

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.

Lubricene, Gear Grease, Cylinder and Machinery Oils. R. J. Chard, 6 Burling Slip, New York.

OFFICE BIGELOW BLUE-STONE COMPANY, 1 247 BROADWAY, NEW YORK, April 8, 1880.

H. W. Johns Mfg Co., 87 Maiden Lane, New York. GENTS: Owing to the fire which occurred on the morning of February 1, at the works of our blue-stone and planing mills, situated at Malden, on the Hudson, we shall shortly require more of your roofing material, and would like quotations for same.

You are at liberty to make any use you choose of this letter, and refer any one to us as to the merits of the Asbestos Roofing. Respectfully yours, JOHN MAXWELL, Lessee.

G. W. Baker, Wil., Del., makes the Post Band Saw for hand-foot, and steam. Will cut 7 inches thick of hard wood.

For round text hand and for a pen to stand hard usage, try Esterbrook's Exquisite, No. 50. Ask your stationer for them.

Wanted—Situation by Draughtsman. Technical education; bridge work; general machinery or tools. Address A. B. C., Davis St., Elmira, N. Y.

Power, Foot, and Hand Presses for Metal Workers. Moderate prices. Peerless Punch and Shear Co., 52 Dey St., New York.

Valuable Patents for Sale or Lease on Royalty to good party. Address P. E. Bird, Jenkintown, Pa.

H. L. Perrine, Mech, Draughtsman, 6177th St., Washington, D. C. Drawings for inventors from sketches or models.

For Sale.—U. S. and Canadian Patent for a Blind Stitch Sewing Machine; a valuable invention. Address P. Hoffman, 197 East Genesee St., Buffalo, N. Y.

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

Catalogue of Useful Books on Applied Science sent free. E. & F. N. Spon, 446 Broome St., New York.

Blake Lion and Eagle Imp'd Crusher. See adv. p. 236.

Foundry and Machine Shops for sale. Established in 1846. Write for description to E. J. Hoen, Addison, Steuben Co., N. Y.

Corrugated Traction Tire for Portable Engines, etc. Sole manufacturers, H. Lloyd, Son & Co., Pittsburg, Pa.

Spokes and Rims, white oak and hickory, best quality, to any pattern, and Hammer Handles of best hickory. John Fitz, Martinsburg, West Va.

For the best Stave, Barrel, Keg, and Hogshead Machinery, address H. A. Crossley, Cleveland, Ohio.

Collection of Ornaments.—A book containing over 1,000 different designs, such as crests, coats of arms, vignettes, scrolls, corners, borders, etc., sent on receipt of \$2. Palm & Fechteler, 403 Broadway, New York city.

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

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

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

Stave, Barrel, Keg, and Hogshead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

Solid Emery Vulcanite Wheels—The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

Sheet Metal Presses. Ferracute Co., Bridgeton, N. J.

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

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

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y. Bradley's cushioned helve hammers. See illus. ad. p. 269.

Forsyth & Co., Manchester, N. H., & 213 Centre St., N. Y. Bolt Forging Machines, Power Hammers, Comb'd Hand Fire Eng. & Hose Carriages, New & 2d hand Machinery. Send stamp for illus. cat. State just what you want.

Electrical Indicators for giving signal notice of extremes of pressure or temperature. Costs only \$20. Attached to any instrument. T. Shaw, 915 Ridge Ave. Phila.

Instruction in Steam and Mechanical Engineering. A thorough practical education, and a desirable situation as soon as competent, can be obtained at the National Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.

Hydraulic Jacks, Presses and Pumps. Polishing and Buffing Machinery. Patent Punches, Shears, etc. E. Lyon & Co., 470 Grand St., New York.

Portable Forges, \$12. Roberts, 107 Liberty St., N. Y.

Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 238.

Peck's Patent Drop Press. See adv., page 236.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 262. For Separators, Farm & Vertical Engines, see adv. p. 251.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N. Y. Wm. Sellers & Co.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 253.

