

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 publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.

Asbestos Board, Packing, Gaskets, Fibers, Asbestos Materials for Steam & Building Purposes. Boiler & Pipe Covering, Asbestos Pat. Fiber Co., limited, 194 B'way, N. Y. Corrugated Wrought Iron for Tires on Tractor Engines, etc. Sole m'f'rs., H. Lloyd, Son & Co., Pittsb'g, Pa. "Temper is everything," and in the pens of the Esteban Steel Pen Company the temper will be found all that is to be desired.

For Sale.—One Spoke Tenanter, Throater, Facer, and Sand Belt. Nearly new and improved. Edward Hollingsworth, Wilna, Md.

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

The Mackinnon Pen or Fluid Pencil is the champion writing instrument of the age. Uniform in stroke, uses any ink, always with you, always ready. Diamond pointed. See SCIENTIFIC AMERICAN, April 24. Mackinnon Pen Company, 200 Broadway, New York.

OLD ORCHARD HOUSE, Me., June 18, 1880.

To the H. W. Johns M'fg Co., 87 Maiden Lane, New York: The Old Orchard House, having just been completed with two coats of Johns' Asbestos Paints, in a manner perfectly satisfactory to me, I would endorse them as being not only of the most wonderful covering capacity, but also on the point of economy and manner of working under the brush. . . . Although two coats were called for under the contract, yet under the large piazza I found one coat was entirely sufficient.

(Signed) E. C. STAPLES, Proprietor. Road Locomotive for sale. Aveling & Porter 12 H. P. Nearly new. Apply W. C. Oastler, 43 Exchange Place, New York.

Portable Engine on Wheels for sale. English manufacture; 12 H. P.; new. W. C. Oastler, 43 Exchange Place, New York.

Apply to J. H. Blaisdel for all kinds of Wood and Iron Working Machinery. 107 Liberty St., New York. Send for illustrated catalogue.

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

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

Our new Stylographic Pen (just patented), having the duplex interchangeable point-section, is the very latest improvement. The Stylographic Pen Co., Room 13, 169 Broadway, N. Y.

Advertising of all kinds in all American Newspapers. Special lists free. Address E. N. Freshman & Bros., Cincinnati, O.

Skinner & Wood, Erie, Pa., Portable and Stationary Engines, are full of orders, and withdraw their illustrated advertisement. Send for their new circulars.

Sweetland & Co., 126 Union St., New Haven, Conn., manufacture the Sweetland Combination Chuck.

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

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

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

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 Hoghead 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.

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

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y. Blake "Lion and Eagle" Imp'd Crusher. See p. 13.

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.

Forsyth & Co., Manchester, N. H., & 207 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.

Air Compressors, Blowing Engines, Steam Pumping Machinery, Hydraulic Presses. Philadelphia Hydraulic Works, Philadelphia, Pa.

Burgess' Non-conductor for Heated Surfaces; easily applied, efficient, and inexpensive. Applicable to plain or curved surfaces, pipes, elbows, and valves. See p. 284.

Eclipse Portable Engine. See illustrated adv., p. 413.

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

Sheet Metal Presses, Ferracite Co., Bridgeton, N. J. For best low price Planer and Mather, and latest Improved Sash, Door, and Blind Machinery, Send for catalogue to Rowley & Hermance, Williamsport, Pa.

Peck's Patent Drop Press. See adv., page 14.

Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 13.

4 to 40 H. P. Steam Engines. See adv. p. 413.

Improved Solid Emery Wheels and Machinery, Automatic Knife Grinders, Portable Chuck Jaws. Important, that users should have prices of these first class goods. American Twist Drill Co., Meredithville, N. H.

For Standard Turbine, see last or next number.

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

Millstone Dressing Diamonds. Simple, effective, and durable. J. Dickinson, 64 Nassau St., New York.

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

Wanted—The address of 40,000 Sawyers and Lumbermen for a copy of Emerson's Hand Book of Saws. New edition 1880. Over 100 illustrations and pages of valuable information. Emerson, Smith & Co., Beaver Falls, Pa.

Eagle Anvils, 10 cents per pound. Fully warranted.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 28.

For Wood-Working Machinery, see illus. adv. p. 23.

For Separators, Farm & Vertical Engines, see adv. p. 28.

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

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 28.

Soapstone and Empire Gum Core Packing, the best for Railroads. Greene, Tweed & Co., New York.

\$275 Horizontal Engine, 20 H. P. See page 28.

For Patent Shapers and Planers, see illus. adv. p. 28.

Comb'd Punch & Shears; Universal Lathe Chucks. Lambertville Iron Works, Lambertville, N. J. See ad. p. 301.

