

Business and Personal.

The Charge 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.

The genuine Asbestos Steam Pipe and Boiler Coverings are the most durable, effective, and economical non-conducting coverings in use. They can be easily applied by any one at a cost of from 25 to 50 per cent less than is usually charged for inferior coverings. H. W. Johns Mfg Co., 87 Maiden Lane patentees and sole manufacturers.

Blake's Belt Studs. The strongest fastening for Rubber and Leather Belts. Greene, Tweed & Co., New York. See Bentel, Mergandant & Co.'s adv., page 413.

The circulation of the blood has been demonstrated by the microscope, and the proof of the circulation of Esterbrook's Pens is that they are found everywhere.

The American Electric Co., Proprietors and Manufacturers of the Thomas Houston System of Electric Lighting of the Arc Style. See illus. adv., last or next number.

Hotchkiss' Mechanical Boiler Cleaner, 84 John St., N. Y., prevents foaming, burning, scaling; removes all mud; saves repairs, fuel, and labor. Engineers make ten per cent selling other parties than employers. Send for circular.

Special Tools for Railway Repair Shops. L. B. Planders Machine Works, Philadelphia, Pa.

The Cider Press manufactured and sold by Messrs. Boomer & Boschert, No. 15 Park Row, New York, is acknowledged far superior to any other in use. It has received the Gold Medal at a number of State Fairs. Farmers and others interested will please send for illustrated circular with prices.

Jenkins' Patent Valves and Packing "The Standard." Jenkins Bros., Proprietors, 11 Dey St., New York.

A Practical Dyer of Turkey Red, and Preparing the Oil, desires a Situation. Address Dyer, Box 672, N. York.

Cotton Belting for Elevators; Carrying and Driving Belts. Greene, Tweed & Co., 118 Chambers St., N. York.

6 in. x 6 in. Yacht Engine, in perfect order, for sale. Ward, Stanton & Co. Makers. Address T. H. Worrall, Meredith, N. H.

Steel and Iron Drop Forgings manufactured of every description. Estimates given upon application. Richard Eccles, Mechanic St., Auburn, N. Y.

Astronomical Telescopes, first quality & low prices, Eye Pieces, Micrometers, etc. W. T. Gregg, 75 Fulton St., N. Y.

Notice—Alden Crushers & Pulverizers manufactured & sold only by patentee, Farrelly Alden, Pittsburg, Pa. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

A perfect Mowing Machine is an absolute necessity to a farmer. The best made is the Eureka. It has the lightest draught, and will cut at least one-third more grass per hour than any other mower. Simple in construction and durable. Prices reasonable. Send for illustrated catalogue to Eureka Mower Co., Towanda, Pa.

Wren's Patent Gate Bar. See adv. page 397.

Exporters of Machinery for Plantations. Sugar Machinery, Coffee Huller and Cleaners. Information and estimates on all classes of American machinery and patented devices. Agricultural Implements and Hardware. Jos. H. Adams & Son., 283 Pearl St., New York.

The Mackinnon Pen or Fluid Pencil. The commercial pen of the age. The only successful reservoir pen in the market. The only pen in the world with a diamond circle around the point. The only reservoir pen supplied with a gravitating valve; others substitute a spring, which soon gets out of order. The only pen accompanied by a written guarantee from the manufacturer. The only pen that will stand the test of time. A history of the Mackinnon Pen; its uses, prices, etc., free. Mackinnon Pen Co. 200 Broadway, New York.

Fragrant Vanity Fair Tobacco and Cigarettes. First Prize Medals—Vienna, 1873; Philadelphia, 1876; Paris, 1878; Sydney, 1878—awarded Wm. S. Kimball & Co., Rochester, N. Y.

Superior Malleable Castings at moderate rates of Richard P. Pim, Wilmington, Del.

Wood Working Machinery of Improved Design and Workmanship. Cordeman, Egan & Co., Cincinnati, O.

