

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.

Any person can get from five to forty acres choice land, with perfect title free, for trifling services around home; business select and honorable. Address for explanatory circular, SECRETARY, 84 Nassau street, New York.

Wanted a Superintendent; a thoroughly capable man who understands the malleable iron business and is competent to manage the manufacturing department. State experience, reference, and salary expected. Address "Malleable," P. O. Box 332, Pittsburg, Pa.

Automatic Planer, Knife Grinders, best Solid Emery Wheels, Machines to run Emery Belts, etc. All warranted satisfactory. Address Amer. Twist Drill Co., Meredith, N. H.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. Complete outfit for plating, etc. Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

To indorse a promissory note may cost a large sum, but to indorse an Esterbrook Pen costs nothing, and is the most natural thing to do after using one.

Bostwick's Giant Riding Saw Machine, adv., page 372.

Small articles in sheet or cast brass made on contract. Send models for estimates to H. C. Goodrich, 66 to 72 Ogden Place, Chicago, Ill.

Heavy Trimmed Walrus Leather, by the Hide or in Wheels, for Polishing Metal. Greene, Tweed & Co., N. Y.

Mortise, Rim, Catch, Sash, and Padlocks. Novel; unpickable. Patented. Right or Royalty for sale. Box, 182, Campaign, Ill.

Latest Improved Diamond Drills. Send for circular to M. C. Bullock Mfg. Co., 80 to 88 Market St., Chicago, Ill.

OFFICE OF CHAUNCEY KILMER & CO., ROCK CITY FALLS, N. Y., May 24, 1882.

GENTLEMEN: In reply to yours of the 20th inst. about H. W. Johns' Asbestos roofing, we consider it the most durable, economical, and, at the same time, fire-proof roofing that we have ever used, having had an opportunity two years since of testing its fire-proof qualities on a portion of our mill where the roofing had then been on some three years, confining the fire to the immediate vicinity of the ventilator, over the rotary engine, where it originated. Since then we have reconstructed the main portion of the mill and covered it with the Asbestos roofing in preference to all others. Very truly yours, CHAUNCEY KILMER & SON.

For Sale.—A Beam Engine, condensing; 34 inch cylinder by 48 inch stroke; Sickle's cut-off; now developing 300 horse power by card. Flywheel, 20 feet diameter by 36 inch face. Can be seen running at the Brooklyn City Flour Mills, Jewell Milling Company, foot of Fulton Street, Brooklyn.

See Bentel, Margedant & Co.'s adv., page 374.

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

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

The Berrymen Feed Water Heater and Purifier and Feed Pump. I. B. Davis' Patent. See illus. adv., p. 373.

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.

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. 372.

Gould & Eberhardt's Machinists' Tools. See adv., p. 372.

Centrifugal Pumps, 100 to 35,000 gals. per min. Seep. 374.

Barrel, Key, Hogshead, Stave Mach'y. See adv. p. 373.

For Heavy Punches, etc., see illustrated advertisement of Hilles & Jones, on page 374.

Lehigh Valley Emery and Corundum Wheels are free cutting, durable, and safe. Can be adapted to all kinds of work. Write for prices, stating sizes of wheels you use. Lehigh Valley Emery Wheel Co., Lehigh, Pa.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 374

Vertical Engines, varied capacity. See adv., p. 372.

Combined Concentric and Eccentric Universal and Independent Jaw Chucks. The Pratt & Whitney Co., Hartford, Conn.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blind Machinery, Send for catalogue to Rowley & Hearnance, Williamsport, Pa.

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

Blake's Belt Studs. The strongest and best fastening for rubber and leather belts. Greene, Tweed & Co., N. Y.

The Porter-Allen High Speed Steam Engine. South-west Foundry & Mach. Co., 430 Washington Ave., Phil. Pa.

4 to 40 H. P. Steam Engines. See adv. p. 372.

First Class Engine Lathes, 20 inch swing, 8 foot bed, now ready. F. C. & A. E. Rowland, New Haven, Conn.

For Sale.—Baltimore Nickel Plating Works. Established in 1871. Complete equipment, including new boiler and engine. Address A. Greenleaf & Co., 15 Mercer St., Baltimore, Md.

Cope & Maxwell Mfg. Co.'s Pump adv., page 353.

Common Sense Dry Kiln. Adapted to drying of all material where kiln, etc., drying houses are used. See p. 358.

Supplee Steam Engine. See adv. p. 357.

