon, 35 Murray Street, N. Y.

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 This is for our information, and not for publication.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 Information requests on matters of personal rather than general interest, and requests for Prompt Answers by Letter, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each. Minerals sent for examination should be distinctly marked or labeled.

(1) J. H. C.—The developer which has been found to work well on plates coated with Mr. Henderson's emulsion is as follows:

- No. 1. Sal soda..... 4 oz. Sulphite soda..... 3 oz. Water..... 32 oz.

- No. 2. Pyrogallol..... 1/4 oz., 218 grs. Oxalic acid..... 35 grs. Water..... 5 oz.

Dissolve the oxalic acid in water, then add the pyro. To develop a large plate, take 2 1/2 oz. of No. 1, add 3/4 oz. of water, and 1 drachm of No. 2.

(2) J. D.—The anthracite coals vary from 39 to 42 cubic feet to the ton. The bituminous coals vary from 41 to 49 cubic feet to the ton.

(3) J. C. C. writes: Suppose a cannon one mile long is put on car wheels and placed on a railroad track, the cannon being loaded with powder sufficient to drive a ball one mile a minute; attached to the car wheels at the breech of the cannon is an engine, with power sufficient to draw the load one mile a minute. Supposing it possible to start them both at the same instant, the powder driving the ball one way, and the engine drawing the cannon in the opposite direction. How far will the ball be at the end of the first minute from where it started—one mile or two miles—with relation to the cannon? A. If the gun backs down a mile in one minute, and the ball moves along the gun at the rate of one mile in one minute, the ball will remain stationary in regard to the earth; in fact, the gun runs away from the ball. The ball will be in the mouth of the gun at the end of a minute.

(4) E. S. N.—Steam follows the same law as the atmosphere and gases relative to sudden compression and expansion.

(5) W. G. W. asks: 1. How to grind out the mouths of vials and bottles, so that the corks will fit tightly for holding alcohol and other volatile things? A. Glass stoppers can be made to fit tightly by grinding with emery. This operation can be performed either by hand or on the wheel. 2. Is there any known solvent for charcoal? A. Charcoal is described by Storer as "insoluble in water, alcohol, ether, or in dilute acids or alkaline solutions."

(6) "Steam Fitter" writes: A few days back I had a controversy with an engineer in charge of a steam heating plant. A No. 3 Blake pump is used to return water from hot well to boilers; hot well about six feet above pump; pump would jerk a little as it started back on its stroke; to remedy this, engineer puts on what he calls an "air chamber" on suction pipe, and contends that said air chamber—vacuum chamber I call it—will be full of air, and that as the water floods the pump it will cushion on the air and stop the jerk in the stroke. I contend that the air will be exhausted from the chamber, and as the cylinder fills with water a partial vacuum is formed in the chamber, provided the pump is running fast, and that the shock is relieved by the water filling the vacuum. The jerk in the stroke I think is caused by the water being very hot and partially vaporizing as it flows into the cylinder. Which, if either of us, is right? A. "Steam Fitter" is correct, and engineer may also be said to be correct, as air chamber is a common designation for these appliances.

(7) S. B. G. writes: It is said the Old Liberty Bell was cast in London about the year 1751; but when it reached Philadelphia it was found to contain too much copper, and a second casting was necessary; after which, in the first week of June, 1753, it was hung in the belfry. Please inform me whether it was cast the second time in Philadelphia or in London; and was the same metal used? Also, what was the cause of it being cracked? A. The now famous "Liberty Bell" was imported from England in 1752; it was cracked on trial by a stroke of the clapper, and recast in Philadelphia under the direction of Isaac Norris, to whom is attributed the putting on of the inscription from Leviticus xxv, 10: "Proclaim liberty throughout all the land, unto all the inhabitants thereof." Immediately beneath this is added: "By order of the assembly of the province of Penna. for the State House in Phila." Under this again, "Pass & Stow, Phila., MDCCLIII." In 1777, during the occupation of Philadelphia by the British, the bell was removed to Lancaster. After its return it was used as a State House bell, but was finally removed to Independence Hall. Its last ringing, when it was cracked, was in honor of a visit of Henry Clay to Philadelphia.

(8) J. H. D. asks how the periods of maturity of people inhabiting the different tropical, temperate, and arctic zones compare. In which section is average longevity the greatest? A. Temperate zone.

(9) C. A. S., Jr., asks how to make a dip for brass buttons to darken them, say shade nearly same as dark bronze or Florentine bronze? A. One part oxide of iron, one part white arsenic, twelve parts

hydrochloric acid. Clean the brass well to get rid of lacquer or grease, and apply with a brush until the desired color is obtained. Stop the process by oiling well, when it may be varnished or clear lacquered.

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February 10, 1885,

AND EACH BEARING THAT DATE.

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