The "1880" Lace Cutter by mail for 50 cts.; discount to the trade. Sterling Elliott, 242 Dover St., Boston, Mass.

The Tools, Fixtures, and Patterns of the Taunton Foundry and Machine Company for sale, by the George Place Machinery Agency, 121 Chambers St., New York.

Improved Rock Drills and Air Compressors. Illustrated catalogues and information gladly furnished. Address Ingersoll Rock Drill Co., 1 1/2 Park Place, N. Y.

Experts in Patent Causes and Mechanical Counsel. Park Benjamin & Bro., 50 Astor House, New York.

Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole mfrs., H. Lloyd, Son & Co., Pittsburg, Pa.

Malleable and Gray Iron Castings, all descriptions, by Erie Malleable Iron Company, limited, Erie, Pa.

Power, Foot, and Hand Presses for Metal Workers. Lowest prices. Peerless Punch & Shear Co., 52 Dey St., N. Y.

Recipes and information on all Industrial Processes. Park Benjamin's Expert Office, 50 Astor House, N. Y.

For the best Stave, Barrel, Keg, and Hoghead Machinery, address H. A. Crosser, Cleveland, Ohio.

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

The Brown Automatic Cut-off Engine; unexcelled for workmanship, economy, and durability. Write for information. C. H. Brown & Co., Fitchburg, Mass.

Gun Powder Pile Drivers. Thos. Shaw, 915 Ridge Avenue, Philadelphia, Pa.

Best Oak Tanned Leather Belting Wm F. Forpaugh, Jr. & Bros., 531 Jefferson St., Philadelphia, Pa.

Stave, Barrel, Keg, and Hoghead Machinery a speciality, by E. & G. Holmes, Buffalo, N. Y.

Downer's Cleaning and Polishing Oil for bright metals, is the oldest and best in the market. Highly recommended by the New York, Boston, and other Fire Departments throughout the country. For quickness of cleaning and luster produced it has no equal. Sample five gallon can be sent C. O. D. for \$3. A. H. Downer, 11 Peck Slip, New York.

Clark Rubber Wheels adv. See page 381.

National Institute of Steam and Mechanical Engineering, Bridgeport, Conn. Blast Furnace Construction and Management. The metallurgy of iron and steel. Practical Instruction in Steam Engineering, and a good situation when competent. Send for pamphlet.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Eclipse Portable Engine. See illustrated adv., p. 382.

Nickel Plating. Sole manufacturers cast nickel and other pure nickel salts, importers Vienna lime, crocus, etc. Condit, Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

For Yale Mills and Engines, see page 381.

Wright's Patent Steam Engine, with automatic cut off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

Rollstone Mac. Co.'s Wood Working Mach'y ad. p. 366.

Blake "Lion and Eagle" Imp'd Crusher. See p. 397.

4 to 40 H. P. Steam Engines. See adv. p. 381.

Bracket Woods.—Wm. E. Uptegrove, Saw Mills, 463 East 10th St., New York, offers to the trade a choice stock of these woods. Send for price list.

Saw Mill Machinery. Stearns Mfg. Co. See p. 397.

Peck's Patent Drop Press. See adv., page 413.

Silent Injector, Blower, and Exhauster. See adv. p. 413.

Fire Brick, Tile, and Clay Retorts, all shapes. Borgner & O'Brien, M'rs. 23d St., above Race, Phila., Pa.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Millstone Dressing Machine. See adv., page 237.

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.

Frank's Wood Working Mach'y. See illus. adv., p. 413.

Peerless Colors—For coloring mortar. French, Richards & Co., 410 Callowhill St., Philadelphia, Pa.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 412.

For Separators, Farm & Vertical Engines, see adv. p. 413.

For Patent Shapers and Planers, see illus. adv. p. 412.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 412.

Elevators, Freight and Passenger, Shafting, Pulleys and Hangers. J. S. Graves & Son, Rochester, N. Y.

For Heavy Punches, etc., see illustrated advertisement of Hillis & Jones, on page 413.

