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If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40.

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Drop Forgings. Billings & Spencer Co. See adv., p. 398.

Curtis Pressure Regulator and Steam Trap. See p. 78.

Woodwork'g Mach'ry. Rollstone Mach. Co. Adv., p. 78.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 77.

American Fruit Drier. Free Pamphlet. See ad., p. 94.

Brass & Copper in sheets, wire & blanks. See ad. p. 94.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 20,000 Crank Shafts and 15,000 Gear Wheels, now in use, the superiority of their Castings over all others.

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

Magic Lanterns and Stereopticons of all kinds and prices. Views illustrating every subject for public exhibitions.

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Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers. We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Many numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) C. M. asks: In what proportion of bulk atmospheric air is reduced by compression into 2, 3, 4, etc., atmospheres? I mean, for instance, what room will 1 cubic foot of air occupy after having been compressed to 2, 3, 4, etc., atmospheres, showing a pressure of 45, 60, 75, 90, etc., lb. respectively? A. The pressure resulting from the compression of atmospheric air in volumes after cooling to the normal temperature is—

2 vol. 3/4 vol. 6 vol. 8 vol. 10 vol. 15 lb. 30 lb. 45 lb. 60 lb. 90 lb. At the instant of compression the pressure arising from the liberation of the latent heat carries the pressure somewhat higher.

(2) H. M. B.—We should infer from the description that the substance was some sort of slag having a melting point lower than the heat to which the bricks were exposed. It is probably a silicate of lime or iron. To positively determine its nature an analysis would be necessary, the expense of which would be from \$10 to \$20, and a larger quantity of the coating would be required.

(3) J. L. T. writes that hammering and heating are two essentials to insure a good mill pick. Never strike a pick or any steel tool on edge where the red heat has left it; let all the hammering be on the flat surface, and the last blows right along the point of the tool to bring the steel close where the greatest resistance to the blow is required.

the pick a cherry red heat, and dip without drawing temper; if the steel is good, you will have a pick that will give good service, and you can draw them down just as thin as you want them and give them from 1 1/2 in. to 1 3/4 in. clear temper.

(4) F. W. M. writes: 1. Suppose I have a gear wheel with a loose journal-bearing surface 2 in. in width, revolving on a shaft 1 1/2 inches in diameter, and another loose gear wheel just like the first, only that the width of its journal-bearing surface is half an inch, and it revolves on a shaft 6 inches in diameter. Will the bearing surface in both cases be the same, viz., 94248 + sq. in.? A. The bearing surface will be the same, 94248 + sq. in. 2. Now suppose the wheel on the 6 in. shaft is to be revolved only one-fourth as fast as the wheel on the 1 1/2 in. shaft, would the friction and wear be same in each? A. The friction and wear on the small shaft will be about four times as great as on the larger. The contact surfaces in both instances are the same, but in the former case the same particles are brought in contact with one another four times while the other shaft is revolving once; and since the weight upon both shafts is assumed to be the same, the wear must be four times as rapid in the one instance as in the other.

(5) O. F., Jersey City, asks what sized air chamber is required to sustain about 2,000 lb. dead weight in water? A. A chamber containing 32 cubic ft. of air is sufficient if made of wood.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

S. P.—The sample consists of pyrite (iron sulphide). In order to determine whether it carried gold in paying quantities, an assay, costing \$5.00, will be necessary.—C. B. S.—The specimen is decomposed limestone, of no value.

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January 29, 1884,

AND EACH BEARING THAT DATE.

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