For Patent Shapers and Planers, see illus. adv. p. 251.

For Alcott's Improved Turbine, see adv. p. 270.

Planing and Matching Machines, Band and Scroll Saws, Universal Wood-workers, Universal Hand Jointers, Shaping, Sand-papering Machines, etc., man'fd by Bentel, Margedant & Co., Hamilton, Ohio. "Illustrated History of Progress made in Wood-working Machinery," sent free.

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 254.

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

Chase's Pipe Cutting & Threading Machine. Send for circular. Chase Machine Co., 120 Front St., New York.

Silent Injector, Blower, and Exhauster. See adv. p. 269.

Telephones repaired, parts of same for sale. Send stamp for circulars. P. O. Box 205, Jersey City, N. J.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Large knife work a specialty. Also manufacturers of Solomon's Parallel Vise. Taylor, Stiles & Co., Riegelsville, N. J.

Horizontal Steam Engines and Boilers of best construction. Atlantic Steam Engine Works, Brooklyn, N. Y.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 15,000 Crank Shafts, and 10,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

Brass & Copper in sheets, wire & blanks. See ad. p. 268.

Diamond Planers. J. Dickinson, 64 Nassau St., N. Y.

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

For Superior Steam Heat, Appar., see adv., page 270.

The "Fitchburg" Automatic Cut-off Horizontal Engines. The "Haskins" Engines and Boilers. Send for pamphlet. Fitchburg Steam Engine Co., Fitchburg, Mass.

We will purchase or manufacture on royalty, patented articles of real merit. Farley & Richards, Phila., Pa.

Millstone Dressing Machine. See adv., page 269.

Cut Gears for Models, etc. Models, working machinery, experimental work, manufacturing, etc., to order. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in SCIENTIFIC AMERICAN of last week.

The E. Horton & Son Co., Windsor Locks, Conn., manufacture the Sweetland Improved Horton Chuck.

The best Truss ever used. Send for descriptive circular to N. Y. Elastic Truss Co., 683 Broadway, New York.

Inventors' Institute, Cooper Union. A permanent exhibition of inventions. Prospectus on application. 733 Broadway, N. Y.

For Reliable Emery Wheels and Machines, address The Lehigh Valley Emery Wheel Co., Weisport, Pa.

Comb'd Punch & Shears; Universal Lathe Chucks. Lambertville Iron Works, Lambertville, N. J. See ad. p. 108.

Telephones.—Inventors of Improvements in Telephones and Telephonic Apparatus are requested to communicate with the Scottish Telephonic Exchange, Limited, 34 St. Andrew Square, Edinburgh, Scotland. J. G. Lorrain, General Manager.

Wheels and Pinions, heavy and light, remarkably strong and durable. Especially suited for sugar mills and similar work. Circulars on application. Pittsburg Steel Casting Company, Pittsburg, Pa.

New Economizer Portable Engine. See illus. adv. p. 269.

Cutters shaped entirely by machinery for cutting teeth of gear wheels. 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.

Wm. Sellers & Co., Phila., have introduced a new invention, worked by a single motion of a lever.

Ore Breaker, Crusher, and Pulverizer. Smaller sizes run by horse power. See p. 269. Totten & Co., Pittsburg, Pa.

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) H. L. R. writes: I have an upright tubular boiler, and it leaks around the tubes in the head. I have expanded the tubes several times, and they do not stay in their places. What can I do to make them stay? I thought that they could be fixed by putting a ferrule on the inside and then expand it. Would that do? A. Your trouble may arise from a deposit of sediment on the lower tube sheet or crown sheet of the furnace, or the tubes may be worn so thin that they cannot be made tight. Ferrules might help you, but they should be of cast iron and turned.

