

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.

Guilb's Plastering Machine—The Simplest and Best Tool for applying mortar to walls. One workman using this machine can easily do the work of two men using the ordinary tools. See engraving on page 194. Address Egbert F. Guild, East Saginaw, Mich.

Boat Engines, for sidewheel boats drawing 6 to 12 in; direct acting; link motion; cheap. Box 559, Owego, N. Y.

For Sale.—Two Windmill Patents, and set of patterns for same. None better. F. C. Maxwell, Columbus, O.

Wanted.—The address of Brass Lamp Manufacturers, to fill a large contract. J. J. Hentz, 104 S. Charles St., Baltimore, Md.

Window Safety Guard (for cleaning and repairing windows), simple and effective, by straps, platform. Patent rights and licenses reasonably. R. d'Heureuse, P. O. Box 395, New York.

Best Turkey Emery in kegs, half kegs, and cans; liberal rates by the ton. Greene, Tweed & Co., N. Y.

The newest Plating used for Steel Pens can be seen on Esterbrook's Nickel Plated. Send for samples to Esterbrook Steel Pen Company, 26 John St., New York.

Machines for Tapping Water Mains under Pressure. Apply at Easton Brass Works, Easton, Pa.

For Patent Shapers and Planers, see illus. adv. p. 188.

The genuine Asbestos Roofing is the only reliable substitute for tin, it costs only about one-half as much, is fully as durable, is fireproof, and can be easily applied by any one. H. W. Johns Manufacturing Co., 87 Maiden Lane, N. Y., are the sole manufacturers.

For Separators, Farm & Vertical Engines, see adv. p. 188.

For Sale.—Machine Shop and Foundry, with agl. imp. trade. New buildings; old business; \$25,000 invested. Practical partner preferred. P. Camel, care Manufacturers' Exchange, Quincy, Ill.

Blake's Belt Studs. The best and cheapest fastening for rubber and leather belts. Greene, Tweed & Co., N. Y. For Middlings, Mill and Mill Furnishing, see adv. p. 188.

Wanted.—A Situation as Mechanical Draughtsman, by a young Englishman, 30 years of age. Reference and specimens. Address T. Wild, P. O. Box 4090, N. Y. city.

Wanted.—A good Manganese Property. Samples and full particulars required. Fuller & Stillman, 40 Broadway, New York.

For Sale.—Four Boilers, 100 horse power each, return drop flue; A 1 condition; \$1,500 each. 1 Berryman Heater, 42 x 96; A 1 condition; \$400. D. L. Einstein, 16 White St., New York.

Rare Chance to Invest.—Three valuable Patents for sale. Lantern; Self-opening Oyster or Fruit Can; Coal Sifter. E. P. Follett, 41 East Main St., Rochester, N. Y.

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

Wanted.—A Second-hand improved Country Campbell Press, 31 x 46, for \$500 cash. A. G. Blair, Waynesboro, Franklin Co., Pa.

A Mechanical Engineer, thorough mechanic and draughtsman, desires engagement. Pumping and hydraulic machinery a specialty. Address Hydraulics, Box 773, New York city.

Peck's Patent Drop Press. See adv., page 173.

All kinds Machine Drawings. Inventors' work a specialty. Office hours 9 to 6. 733 Broadway, 3d floor front.

Vertical & Yacht Engines. T. P. Pemberton, 276 Water St., N. Y.

Having bought the Forsythe Scale Works here, we offer our present manufactory, with 25 H. P. engine and boiler, for sale. This property is well situated for manufacturing, only three blocks from depot. Will be sold low. Waukegan, Ill. is 35 miles north of Chicago. Full description sent on application. Powell & Douglas, Mfrs Pumps and Windmills, Waukegan, Ill.

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 Hoghead 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. Yocom & 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.

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

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, Wklyn. N. Y. Bradley's cushioned helve hammers. See illus. ad. p. 174.

Ice Machines selected. Information on all kinds. Benjamin's Sci. Expert Office, 37 Park Row, New York.

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

Eclipse Portable Engine. See illustrated adv., p. 157.

New Inventions examined and tested. Designs and improvements. Reports for investors. Recipes and information on all industrial processes. Benjamin's Sci. Expert Office, 37 Park Row, New York.