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 29.

Patent Steam Cranes. See illus. adv., page 29.

Nellis' Cast Tool Steel, Castings from which our specialty is Plow Shares. Also all kinds agricultural steels and ornamental forgings. Nellis, Shriver & Co., Pittsburg, Pa.

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,000 lbs. to sq. in. Circulars free. Pittsburg Steel Casting Company, Pittsburg, Pa.

Wairus Leather, Emery, and Polishing Goods. Greene, Tweed & Co., 118 Chambers St., New York.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 331.

C. J. Pitt & Co., Show Case Manufacturers, 226 Canal St., New York. Orders promptly attended to. Send for illustrated catalogue with prices.

Rollstone Mac. Co.'s Wood Working Mach'y ad. p. 29.

Elevators.—Stokes & Parrish, Phila., Pa. See p. 28.

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.

Penfield (Pulley) Block Works. See illus. adv. p. 28.

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) J. A. S. asks for the ingredients and proportions used in making picture frame makers' putty. A. Glue, 14 lb.; resin, 7 lb.; linseed oil, 2½ pints; water, 5 pints (more or less); whiting, q. s.; ¼ lb. pitch is sometimes added. Melt the resin, add the oil (hot); soften the glue in cold water, then dissolve it in hot water. Add the glue to the oil and resin, beat together, and add enough warm whiting to make a stiff dough. Oil the mould with sweet oil, and mould by pressure. The dough will not keep—it soon hardens, so that it should be prepared only as required. 2. If in your power also give me the recipe for making the gold lacquer used to give silver leaf the gold color, also used by picture frame makers. A. Shellac 2½ oz.; gum sandarac, 2 oz.; gum elimi, ¼ oz.; spirits of wine, 2 quarts. Mix, and keep for two or three days; strain, add dragon's blood and turmeric to color, and thin with wine spirit.

(2) J. N. C. asks how to clean the inside of a mercurial siphon barometer tube. Having been out of use for a long time the mercury was gone and the inside of the tube has become dirty from dust and oxidation from the mercury. A. Try a small quantity of warm nitric acid. Then rinse with water, rinse with absolute alcohol, and finally with ether; warm, to expel the vapor of ether.

(3) J. L. W. asks (1) for the best known process of pickling cucumbers to keep through the winter. I want the fruit to remain firm and brittle, the pickling ingredients not to be impervious. A. Steep in strong brine for a week; then pour it off, heat it to boiling, and pour it over the cucumbers. In 24 hours drain on a cloth, pack in wide-mouth bottles, fill these with strong hot pickling vinegar, and seal at once. Various spices are added in the bottles. 2. Also, why is sand worked with cement; is it done to keep the cement from cracking, or to make it go farther, or to make it harder when dry, or dry faster? A. Sand hardens and prevents cracking, and lessens the cost of the work.

(4) G. F. W. asks how to prepare the solution and the proportionate quantities necessary to silver in different colors the glass globes such as are often used to trim Christmas trees, etc. My impression is that the globes are blown of different colored glass, and but one solution is required. A. Lead, ½ oz.; tin, ½ oz.; melt together; add immediately ½ oz. bismuth, and carefully skim off the dross. Remove the alloy from the fire, and before it cools stir in 5 oz. of mercury (with care to avoid inhaling the fumes). When the amalgam is to be used for silvering, strain it through a linen cloth and pour it into the clean dry globe through a paper funnel reaching nearly to the bottom of the globe. When the globe is turned about the amalgam will attach itself to the glass. Pour out the excess. 2. Lead, 3 oz.; tin, 2 oz.; bismuth, 5 oz. Put the alloy into the globe, expose it to a gentle heat until the compound has melted (it melts at about 197° Fah. Then by turning the globe slowly around an equal coating may be laid on, which, when cold, hardens and firmly adheres. For the different colors use suitably colored glass.

(5) D. F. H. asks: Can I with six cells of Daniell's battery sound an alarm on a bell located about ten rods distance, in a church tower? A. No, but you can with your battery let off mechanism driven by weight that will do the work.

(6) J. M. asks how to take green mould off from brownstone. A. Try a little strong hot potash solution (aqueous), rinse well after.

(7) M. B. C. writes: I have a boiler 12 feet long, 44 inches diameter, with twenty-two 4½ inch flues, the flame passing under boiler, returning front through one half of the flues, going back through the other half. What would be the horse power of such a boiler? A. About 24 horse power. 2. The flame as it leaves the boiler, passes through a damper, with 12 inches by 23 inches opening, passing down, then up stack. Is the damper of sufficient size? Would there be any gain in passing flame up through damper? Is flue in chimney a proper size, being 21 inches at base, increasing to 26 inches at top; square brick stack, height 70 feet from bottom of ash pit? A. Make your damper opening fifty per cent larger. Instead of passing the flame through one-half the tubes and returning through the other half, return through all the tubes, and do not make the second return. Your draught is now very poor; these alterations will improve it.

