Buziness and Personal.

The Cuarge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue,

TO THE CONSTANT CURRENT CURE COMPANY,

207 Main St., Buffalo, N. Y. SIRS: Your Constant Current Electric Generator, which I have used for several weeks, has entirely cured me of rheumatism, and has proved extremely beneficia in other ways. With it I have counteracted the debilitating effects of overwork and warm weather, and have been invigorated and imbued with fresh vitality. Three of my friends, to whom I loaned my generator, have each ordered one from you. W. R. WARREN,
45.47, and 49 William St., N. Y.

For Sale.-A complete set of Patterns, Flasks, and Core Arbors, for making Cast Iron Flanged lipe, Elbows, Tees, and Greenhouse Fittings. Will be sold low to clean out a branch of a business. Address B, Box 23 3, New York.

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pair of 15 x 24 Engines, good as new, for sale cheap, astheymustbe removed. J. C. Todd. 10 Barclay St., N.Y.

Pays well on small investment. - Stereopticons, Magic Lanterns, and Viewsillus rating every subject for public exhibitions. Lanterns for colleges, sunday schools, and home amusement, 116 page illustrated catalogue free McAllister, Manufacturing Optician, 49 Nassau St., N. Y.

Superintendent vanted .-- A man competent to super in end a works employing about 300 hands in building machinery and tools, and in manufacturing goods for a regular trade. None but a first-class man in all respects need apply. Address B, Box 2333, New York.

Constant Current Electric Generator, Price, \$3. Constant · urrent Cure Company, 207 Main st.. Buffalo, N. Y. Send for circular. See advertisement, p. 253.

Clark & Heald Machine Co. See adv., p. 206.

Ajax Metals for Locomotive Boxes, Journal Bearings, etc. Sold in ingots or castings. See adv., p. 236.

New ('omb'd Milling and Gear Cutting Machines, large range. C. A. Condé & Co., Makers, l'biladelphia. Pa.

A valuable article on the Treatment of Acute Rheu matism, by Afred Still's, M.D., will be fc and in SCIEN- name the date of Tific American Supplement, No. 299. Anything of the question. from the pen of this eminent and experienced physician is interesting and instructive.

New Mct. od of Graining, etc. J. J: Callow, Cleveland, O. Foot Lathes, Fret Saws, 6c. 90 pp. E. Brown, Lowell, Mass,

"How to Keep Boilers Clean," and other valuable information for steam users and engineers. Book of sixty-four pages, published by Jas. F. Hotchkiss, 84 John St. New York, mailed free to any address.

Alden Crushers. Westinghouse Mach. Co., Pittsb'g, Pa. Supplement Catalogue.-Persons in pursuit of information on any special engineering mechanical, or scientific subject, can have catalogue of contents of the Sci-ENTIFIC 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. Combination Roll and Rubber Co., 27 Barclay St., N. Y. Wringer Rolls and Moulded Goods Specialties.

Cope & Maxwell M'f'g Co. 's Pump adv., page 254. Punching Presses & Shears for Metal-workers, Power Drill Presses \$25 upward. Power & Foot Lathes. Low Prices. Peerless l'unch & Shear Co.. 115 S. Liberty St., N.Y.

Pure Oak Leather Belting. C. W. Arny & Son, Manufacturers. Philadelphia. Correspondence solicited.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Split Pulleys at low prices, and of same strength and

appearance as Whole Pulleys — Yocom & Son's Shafting Works. Drinker St., : 'hiladelphi., 1'a. Wood Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O.

Experts in Patent Causes and Mechanical Counsel. Park Benjamin & Bro. 234 Broadway, New York. Malle ble and Gray Iron Castings, all descriptions, by Erie Ma leable Iron Company, limited. Erie, l'a.

National Steel Tube Cleaner for boiler tubes. Adjustab e.durable. Chalmers-spence Co.,10 Cortlandt St., N. Y. Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole mfrs., H. Lloyd, Son & Co., Pittsb'g, Pa. Best Oak Tanned Leather Belting. Wm. F. Fore-paugh. Jr. & Bros., 531 Jefferson St., Philadelphia, Pa.

Nickel Plating, -- sole manufacturers cast nickel anetc Hanson & Van Winkle, Newark, N. J., and 92 and 94

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For Machinists' Tools, see Whitcomb's adv., p. 238. The American Electric Co. and Proprietors and Manufacturers of the Thomson Houston System of Electric

Lighting of the Arc Style. New Britain, Conn. See Bentel, Margedant & Co.'s adv., page 254

Diamond Tools. J. Dickinson, 64 Nassau St., N. Y. Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon. 24 Columbia St., New York.

50,000 Sawyers wanted. Your full address for Emerson's Hand Book of Saws (free). Over 100 illustrations and pages of valuable information. How to straighten saws, etc. Emerson, Smith & Co., Beaver Falls, Pa.