For best low price Planer and Matcher, and latest improved Sash, Door, and B'n'l Machinery, Send for catalogue to Rowley & Hermance, Williamsport, Pa.

Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 173.

Improved Solid Emery Wheels and Machinery, Automatic Knife Grinders, Portable Chuck Jaws. Important, that users should have prices of these first class goods. Address Amer. Twist Drill Co., Woonsocket, R. I.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Company, Buffalo, N. Y.

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

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

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, 9 cents per pound. Fully warranted.

Repairs to Corliss Engines a specialty. L. B. Flanders Machine Works, Philadelphia, Pa.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 188.

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

For Wood-Working Machinery, see illus. adv. p. 188.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus'd adv. p. 62.

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

The Horton Lathe Chucks; prices reduced 25 per cent. Address The E. Horton & Son Co., Windsor Locks, Conn. \$400 Vertical Engine, 30 H. P. See page 188.

Judson's Improved Assay Furnaces and Tongs. Entirely new design. W. E. Judson, Cleveland, O.

Emery Wheels of all kinds, and Machines at reduced prices. Lehigh Valley Emery Wheel Co., Weissport, Pa.

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

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 188.

Patent Steam Cranes. See illus. adv., page 189.

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.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 189.

Drop Hammers, Die Sinking Machines, Punching and Shearing Presses. Pratt & Whitney Co., Hartford, Ct.

Rue's New "Little Giant" Injector is much praised for its capacity, reliability, and long use without repairs. Rue Manufacturing Co., Philadelphia, 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.

Elevators.—Stokes & Parrish, Phila., Pa. See p. 188.

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.

The Twiss Automatic Cut-off; also Vertical and Yacht Engines. N. W. Twiss, New Haven, Conn.



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) E. C. writes: We are using iron turbine water wheels; when there is slush or anchor ice running in the night it sticks to the iron and fills the wheels so as to stop them, while in the daytime, with the same conditions as to degree of cold, wind, and quantity of ice running, it does not bother at all. Can it be explained? A. It is probable that more anchor ice makes during the night than in the day time, the water being in a comparatively quiescent state at night. 2. A board containing 64 square inches surface measure can be cut and put together, so as to measure 65 square inches. Where does the extra inch come from? A. See

square puzzle in SUPPLEMENT, No. 21. If you are very careful in your measurements you will find that the board really has the same area in one case as in the other, and that some of the squares along the line of division are enough smaller than the others to account for the existence of the extra square.

(2) C. D. R. writes: I have quite a quantity of grape vines which grow some six feet high. We have in this section early frosts in spring and fall. I wish a light and cheap covering to tack to a wooden frame six by eight feet long. A. We know of nothing better than some of the cheaper grades of cotton cloth.

(3) J. B. asks (1) if one gravity battery cell can be put to any use. A. It will work a sander or electric bell adapted to light battery power. 2. Can I get an electric shock from it? If so, how? A. Yes, by using an induction coil like that described on page 203, Vol. 39 of SCIENTIFIC AMERICAN. 3. How can I make a voltaic pile to be used in an enclosure? A. See SUPPLEMENT, No. 157.

(4) E. M. G. writes: 1. I am running a portable mule saw mill with a 10 horse power thrashing engine, which is plenty strong, but am troubled some for steam when using green slabs. Now, how would it work to set another portable engine beside the one now in use, and connect the two boilers with a steam pipe, and make steam in both, using one engine? Could they be arranged to burn the sawdust? How large a pipe would be needed to connect the boilers. Would a valve be needed in the pipe to shut off steam from either boiler? A. Yes; set another boiler alongside, and connect with a steam pipe at least as large as that leading to the engine; have no water connection between the boilers, but supply them with water independently. You should have a stop valve in the connecting steam pipe, and be careful to have a separate safety valve on each boiler. With proper arrangements you can burn sawdust with your slabs. 2. Would it be practicable to have an iron tank for hauling water for a thrashing engine, to fill it with steam from the boiler, then start for the water, and when the steam had condensed and formed a vacuum in the tank, to let it suck itself full through a hose, how heavy would the iron need to be to sustain the pressure? A. Yes; you must have tank strong enough to bear safely the greatest internal pressure that the steam will give, and stiff enough to not collapse under the full pressure of the atmosphere.