Ice Making Machines and Machines for Cooling Breweries, etc. Pictet Artificial Ice Co. (Limited), 142 Greenwich Street. P. O. Box 3083, New York city.

Drop Forgings. Billings & Spencer Co. See adv., p. 341.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 342.

The Sweetland Chuck. See illus. adv., p. 342.

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

Electric Lights.—Thomson Houston System of the Arc type. Estimates given and contracts made. 631 Arch, Phil.

Pure water furnished Cities, Paper Mills, Laundries, Steam Boilers, etc., by the Multiford System of the Newark Filtering Co., 177 Commerce St., Newark, N. J.

"T. New, 32 John St., New York, has sold and applied over fifty million feet of his Prepared Roofing, the major part being placed upon manufacturing establishments."—SCIENTIFIC AMERICAN.

Agents Wanted.—None but intelligent and energetic need apply. Must furnish good recommendations, or no notice will be taken of applications. Exclusive territory given. Agents are now making from \$10 to \$15 a day. Address, for terms, The Infalible Coin Scale Co., 267 Broadway, New York city.

Improved Skinner Portable Engines. Erie, Pa.

Jas. F. Hotchkiss, 84 John St., N. Y.: Send me your free book entitled "How to Keep Boilers Clean," containing useful information for steam users & engineers. (Forward above by postal or letter; mention this paper.)

Steel Stamps and Pattern Letters. The best made. J. F. W. Dorman, 21 German St., Baltimore. Catalogue free.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y. For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

Combination Roll and Rubber Co., 27 Barclay St., N. Y. Winger Rolls and Moulded Goods Specialties. Presses & Dies (fruit cans) Ayar Mach. Wks., Salem, N. J.

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

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Presses, Dies, Tools for working Sheet Metals, etc. Fruit and other Can Tools. E. W. Bliss, Brooklyn, 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.

Supplement Catalogue.—Persons in pursuit of information on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

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.

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.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) F. A. W. asks: 1. Will a small glass cylinder, say four inches in diameter (if speeded up), answer in building a frictional electric machine? A. It will answer in a small way. The small diameter of the cylinder will limit the power of the machine whatever may be the speed. 2. How is the amalgam prepared for putting on cushions? A. Melt eight parts of zinc and two parts of tin together. Place four parts of mercury in a wooden box coated inside with chalk, and pour into it the melted tin and zinc (not too hot). Put the cover on the box, and shake violently until the amalgam cools. Pulverize in a mortar, and mix with a little lard.

(2) W. H. O. writes: 1. Our engine is 14x18, with 8 foot drive pulley, with a 3 foot driver on the main shaft; engine now runs 130 per minute. Which would be the best to get more power, by putting a 6 foot driver on the engine, or one large enough on the main shaft, and to run 150 per minute? A. Larger on main shaft. 2. How much more power would we get by running it to 150? My idea is the 6 foot on the engine would be the best, but our engineer differs with me. A. The increase with same pressure would be as 130 to 150. 3. Would it not take as much steam by running 150, and the 6 foot driver? A. The increase in quantity of steam required would be in same proportion if doing increased work.

(3) J. M. F. asks: Will you please state how to soften rubber and to harden it again? A. If you refer to ordinary or vulcanized rubber, try digestion in bisulphide of carbon to soften and exposure to air to harden again. Rubber is usually moulded before vulcanizing it, when a moderate heat suffices to soften the substance.

(4) R. W. H. writes: I have great difficulty with belts slipping. I covered one pulley with leather, which, as long as it lasted (remained attached), worked well. How can I make the leather adhere to an iron pulley without drilling and riveting? A. Try the following for fastening leather on the pulley: Steep the leather in an infusion of gall nuts; a layer of strong hot glue is spread upon the pulley, and the leather forcibly applied on the flesh side, and allow it to dry under the same pressure. Marine glue may also be used to advantage in a similar manner.

(5) W. H. G. asks: 1. Which is the best method for plating cutlery, etc., with tin, by the electro-plating process, or by the immersion process, by dipping into the hot metal? A. See "Tin Plating," SUPPLEMENT, No. 310. For such goods the hot dip is generally preferred if a heavy coating is desired. 2. Can that bright luster be obtained after the articles are plated with the battery, that the articles have by the immersion method? A. Yes, if the current has been properly applied. 3. By the immersion process the

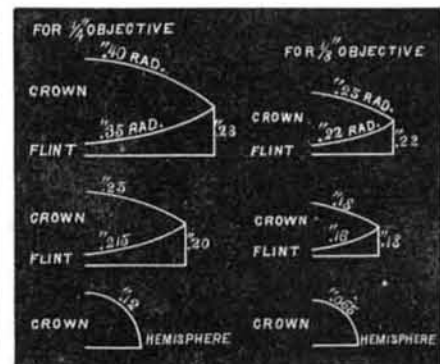
handles are liable to be injured. How will the battery affect them? A. The battery solution used cold will not injure the handles under ordinary conditions.