(8) G. B. asks: 1. How much power in pounds will it require to run a 16 foot boat, 4 feet beam, on smooth water? A. 70,000 to 90,000 foot lb. 2. Will a smaller propeller than 11 inch run it with any success? A. No. 3. How many revolutions must the screw make to the engine's once, per minute. A. The propeller should run the same speed as the engine. 4. How many revolutions must the governors make in accordance with the screw? A. You need no governor.

(9) P. L. C. asks what is the best solution in which to dip shingles to make them more durable. A. Zinc chloride, mercuric chloride (corrosive sublimate), and creosote, dissolved in water, have been used for this purpose. Water shed from roofs covered with such shingles is unfit for drinking or culinary purposes.

(10) J. E. B. asks if a boiler with sufficient capacity to generate steam to an engine of 24 inches cylinder, at 50 lb. pressure per square inch, be capable of furnishing steam to an engine with cylinder twice the area, with only 25 lb. steam, other things being the same. A. A boiler furnishing steam at 50 lb. pressure to a given cylinder, the steam would have a total pressure, including atmosphere, of 64.75 lb., and would furnish a cylinder of double capacity (not considering radiation and condensation) with steam 32.375 lb. total pressure—equal to 32.375—14.75=17.625 lb. pressure above atmosphere.

(11) J. L. writes: We are about building a school house of six rooms, two stories. The members of the school board differ as to the best method of ventilation and heating the building. Some are in favor of stoves, others are for hot air. I am in favor of getting the opinion of those who understand such things, and having every confidence in the opinions expressed in the SCIENTIFIC AMERICAN, I ask you to give us information as to the best method of ventilating and heating a school building of six rooms. A. To heat by steam, half the heating surface to be indirect coils in the basement and half long wall coils, in the rooms on the outside walls and under the windows. In the inside walls of the rooms there should be built for ventilating three flues for each room of 144 square inches cross section each. The flues for the upper rooms to start at the floor and run straight through the roof, and finished with an Emerson trap, or something like it. The flues from the lower rooms to start at the floor also, and to pass direct to the roof and to have no connection with the flues for the upper story. The heating flues from the basement for the indirect coils to second floor should be in the outside walls, and run from close under the cellar ceiling to two feet above the two story floor. The registers for the first floor may be through the floor near the outside walls, and opening directly over the heating coils. It is not actually necessary to warm the outlet flues, in the inner walls, if each has a separate cowl or top. The life of a good steam apparatus is unlimited, except the boiler, which will last about twenty years. The cost would be from \$750 to \$1,000. Have a competent steam heating engineer make plans, and be sure he is correct as to quantity and quality; then submit the plans to the bidders, and see that the party who gets the job carries it out to the letter. If plans are to be submitted, it is best to receive them without price, on their merits only, and throw the best plan open to competition.

(12) W. C. writes: 1. I send you this day a sample of sand, and would like to know if it contains any of the precious metals. A. It probably contains a trace of gold. A fire assay would be necessary to determine this. 2. I would like to know how many pounds of steam I can safely carry on a small copper boiler, No. 18 of the wire gauge. Dimensions of the boiler are 12 inches in length and 9 inches in diameter. A. 30 lb. per square inch of joint head sufficiently strong. 3. Where is there a good school I could attend for studying civil engineering for beginners? A. "Rensselaer Polytechnic Institute," Troy, N. Y.; "Stevens Institute," Hoboken, N. J. 4. What would be the best manner of heating the above mentioned boiler—by petroleum or coal? A. Coal.

(13) A. W. P. asks: 1. What size engines will it require to drive a buggy that will carry two men over ordinary roads? A. Two engines, 3 inches cylinder by 6 inches stroke. 2. How many square feet of heating surface will be required to make steam for the engines? A. 100 to 120 feet. 3. Will a vertical tubular boiler be best? A. Yes. 4. Should I use one or two engines? A. Two. 5. Give the weight of boiler, engines, etc., as near as possible. A. Weight will depend much on the kind of boiler. 6. What power will I get from an engine, two inch and four inch stroke, with 60 lb. steam, and 300 revolutions? A. One horse power.