Comb'd Punch & Shears; Universal Lathe Chucks. Lambertville Iron Works, Lambertville, N. J. See ad. p. 413.

Reed's Sectional Covering for steam surfaces; any one can apply it; can be removed and replaced without injury. J. A. Locke, Agt., 32 Cortlandt St. N. Y.

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 413.

A profitable business for a person with a small capital. Buy a Stereopticon or Magic Lantern, and an interesting assortment of views. Travel and give public exhibitions. For particulars, send stamp for 116 page catalogue, to McAllister, Mfg Optician, 49 Nassau St., N. Y.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 413.

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.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 413.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blind 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 Schleicher, Schumm & Co., Philadelphia, Pa. Send for circular.

Penfield (Pulley) Blocks, Lockport, N. Y. See ad. p. 412.

Tyson Vase Engine, small motor. 1-33 H. P.; efficient and non-explosive; price \$50. See illus. adv., page 413.

Lightning Screw Plates and Labor-saving Tools. p. 412.

Use Vacuum Oil Co.'s Lubricating Oil. Rochester, N. Y.

NEW BOOKS AND PUBLICATIONS.

SCIENCE AND REVELATION. By Dr. Philip S. Hocker. Kansas City, Mo.: Ramsey, Millett & Hudson.

Dr. Hocker has given in a very small pamphlet what he considers "a short and concise solution of some of the problems which have, of late years, attracted the attention of our most profound scholars in Europe and America." In other words, he sets right the "mistakes of Darwin and infidel scientists" in the usual style of those who have but a remote hearsay knowledge of scientific facts and theories.

EXAMPLES OF HOUSEHOLD TASTE. By Walter Smith, State Director of Mass. School of Design. New York: R. Worthington. 4to pp. 521. \$6.

Mr. Worthington has had students of industrial art (and all who wish a permanent remembrance of the art wealth displayed at Philadelphia four years ago) under deep obligation by bringing out so handsome an edition of Mr. Smith's "Industrial Art at the International Exhibition." Five or six hundred fine engravings, many of them full page, exhibit as many objects selected for their conspicuous beauty or the technical skill displayed in their construction. The text is a valuable contribution to the literature of industrial art.

HOUSEHOLD SANITATION:

I. HEALTH AND HEALTHY HOMES: A GUIDE TO DOMESTIC HYGIENE. By George Wilson, M.A., M.D. 12mo, pp. 314. \$1.50.

II. DWELLING HOUSES, THEIR SANITARY CONSTRUCTION AND ARRANGEMENTS. By W. H. Corfield, M.A., M.D. 12mo, pp. 112.

III. OUR HOMES. By Henry Hartshorne, A.M., M.D. 16mo, pp. 149. 50 cents.

These three volumes from the press of Presley Blakiston, Philadelphia, cover in a more or less popular way the

important field of domestic sanitation, the necessity of maintaining healthy conditions in the homes of the people, and the simpler methods of securing such desirable results. The first on the list discusses the fundamental conditions of healthy living in a manner so admirable in every respect that we should be glad to see it made a text book in every school in the land. There is no branch of vitally useful knowledge so commonly neglected in schools and other institutions of learning, nor any that the community can so ill afford to neglect. Mr. Corfield's book comprises a course of Cantor Lectures before the London Society of Arts. It aims to furnish a short and practical exposition of the means by which dwelling houses may be made and kept wholesome. Though addressed particularly to sanitary engineers and house furnishers, and draws illustrations of sanitary appliances altogether from British sources, it contains much of direct and suggestive value to American readers. The third book on the list is one of the series of American Health Primers, of whose general excellence we have had occasion to speak in recent issues of this paper. Dr. Hartshorne discusses in a sensible and easily comprehended style the teachings of science and experience with regard to the sanitary influences of situation of houses, their construction, light, warmth, ventilation, water supply, drainage, disinfection, and kindred topics bearing upon the question how to have healthy homes. The publication of works of this nature is an encouraging circumstance. If they could only reach and interest every household the national sicklist and death rate might be cut down to half their present dimensions.