(5) J. W. S. asks: Can gutta percha be bleached white; if so, what is the process? A. White gutta percha is obtained by precipitating a solution of ordinary gutta percha in chloroform by alcohol, washing the precipitate with alcohol, and finally boiling it in water, and moulding into desired form while still hot.

(6) J. R. asks: What will take old paint off wood without injuring the wood? I am told that I will have to burn it, but I think there is another process. A. Strong aqueous solution of caustic potash softens oil paint, which in this state may be removed by scraping. The potash is, however, liable to injuriously affect the wood. Burning is more commonly resorted to.

(7) W. H. B. writes: Having tried to galvanize some small wrought iron hooks, I could not make the zinc take to the iron. I used a pint of sulphuric acid, pint of muriatic acid, pint of sal ammoniac, and zinc enough to cover the hooks. I first dissolved the zinc with muriatic acid, then I reduced the sulphuric acid with water. I then dissolved the sal ammoniac, then I dipped the hooks into the sulphuric acid, then after washing it off I then dipped it into the muriatic acid; after taking it out and letting it stand for some time, I then dipped it into sal ammoniac, after taking it out and letting it stand some time I then dipped it into the zinc, but on taking it out the zinc would not stick to it. Can you tell me where the trouble is? A. Clean the metal by pickling in the dilute acid, and scouring (or tumbling) with moist sand, if necessary. Rinse quickly in pure water, pass through the chloride of zinc solution, and then transfer to the zinc pot. Keep the melted metal covered with dry sal ammoniac. Moist iron rusts very quickly when exposed to the air, and unless the surface is perfectly freed from this oxide it will not take the zinc.

(8) F. M. O. asks: What is the mode of manufacture, and what are the uses of the so-called mineral wool? What substance can I use to cover the surface of molten metals, say at a dull red heat, to prevent the formation of the film of oxide? Can a glass be made sufficiently fusible to answer the purpose? A. See pp. 20 and 278, Vol. 38, SCIENTIFIC AMERICAN. Have you tried borax (borax glass) or the double borate of sodium and potassium?

(9) E. Y. D. asks: 1. Do you know of anything that will cement two pieces of vulcanite, it being a straight joint? I have tried rubber, and it did not harden in 24 hours. I have also tried good cements which are patented. A. Melt together equal parts of pitch and gutta percha, and add about 1-5th part of shellac. Stir until a perfectly homogeneous mixture is obtained. Use hot (avoiding excess), and submit the joint to strong pressure until the cement has properly hardened. 2. Can you tell me what the precipitate of the following is: I took olive oil and made very hot, almost boiling, into it I dropped a piece of phosphorus; there is now a deposit in the vessel. A. It is probably phosphorus.

(10) F. M. asks whether it is preferable to make the upper or the lower belt the driving belt in case of a long horizontal belt. A. All authorities agree, and all experience goes to prove, that a belt should drive by the lower side.

(11) J. S. asks how to compute the horse power of a boiler. A. Total number of square feet of heating surface, divided by 12=H. P.

(12) "Mechanic" asks whether, in order to make a boat buoyant when she is filled with water, it is better to seal up the tanks, simply allowing the atmospheric air to get in; or whether it is better to pump compressed air into the tank. A. Simply seal your tanks. If you fill them with compressed air it will add slightly to the weight the boat must carry.

(13) G. I. B. asks: 1. What is the rule for calculating the horse power a belt will transmit? A. A very safe rule is that at a speed of 800 feet per minute

each inch in width of belt equals one horse power, that is, 800 foot inches=1 H. P. 2. Does the same rule apply to friction wheels? A. No. 3. The slides of our engines heat so that they need to be oiled every few minutes, to keep from cutting the crosshead brasses; everything appears to be level and in line; runs about 120 strokes per minute. What is the probable cause? A. They have probably too little bearing surface.

(14) W. E. F. writes: I am a paper manufacturer, and boil my rags and raw stock in "rotary boilers" under, say, 50 lb. pressure, and dry my paper with live steam. We are troubled with too much cinders in the boiler, weakening the chemical solutions, and filling the pipes and drying cylinders in drying machine. I wish to ask: 1. Can we economize heat and fuel by using superheated steam? A. Yes. 2. We have a flue 6x3, 14 feet long, between the brickwork of the boiler and smoke stack. Can we put in this a system of coils, or lengths, of pipe, drying the steam from the heat that would otherwise be wasted? A. Yes, if properly arranged. 3. Would this mode be dangerous? A. If well arranged and managed, no. 4. Will steam so dried do more boiling and drying when superheated than before? A. Yes.