(14) F. H. A. writes: I have the following machinery running at the speeds given: Will you give me, through the SCIENTIFIC'S "Notes and Queries," the horse power required to drive them all at once, or a rule by which I can find out myself? No. 1, 3,600 revolutions, 3½ in. belt, lathes; No. 2, 2,000 revolutions, 4 inch belt, lathes; No. 3, 2,800 revolutions, 4 inch belt, circular saw, 12 inches diameter? A. Multiply the speed of the belt in feet per minute, by the width of the belt in inches, and divide by 600; the quotient is the horse power the belt will drive easily.

(15) E. G. McD. asks: Would you consider a lightning rod, on a frame building, which is run into a rainwater cistern (say 10 feet deep in the ground), a good protection? Of course the lower end of the rod would be under water always. A. In order to make a lightning rod really safe, the bottom of the rod should have a large conducting surface connected with the earth or with water in the earth. Simply dipping the lower end of the rod for a short distance into the water is not sufficient. For example, if the rod is one inch square, and extends one foot into the water, you have a conducting surface of only 49 square inches in contact with the water. This is not enough. If it were 49 square feet of conducting surface, that would be better. One of the best of all ground connections is to have the bottom of the rod soldered to the exterior of an iron water pipe that extends a few hundred feet under ground. In this way a conducting surface of great extent is obtained, and comparative safety secured.

(16) J. L. writes: Your answer to querist how to cut glass tubes for gauges, I think I can tell you a better way. Lay the glass on a pen rack or anything so it can be revolved, and scratch it with a file, and then blow with a blow pipe a flame upon it until it is quite hot, and then blow cold, and it will snap off right where it was marked every time.

(17) D. J. writes: 1. I have an engine 3½ x 1¼. What size force pump would it work? A. Area of pump piston about one-third area of steam piston, if of same stroke. 2. What size should I make the air chamber? A. 8 to 12 times the capacity of pump. 3. From what depth would it suck water and about how high would it throw water? A. 20 to 24 feet suction, height depends upon the size and form of delivery nozzle. 4. What size should the feed and discharge pipes of the pump be? A. About three-fourths the area of pump piston. This thing would be of no use as a fire engine.

(18) C. E. R. asks: How much cold water pressure do I want to give a boiler to carry 75 lb. steam using same steam gauge in both cases; in other words, what proportion, or is there any rule? A. By government rule, 113 lb. Steam pressure allowed is two-thirds the cold water test pressure. 2. I am using a steam engine, 12x30, with a lead the thickness of writing paper. It will not cut off till the crank has traveled within two inches of next center. How can I change it? A. If the engine is to work at a high velocity, give one-eighth inch lead, and if you wish to cut off shorter, give the valve more lap, say one-half inch. 3. Will it give any more power by cutting off sooner? No, but you will work with more economy. 4. I am not getting power enough now; my boilers are scaled bad. What is the best way to rid of the scale and keep them clean? A. Heat the water to the boiling point before forcing it into the boiler.

(19) L. F. T. writes: In your answer, April 10, page No. 234, question 4, you did not say how I should apply the hydrofluoric acid in glass engraving. A. After waxing and cutting the design, place the plate face downward over a warm shallow leaden tray partly filled with powdered fluorspar thoroughly moistened with strong oil of vitriol (sulphuric acid) for half an hour or more.

(20) A. F. S. L. asks: What is the fastest time ever made by a locomotive engine? A. For a considerable distance, about 60 miles per hour; for short run, 75 miles to 80 miles.

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

N. C. F.—1. Clay iron stone. 2. Quartz and slate. 3. Orthoclase—feldspar. 4. Quartzose rock. 5. Quartz, hornblende and mica. 6. Mica slate. 7. Principally hornblende. 8. Sandstone with molybdenite. 9. Sandstone. 10. Granite. 11. Oolitic limestone. 12. Limestone pebble. Nos. 4 and 5 may carry a little silver.—R. D. McC.—1 and 5. Chiefly quartz. 2 and 6. Altered feldspar and limonite. 3. Quartz and obsidian. 4. Limonite. 7. Metallic lead (button). Some of these may contain small quantities of silver; an assay would be necessary to settle this point.—S. B.—It consists chiefly of copper and iron sulphides and carbonates, probably carrying silver. If the sample is representative of the body ore, the property is likely to prove a valuable one.—N. P. F.—A variety of aenite—feldspar, hornblende, and quartz. The specimen contains a small quantity of graphite (blacklead).—E. G. A.—1. Magnetite.—2. Argillite and iron pyrites. 3. Limonite. 4. Chiefly feldspathic rock.

COMMUNICATIONS RECEIVED.

Why the needle points northerly. By E. W. On Capillarity. By G. H. S.