MAGUIRE'S CODE OF CIPHERS: A COMPREHENSIVE SYSTEM OF CRYPTOGRAPHY DESIGNED FOR GENERAL USE. By Charles H. J. Maguire, of the Union Bank of Lower Canada, Quebec. For sale by the author. Price \$2.

A system of secret writing based on a combination of any three letters of the alphabet, the keys to be arranged by the correspondents according to mutual agreement to change one or more of the letters. The system has been arranged in conformity with the regulations respecting secret writing telegrams adopted by the International Convention of Telegraph Companies. The vocabulary contains upwards of 18,000 words. There is given besides a large collection of banking, mercantile, and other words and phrases and sentences in common use, geographical names, etc.

THE STUDENT'S ILLUSTRATED GUIDE TO PRACTICAL DRAUGHTING. By T. P. Pemberton. 12mo, pp. 112. \$1. For sale by the author, 5 Dey street, New York.

The author, a draughtsman of long experience, has sought to lay down the elements of the art of draughting in a manner so clear that any young mechanic or student of mechanics can easily master them. The instruction is practical throughout, and plainly put.

MODERN ARCHITECTURAL DESIGNS AND DETAILS. Part 2. New York: Bicknell & Comstock. \$1.

Plates 9 to 16 show details of store finish, store counters and sections, brackets, gates, and fences, window caps and hoods, architraves, bases and wainscoting, balconies, and two designs for cottages, with front and side elevations, plans, etc.

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.

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

(1) M. T. asks: What is best to use in a wooden cylinder for smoothing up small turned wood work? A. It is generally sufficient to tumble the articles together without the addition of anything. You might, however, add hardwood turnings or planer chips to advantage.

(2) J. M. asks: 1. What is the best arrangement to get the greatest amount of heat from a small battery or pile? A. By passing the current through a fine platinum wire. 2. What is the best waterproofing process for cotton cloth, outside of caoutchouc and oil? A. See SCIENTIFIC AMERICAN, Vol. 41, p. 251 (5).

(3) W. R. D. asks whether there is any way of drawing or forcing out escape steam rising from 30 or 40 boiling water tanks which are continually open. The room is about 75x120x35 feet high, with four common ventilators about 4x4x3 feet high. A. It would relieve your trouble to increase the height of your ventilators to 18 or 20 feet, but if this is not sufficient, a fan blower will do it. 2. Is such steam necessarily injurious to health? A. The vapor of water at the pressure of the atmosphere is not injurious to health.

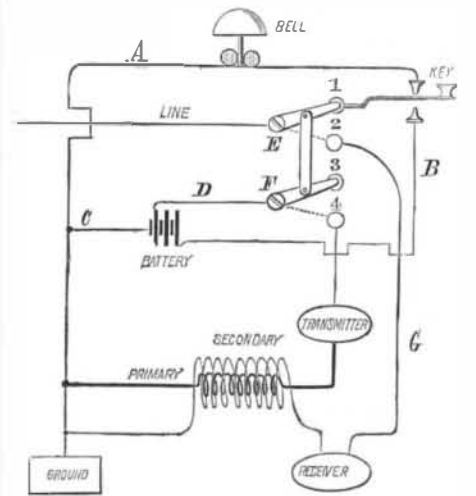
(4) A. H. G. asks: What proportion should the heating surface of a boiler be to the radiating surface in steam coils? I have 13,450 lineal feet of one inch pipe in my building. How many square feet of heating surface should my boiler have to do the work

easily? A. In your climate, a horizontal multitubular boiler of about 600 square feet of surface, properly set and fired, will be enough, say, 16 feet long by 48 inches diameter with from 40 to 50 three inch tubes.