(2) H. & D. D. ask: 1. Can a common machinist make a photograph that will repeat what has been spoken into it? If so, will you please tell us where we can get a description of one. We are both pretty fair hands with our tools, and we would like to make one. A. Yes. For directions see SUPPLEMENT 133. 2. Is there any way that we could make carbon? We have been experimenting with an electric light, and

would like to try and make our own carbon points. A. You will find formulae for electric light carbons in "The Electric Light," by Higgs; but we would not advise you to try to make them. It is far better and cheaper to purchase. 3. What part of a horse power is an engine with a cylinder 1 inch by 2 inches, and what size of boiler would it require to drive it, the piston making 26 strokes per minute, using 45 lb. of steam? A. If you mean 26 strokes, it is one-third horse power; if you mean 26 revolutions, two-thirds horse power. In the first case, 6 square feet heating surface in boiler, and in the last 12 square feet. 4. Are the two cylinders of a double acting engine equal to both added together; as, for example, take 11 inch by 20 inch hoisting engine. If we were to use a 22 inch by 40 inch single engine, would it give the same amount of horse power using same pounds steam in both cases? A. Yes; equal to one of 11 inch diameter by 40 inch; but a cylinder 22 inch by 40 inch is equal to four of 11 inch by 40 inch, or eight of 11 inch by 20 inch.

(3) W. J. N. asks: What makes the best polish to clean up and brighten old furniture, pianos, etc., and coffin varnished surfaces? A. Dissolve 4 oz. orange shellac in 1 quart of 95 per cent alcohol; to this add 1 quart of linseed oil and 1 pint of turpentine; when mixed add 4 oz. of sulphuric ether and 4 oz. of aqua ammonia, mix thoroughly and well before using. Apply with a cloth or sponge, and rub the surface to which it is applied until the polish appears.

(4) J. F. M. writes: To tighten a pipe box that has turned and worn the hub away so that it cannot be wedged—center the box, secure it with three thin strips of wood, and pour melted sulphur around it. As the sulphur cools it expands and holds the box perfectly tight.

(5) J. A. M. writes: I notice quite a difference in the formulas you give in regard to the horse power of belting. Some time ago I took the formula as follows from your paper, of which I have many volumes:
$$W, \text{ in inches} \times S, \text{ in feet per minute} = H. P. \frac{33000}{600}$$

Then February 14 some belting establishment furnishes the following for a 6 inch belt
$$\frac{6 \times 4^2 \times 1200}{2 \times 33000} = H. P.$$

Then in the number for March 27, in answer to G. I. B., you say 800 feet inches = H. P. A. The formula
$$\frac{W \times S}{600} = H. P.$$
 is considered a good practical rule for belts of average width and length, and is used by many engineers. The formula
$$\frac{W S}{800} = H. P.,$$
 is safer for narrow and short belts running on small pulleys. These formulae are very simple, and meet the want of practice.

(6) O. asks: Can illuminating gas be made from water? If so, how? A. Yes; when superheated steam is passed slowly through a large body of ignited carbon (coal) it parts with its oxygen to the latter. The resulting gas—composed chiefly of hydrogen and carbon monoxide—has very little illuminating power, but this is remedied by introducing a small quantity of the vapor of some rich hydrocarbon—as naphtha—into the retort with the gases.

(7) G. M. T. asks for a recipe for a reliable shoe gloss. A. Shaw's patent blacking is made as follows: Soft water, 1 gallon; logwood extract, 6 oz.; dissolve by gentle heat; soft water, 1 gallon; borax, 6 oz.; shellac, 1 1/2 oz.; boil until solution is effected; potassium dichromate, 3/4 oz.; water, 1/2 pint; dissolve and add all together. It is preferred to add to this before boiling 3 oz. of spirit of ammonia or aqua ammonia.

(8) R. A. S. asks how to make a cement for uniting metals to glass. A. Take 1 lb. shellac dissolved in a pint of strong methylated spirit, to which is to be added 0.05 part of solution of India-rubber in carbon bisulphide; or take 2 ounces of a thick solution of glue, and mix with 1 ounce of linseed oil varnish, or 3/4 of an ounce of Venice turpentine; boil together, and agitate. The pieces cemented should be fastened for 50 or 60 hours to get fixed.