(15) E. H. R. asks: Why would not crude petroleum oil answer as well as creosote oil for the preservation of wood? It is as penetrating, if not more so than any other oil, will not dry, and is cheaper than anything else. A. Petroleum unfortunately renders wood very inflammable. The effects of creosote are more positive and lasting.

(16) L. P. L. asks: 1. How can hair be made to grow on the face most rapidly? Is there anything besides shaving that can be done? A. The growth of hair on the face of adult males is influenced chiefly by constitutional causes. Those causes which tend to produce vigorous health in the general system and in the skin usually stimulate the hair. Chief among these is very frequent bathing. As a rule local applications are useless. 2. How can aniline inks be kept from fading? A. If exposed to light the fading is unavoidable. 3. Can aniline inks be made, by any preparation of the cloth, or addition to the ink, indelible for marking linen? A. With exception of aniline black, no.

(17) C. L. F. asks: 1. Is there any preparation that will cause the beard to grow to extraordinary length or add to its growth in any manner? A. See answer to L. P. L., this page. 2. Is there a preparation which will make a meerschaum pipe of uniform color? I have one that has been in use several years, and is only colored about the lower part of the bowl where the stem goes in. A. Boiling in oil containing annatto is sometimes resorted to.

(18) C. L. B. asks: In changing an engine from 2 feet stroke to 18 inch, would I need to have a shorter cylinder? A. You must either shorten the cylinder or fill up the waste space of the ends by deep heads.

(19) J. C. L. writes: I have heard it said that the majority of persons in looking at objects use one eye only, to a partial exclusion of the other. Is this true? A. It is not generally true. When both eyes are in their normal condition, both are equally used. The full intention of vision is not realized unless both eyes are used. With one eye everything appears flat. With two eyes objects look stereoscopic.

(20) J. W. E. asks whether United States sabers are made of spring or cast steel. A. They are made of the best quality of cast steel.

(21) W. E. B. writes: 1. I have a small steam engine whose cylinder is three inches in length with a two inch bore. How much space should there be between the piston and cylinder head at the end of the stroke? A. Not more than 3-16 inch. 2. Where can I obtain printed instructions by which I can make a model engine? A. We know of none. Follow the proportions of larger engines as given in back numbers of SCIENTIFIC AMERICAN and SUPPLEMENT.

(22) N. T. L. writes: There are two locomotive drive wheels at rest on the track; one is small, the other is large. Does more of the surface of one wheel come in contact with the rail than the other; if so, which one? A. With deflection of the rail, yes. The large one has the most surface in contact. Theoretically if there be no deflection, there would be no difference, as both would rest on a simple line of contact.

(23) C. M. B. asks: Is there any book published on saw hammering. If so, by whom and where can they be obtained? A. You will find a comprehensive article on the subject on p. 259, Vol. 27, SCIENTIFIC AMERICAN.

(24) R. S. asks for the process used in marblizing slate mantels, and how the different shades and colors are acquired. A. The slate is coated with asphalt, ground to a smooth surface, and baked. The paints are mixed in oil and floated on water, the prepared slate being brought into contact with the under surface of the paint by bringing it up through the water. The paint thus adheres in irregular patches, producing the marblization. After drying it is again baked.

(25) F. M. asks (1) if fruit and meat cans are not soldered by machinery. A. Yes. 2. Is mercury used in the solder? A. Mercury has been found in the solder of some cans in which edible substances have been inclosed, but its use in solder cannot be too strongly deprecated, as it not only endangers the lives and health of the persons who consume the canned goods, but it also poisons the workmen who use the solder.

(26) W. D. G. asks: If I build a mill dam, say 17 feet high, and it backs the water up the stream, say 5 miles, how far from the upper side of the dam does the pressure of water operate or press against the dam? A. The pressure against your dam will be the same, whether the water sets back 500 feet or 5 miles; it is the depth of water at the dam which determines the pressure.

(27) L. C. asks: 1. Is the fine edge of a razor produced on a strap by abrading the sides until a sharp angle is produced, or on the particles of steel mag-