(5) P. B. asks: 1. How many one gallon gravity cells would a physician need for all kinds of cauterizing? A. Use the Grenet or Byrne battery for cauterizing. The gravity is not suited to this work. 2. Can sulphate of copper and bichromate of potassium be united in one battery? A. Different kinds of batteries cannot be worked well together.

(6) J. C. H. asks: 1. Can a room 180x40x11 be heated quicker and more uniformly by placing say 1,290 feet of one inch steam pipe around the room next to the wall (the wall being brick), than by placing the same number of feet of same size pipe in four radiators, to be placed at equal distances apart, either next to the wall or in the center of the room? A. Yes. 2. How much one inch pipe ought it to take to heat properly a room 180x40x11 feet, by either method, for a person to sit to work? The building is exposed on all sides, built of brick. The room is in third story, under a tin roof, the room being ceiled overhead, windows four feet apart all round the room. The lower part of building is kept warm. Steam pressure of the boiler is 60 lb. A. Not knowing the window surface we cannot say correctly, but would think from the description of your building 2,000 to 2,500 feet of one inch pipe distributed around the walls of the building should be sufficient. If you place the same amount of pipe in four radiators, place them where you will, you cannot warm such a room properly; any one sitting in front of a window will have cold feet.

(7) J. S. and others ask how to make telephone connections for an open circuit line. A. The annexed diagram shows all of the connections for one end of the line, both ends being alike. The connections are shown in condition to call or receive a call. When



a call is received the current passes from the line through the switch, E, button 1, key, top contact of the key, bell-magnet, and ground wire, A, to the ground. When the key is depressed to call a distant station, the key touches the lower contact, on the battery wire, B, sending the current through the button 1, switch, E, and line to the bell and ground of the distant station. The current returns by the ground and wires, A, C, to the battery. After calling, the switch, E, is moved to button 2, and the switch, F, being connected with the switch, E, by an insulating connection is at the same time moved to button 4, as shown in dotted lines. Now the line connection is through the switch, E, button 2, wire, G, receiver, the secondary wire of the induction coil to the ground. The switch, F, when turned as described completes the local circuit, the current passing from one cell of the battery through the wire, D, switch, F, button 4, transmitter, primary of the induction coil ground wire, A, and wire, C. The connections are now correct for talking. Should the transmitter be of the class capable of withstanding a heavy current, the wire, D, will be connected so as to include all of the elements of the battery, and the wire, B, instead of being connected with the battery will be connected with the button 3. The diagram shows the connections adapted to the class of transmitters employing but a single battery element, and to a line requiring several cells of battery to call. If a single cell of battery is sufficient to call, the wire, B, will be connected with button 3.

(8) E. F. F. writes: I want to know the velocity of the "electric telegraph." I have consulted many prominent books, but have never been able to ascertain the fact. A. If you mean velocity of the electric current, it varies according to the conditions from 13,500 to 62,000 miles per second.

(9) A. E. R. asks: 1. Is it best to keep a boiler that is not used but a day or two every three months, full of water or empty? No danger of freezing, as it stands beside others in use. A. Keep it full. 2. Do you consider try cocks in a water column as safe as when tapped into the boiler the old way? A. No.

(10) M. S. writes: I have a portable 10 horse power return flue boiler, in which I cannot use water containing organic matter, as it causes foaming. Why is this? A. We think either you have too little steam room, or the circulation is bad. 2. What is the best way to loosen a pump (suction pump) in which the piston is frozen fast, and what is the best preventive of freezing? A. Thaw by the use of hot water. To prevent the freezing open the bottom valve with a hook or other means to let the water out of the pump.

(11) J. A. Y. asks: Where does ice form during the freezing process—upon the surface or the bottom of the stream or vessel? A. Usually on the surface. Anchor ice is an exception.

(12) F. E. K. asks: Will the strings or wires in a well made piano, when tuned ready to send out of factory, stretch enough to lower the pitch, supposing the tuning pin is securely fastened? A. When pianostrings are of the best quality of steel, and have been put on a good pianoforte, they are tuned (in first