(9) F. B. asks for a good waterproof cement. 1. Soak pure glue in water until it is soft; then dissolve it in the smallest possible amount of proof spirit by the aid of a gentle heat. In 2 oz. of this mixture dissolve 10 grains of gum ammoniacum, and while still liquid add half a drachm of mastic dissolved in 3 drachms of rectified spirit. Stir well, and for use keep the cement liquefied in a covered vessel over a hot water bath. 2. Shellac, 4 oz.; borax, 1 oz.; boil in a little water until dissolved, and concentrate by heat to a paste. 3. Ten parts of carbon disulphide and one part oil of turpentine are mixed, and as much gutta serena added as will readily dissolve. 4. Melt together equal parts of pitch and gutta serena, apply warm, and press the parts firmly together until quite cold. 5. The ordinary marine glue consists of caoutchouc, 1 oz.; genuine asphaltum, 2 oz.; benzole or naphtha, q. s. The caoutchouc is first dissolved by digestion and occasional agitation, and the asphalt gradually added. The solution should have about the consistency of molasses.

(10) A. H. writes: I have a driving or cog wheel, 8 feet in diameter, the piston 12 inches, band wheel shaft 8 feet long, band wheel 9 feet in diameter. What change can be made to lighten the draught? As it is it takes five horses to run a 40 saw gin. I want to decrease the draught to 2 or 3 horses. A. With the best arrangement you cannot drive a 40-saw gin properly with less than 4 horses. By putting your machinery in line and in good order, you may decrease the friction, so that 4 horses will drive the gin with the present machinery.

(11) W. M. asks: Which is the best for the health of the human kind, beef steak so rare that the blood will follow the knife, or steak cooked through only? A. The cooked meat is best.

(12) A. E. P. asks for a receipt for stain to apply to holly wood to imitate black walnut. A. Paint over the wood with a solution made by boiling 1 part of catechu, cutch, or gambier, with 20 parts of water and a little soda. This is allowed to dry in the air, and then the wood is painted over with another solution made of 1 part of bichromate of potash and 30 parts of

water. By a little difference in the mode of treatment, and by varying the strength of the solutions, various shades of color may be given with these materials, which will be permanent, and tend to preserve the wood. After drying, slightly oil and finish with shellac varnish if desired.

(13) C. L. T. asks how to put on the watered or mottled appearance to brass articles. A. The brass is first polished to the required degree, and if it is a fine surface, the mottled appearance is imparted by rubbing over it with a gyratory motion a Scotch gray stone moistened with water. If the work is not very fine, a piece of fine emery paper may be used in the same way. If it is coarse, a dead smooth file may be used. Another method is to secure emery cloth or paper to the end of a small round stick, placing the stick in the universal chuck of a lathe, holding the work against it with a light pressure, and moving it along while the lathe revolves.

(14) R. H. G. asks how to stain light colored wood a dark mahogany, cherry, or rosewood color, something that will not have to be applied hot. A. 1. Boil 1/2 lb. logwood in 3 pints of water, and add 1/2 oz. salt of tartar. 2. Boil 1/2 lb. madder and 1/2 lb. fustic in 1 gallon water. 3. Boil 1 lb. Brazil wood and 1 oz. of washing soda in 1 gallon of water, apply, and then brush over it before dry a solution of 2 oz. alum in 1 quart of water. With these wood, if dry, may be stained in the cold; but the dyeing will be accomplished far more quickly and satisfactorily if the liquids are applied hot.

