

Business and Personal.

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Acme engine, 1 to 5 H. P. See adv. next issue. "U. S." metal polish. Indianapolis. Samples free. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. 6 Spindle Turret Drill Presses. A. D. Quint, Hartford, Ct. Patent Open-Side Planing and Shaping Machines. Pedrick & Ayer, Philadelphia, Pa.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York. Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Light and Canal Sts., New York. Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wie, Syracuse, N. Y.

Wanted—Novelties to manufacture on royalty, in cutlery, cutting instruments, or malleable iron tools. S. T. Roller, 10 Appleton St., Holyoke, Mass.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y.

For the original Bogardus Universal Eccentric Mill, Foot and Power Presses, Drills, Shears, etc., address J. S. & G. F. Simpson, 26 to 36 Rodney St., Brooklyn, N. Y.

What do you want to buy? We will send without cost to you, catalogues, price lists, and information concerning anything you wish. Paret, Willey & Co., 265 Broadway, New York.

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For Sale—An invention on an "electric" vestibule latch lock, which opens from outside with key, inside knob and electricity. The same not yet in market. W. Blackham, box 1128, New York City.

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Send for new and complete catalogue of Scientific and other books for sale by Munn & Co., 361 Broadway, New York. Free on application.

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 This is for our information and not for publication.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.

INDEX OF NOTES AND QUERIES. No. Arsenic, test for... 4364 Phosphorus, test for... 4362 Photographic... 4367, 4368

(4362) R. S. H. asks: 1. How can I test limestone to find if it contains phosphorus? A simple test, as I am no chemist. A. There is no simple test. Dissolve in nitric acid and add a large excess of ammonium molybdate dissolved in nitric acid. A very bright yellow precipitate indicates phosphoric acid, provided no silica or arsenic acid is present. 2. What is the necessary analysis of sand used, for furnace bottoms in open hearth steel making, and why common silica sand does not answer the purpose? A. Such sand would incline to run into slag with the oxide of iron. It would not possess enough consistency. An absolute analysis of the sand is not necessary. For the ordinary acid process a siliceous sand is used which should have cementing qualities, so as to make a solid bed. 3. If an electro-magnet or an iron core surrounded with a coil of wire was held near the armature and between the poles of an electric motor, would not a current be induced in the coil? A. Under the conditions a slight current might be generated if the coil made a closed circuit. 4. There was an electric candle used for alternating current arc lamp, consisting of two carbons placed together and insulated from one another. I have forgotten the name of the inventor, but it is a foreign invention. What is the failing of this lamp, and why is it not now used? A. You refer to Jablochhoff's candle. It was not economical.

(4363) G. K. asks: 1. When FeSO4 is boiled with HNO3, Fe2(SO4)3 is produced; please give the equation or reaction. A. An excess of sulphuric acid is required, hence your statement is incorrect. The following is the reaction: 12FeSO4 + 2HNO3 + 6H2SO4 = 6Fe2(SO4)3 + 2NO + 4H2O. 2. Is the lightning rod still considered a protection against lightning? A. Yes. See our SUPPLEMENT, Nos. 746, 650, 249, 348, 525, 288.

(4364) N. P. writes: I wish to know of a simple and sure test that I can employ to find if there is an adulteration of white arsenic in powdered borax. Have used a little of it bottled in soft water for the complexion. A. Dissolve in water, add a little hydrochloric acid and place a drop on a bright surface of copper. A lead-colored stain indicates arsenic. Borax acts as a mild alkali. The above test is not sure, but will answer your purpose, we think.

(4365) J. F. writes: The photographs of bullets taken by Professor C. V. Boys cannot be correct. As quoted, "the bullets had not had time to settle down to steady flight, but were variously tilted across the path." It is well known that the stability of an ordinary rifle bullet decreases toward the end of its flight, and with the modern magazine rifle I find no variation of angle up to twenty feet from the muzzle.

(4366) W. W. N. asks: How many cells of simple plunge battery described on page 400, "Experimental Science," will be required to operate a two candle power incandescent lamp at short periods at a time, and how long would they operate the lamp if used continuously? A. It will require 3 cells. Such a battery will run a lamp for about two or three hours continuously.

(4367) H. P. asks for formula for printing on cloth from a negative. A. Prepare the following:

- Boiling water... 20 oz. Chloride of ammonium... 100 grs. Iceland moss... 60 "

When nearly cold, filter and immerse the linen for 15 minutes. Sensitize for 15 minutes in an acid, 20 grains to the ounce, silver bath, and when dry stretch over a cardboard. Print deeper than usual and tone in a solution of—

- Water... 20 oz. Acetate of sodium... 2 drs. Chloride of gold... 3 grs.

Add a few grains of common whiting. Fix in hypo 1 ounce to 20 ounces of water.

(4368) A. H. asks (1) the method used for transferring photographs on to gold and silver watch domes to be durable. A. You can by using Eastman's transfer photo paper transfer a picture on to a watch dial without difficulty. Address Eastman Co., Rochester, N. Y. 2. If diamond steel can be bought for engraving on gold and silver, and is it better for holding an edge than the ordinary Stubs steel? A. The diamond brand of steel is not made in suitable sizes for gravures. The Swiss steel gravers are a favorite with jewelry and watch engravers.

(4369) W. T. N. asks: What causes the peculiar acid smell when any steel instrument is being sharpened on a whetstone where water is used? A. The peculiar smell of a stone when rubbed is due to the odor of the stone; it will be the same when two stones are rubbed together. It may sometimes be attributed to ozone.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

May 17, 1892,

AND EACH BEARING THAT DATE.

(See note at end of list about copies of these patents.)

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Palmer... 475,046; Saws, adjustable mandrel for wabbling, H. L. Mann... 474,844; Scale, automatic grain weighing, J. H. Gunder... 474,825; School seat, see School seat... 474,896; Scraper, dir, W. P. Ball... 474,896; Screen, see Paper pulp screen... 474,804; Seat, see Car seat, School seat, Vehicle seat... 474,930; Separator, F. H. Wheelan... 474,842; Sewing machine, Leeg & Weston... 474,842; Sewing machine needle, Legg & Weston... 475,023; Shade fixture, window, W. W. Wythe... 475,228; Shafting and hanger therefor, flexible, J. H. Beebe... 475,104; Shearing machine, J. B. Foote... 474,822; Shoe, E. C. Anderson... 475,073; Shoe clasp, G. Mangrum... 474,814; Shovel scraper attachment, R. J. Edwards... 475,288; Shutter worker, A. H. Hull... 474,831; Signal, see Engine signal, Railway time signal... 474,832; Signaling apparatus, B. J. Noyes... 474,853; Signaling system, H. A. Chase... 474,842; Signifier, H. W. Taylor... 474,899; Skate, C. 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