Telegraph, Telephone, Elec. Light Supplies. See p. 253. Elevators, Freight and Passenger, Shafting, Pulleys and Hangers. L. S. Graves & Son, Rochester, N. Y

Gear Wheels for Models (list free); Experimental Work, etc. D. Gilbert & Son. 212 Chester St., Phila., Pa. Gould & Eberhardt's Machinists' Tools. See adv., p. 222.

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ment of Hilles & Jones, on page 254. Centrifugal Pumps, 100 to 35,000 gals. permin. See p. 253.

Barrel, Key, Hogshead, Stave Mach'y. See adv. p. 254. Draughtsman's Sensitive Paper.T.H.McCollin, Phila., Pa. Lathes, Planers, Drills, with modern improvements. The Pratt & Whitney Co., Hartford, Conn.

Catechism of the Locomotive. 625 pages, 250 engravings. The most accurate, complete, and easily understood book on the Locomotive. Price \$2.50. Send for a catalogue of railroad books. The Railroad Gazette, 73

Broadway, New York. For best low price Planer and Matcher, and latest improved Sash, Door, and Blin i Machinery, Send for catalogue to Rowley & Hermance, Williamsport, Pa.

The only economical and practical Gas Engine in the market is the new "Otto" Silent, built by Schleich Schumm & Co., Philadelphia, Pa. Send for circular. Silent, built by Schleicher

Electric Lights .- Thomson Houston System of the Arc type. Estimates given and contracts made. 631 Arch, Phil. Common Sense Dry Kiln. Adapted to drying all of ma terial where kiln, etc., drying houses are used. See p.254. 4 to 40 H P. Steam Engines. See adv. p. 254.

The Porter-Allen High Speed Steam Engine. Southwork Foundry & Mach. Co.,430 Washington Av., Phil. Pa.



HINTS TO CORRESPONDENTS.

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

Names and addresses of correspondents will not be

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

Correspondents whose inquiries do not appear after 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.

Any numbers of the Scientific American Supple-MENT referred to in these columns may be had at this office. Price 10 cents each.

(1) G. E. M. asks: Can you give me a recipe for making black ink that will flow freely, be durable, and brilliant jet black at time of writing ? There are plenty of inks that turn black. I want an ink that writes black and stays black. A. Try the following: add to a pint good iron gall ink from ten to fifteen drops of nitric acid, and heat over the water bath until reduced about one-fifth in volume, then add six drachms of pyrogallic acid and half an ounce of neutralized indigo-sulphate (paste). See other receipts for black inks in Supplement, No. 157.

(2) A. W. asks: What are the expansive properties of air compared with steam? Suppose a vessel filled with air, say at 30 lb. pressure, we reduce the space occupied by the air to one-half, would the pressure be just doubled, or what would the pressure then be per square inch? A. Air follows the same law as steam. Reducing the volume one-half doubles the pressure within a small fraction, if the temperature remains unchanged. 2. How are air guns made? A You will find a description of air guns in "Appletons' Dictionary of Machines, etc.," also in "Appletons' Dictionary of Applied Mechanics."

(3) O. R. M. asks: What kind of paper is used in making paper canoes, and how is it cemented together? A. Sheets of stout manifa passed through a hot bath of aqueous solution of zinc chloride (at 75° B), pressed strongly together and then soaked in dilute aqueous soda solution containing a small amount of glycerin, cohere to form a strong, stiff, waterproof board admirably adapted to the construction of small Presses. Dies, Tools for working Sheet Metals, etc. boats. Single sheets of paper passed quickly through Fruitand other can Tools. E. W B.iss. Brooklyn, N. Y. the zinc chloride bath, pressed and washed and dried, C. B. Rogers & Co., Norwich, Conn., Wood Working are waterproof, and may be otherwise joined to form waterproof boards by any suitable cement.

> (4) J. M. B. asks: How can I make indelible ink of good quality for marking on linen? A. (1) Add caustic alkali to a saturated aqueous solution of cuprous chloride until no further precipitate forms; allow the precipitate to settle, draw off the supernatant liquid with a siphon, and dissolve the hydrated copper oxide in the smallest possible quantity of ammonia. It may be mixed with about six per cent of gum dextrine for use. Before washing pass a hot iron over the writing. (2) Asphaltum, 1 part; oil of turpentine, 4 parts; dissolve and temper with printer's ink. Best used with a stamp. See other recipes on this page.

(5) G. A. H. inquires how to make a durable whitewash for ontbuildings. A. Slake half a bushel good lime in boiling water in a covered vessel. and strain it through a fine sieve; add a peck of salt dissolved in a small quantity of hot water, three pounds of rice boiled with water to a thin paste, one pound of Spanish whiting, one pound of glue softened by soaking in water and then dissolved over a water bath, and five gallons of hot water. Agitate. cover from dust, and allow to stand several days. Apply hot. Slaked lime or hydraulic cement mixed with skimmed milk makes a cheap and durable paint for outdoor work.

[OFFICIAL.]

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['Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866. will be furnished from this office for 25 cents In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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