(15) J. W. writes: In placing a heater of a series of pipe in flue from boiler to stack, I circulate the feed water through and heat the water to say 50, 100, 150, 200, or 250° by thermometer, what saving per cent of coal should I have when thermometer indicates at the different figures, or does the saving vary at the different figures? A. In the use of heaters for the feed water of steam boilers the gain can be estimated by the following formula:
$$E = \frac{t - t'}{T - t'}$$
 in which E is the economy or gain per cent, T total temperature (sum of latent and sensible heat) t—the temperature of feed water entering the heater, t' the temperature of water entering the boiler after passing through heater. Example: T=1,200°, t=50°, t'=300°; then E= $\frac{200-50}{1000}$ = 0.15, or 15 per cent gain.

(16) O. F. R. writes: I have 24 inches (miner's, 1 in. hole, 10 inches pressure of water). Have a 5 stamp mill, stamps weighing 480 lb. each, each stamp must drop 80 to the minute. What size overshot wheel and what size drums will it require to run the mill of 5 stamps, 80 drops to the minute, with 24 inches of water? A. To work the stamps would probably require 15 horse power=495,000 foot lb. Allowing that an overshot wheel will give 66 per cent of the power of the fall, you would require a wheel about 30 feet diameter.

(17) J. A. H. asks: 1. Will three plain cylinder boilers, each 30 feet by 36 inches, with grate surface 6 by 9 feet, afford sufficient steam for two 11x18 engines? A. Yes. 3. Will a 50 horse engine doing 30 horse work require more steam than a 30 horse engine worked to its full capacity? A. Very little, scarcely appreciable. No more if the 50 horse is worked expansively to the best advantage.

(18) W. E. S. writes: I am about to construct a small steam skiff about 12 feet long by 3 in width; please inform me what size cylinders it will require to run it, provided I have one engine on each side of the wheel. A. Two engines, 2 1/2 inches cylinder and 3 inches stroke.

(19) S. H. H. asks: 1. Which way will two engines, coupled together on the same crank or fly wheel shaft, give the most power, with the cranks quartered like a locomotive so there is no dead point, or set exactly opposite each other? A. There would be no difference in power, but set at right angles, will work steadier and better for all purposes.

(20) E. T. asks how to detect alum in bread. A. M. Buchner, a French scientist, discovered that a single drop of alcoholic extract of Campeachy wood, placed upon pure flour or bread, will cause a brownish yellow stain. If the flour contains alum, in the proportion of one or two per cent, the color will turn to a grayish blue or violet gray. With one half per cent of alum the tint is reddish yellow, with a border of gray blue, and small blue spots can be discovered by examining it with the lens. One fourth per cent of alum is the limit of reaction, when the blue border disappears, although the small spots are faintly discernible.

(21) J. A. G. asks: 1. How can I stop leaks in steam pipes? A. It depends entirely upon the metal of the pipes and character of the leak. If the pipes are defective they should be replaced. If the leak is due to poor fitting the only proper remedy is to do the work over. If the leak is due to unequal expansion the pipes must be re-arranged. 2. How many cells would be required to make a good magnet of a steel bar weighing about 1 lb.? A. About 4 cells of Bunsen battery. 3. Where can I find instructions for making a small magneto electric machine? A. In SUPPLEMENT, No. 161.

(22) G. S. L. asks what size boiler is needed for running small engine, 2 inch stroke by 1 inch bore? Also, can I heat the same by oil: if so, what kind of oil would be best for the purpose? A. Your boiler should have about 10 square feet of heating surface. You can run such a boiler with kerosene, but gas is much better.

(23) C. W. N. asks: How many pounds strain will the cogs on two wheels support, one wheel being 12 inches the other 7 inches in diameter (the strain being steady); size of cogs: length 1 1/2, width at base 3/4, width at top 3/4, depth 3/4; two cogs in mesh at a time? A. If the teeth bear fairly, one tooth 450 lb., two, 900 lb.; in actual use, not more than one-fourth these pressures should be allowed. 2. How much will a 3/4 wire cable chainsupport on a steady strain—how many pounds? A. For a short link chain made of 3/4 inch wire, 6,700 lb.; and for wire rope 3/4 inch diameter, 4,000 lb. These are maximum working strains.