(6) G. M. asks: 1. Will a cylinder boiler, made of brass, diameter 9 inches, length 18 inches, to be heated by means of kerosene lamps, be sufficient to generate enough steam to run a double acting engine, cylinder, diameter 1/2 inches, stroke 3 inches. If not, please state size required? A. Only about half enough boiler. 2. Will brass one-sixteenth of an inch thick be sufficiently strong to stand the pressure? A. It should be one-eighth of an inch thick. 3. What size safety valve shall I use on such a boiler? A. Three-quarters to one inch diameter will answer.

(7) W. H. B. asks: Will you please tell me how I can transfer prints from paper on to metal? A. To transfer a fatty ink engraving on metal proceed as follows: First coat the face of the dampened engraving with clear copal varnish, made rather thin, and when this has partly dried press it smoothly and firmly into contact with the metal plate, and allow it to remain until dry. Then moisten the back of the engraving, and with a moist sponge, a piece of soft rubber, and the fingers, rub the softened paper until it has crumbled away, leaving nothing but the inked lines adhering to the varnished metal.

(8) G. W. T. asks: 1. Which is the best and most profitable method of polishing pretty coarse brown walnut? I have tried many manners, but none of them will stand any length of time. A. For brown walnut, fill well with shellac varnish and rub down with French polish. If a varnish surface is required that shall be smooth, fill as before with shellac varnish and rub down with fine sandpaper, and repeat if a finer surface is desired, then varnish with copal or other hard drying varnish, and rub down with French polish. 2. How is the bright hard polish on sewing machines obtained? A. The bright surface on sewing machines is obtained by using the best Japan varnish, drying in an oven free from dust at a temperature of about 225° Fah. If the work is required to be very smooth, it must be rubbed down with fine sandpaper or ground pumice stone in water, according to the requirements of the work, then put on another coat of japan and bake as before. 3. What sort of varnish is applied to cover the transfer pictures, and is this varnish hardened cold or warm, and how many degrees are allowed? A. The transfer pictures should be covered with thin mastic varnish. Use a fine flat camel's hair brush and brush lightly, so as to conceal the overlapping of the mastic upon the japan varnish. Dry by baking at about 150° Fah.

(9) R. H. F. writes: I have made a large compound microscope stand, and with a one inch objective I have obtained good results. As I either have or can readily make the tools for grinding small lenses, I would like to experiment on making some one-quarter inch and one-eighth inch objectives. Can you tell me what are the focal lengths of the lenses used, and how they are combined to make such objectives? A. For these objectives you can make all of the front surfaces plane, working to the diagram as nearly as possible. The figures given will not be absolutely correct for all kinds of glass. Select good heavy flint and good crown glass; make your set of lenses as per diagram, and place



them in a temporary and adjustable setting, so that for the quarter inch you will have the hemispherical front, and the second pair about one-sixteenth inch apart, the second and third pair about one-eighth inch apart. If the right kind of glass is chosen, the lenses well polished and centered, you will only have to make a movement of one or two of the lenses backward or forward for the final adjustment. But if the chromatic aberration is not correct, or the spherical aberration is over or under correct, trouble begins. The correction for color may be made by altering the inner curves of the back pair, and the correction for spherical aberration may be made by altering the inner curves of the middle pair. Of course the beginner can hardly expect to accomplish all this at once. It has taken a long time for professional opticians and mathematicians to bring objectives to their present perfection, and there is still room for and expectation of improvement.

(10) B. & W. write: On several of the locomotives of our western railroads, the whistle is so arranged that when the valve is opened the tone rises clear and bell-like to a high note, and then is made to descend the scale, and die away gradually on a lower tone than that made at first, and producing a very weird and striking effect. Can you tell us how it is produced? A. These whistles are made with a sliding piston inside the bell operated by a lever let in through the steam chamber with a piston rod connecting the two parts together. The bell is much longer than the ordinary whistles to make the range of tone to suit, and may be adjusted to range a musical third, fifth, or octave. 2. Also, can you tell us the requisites for a good clear whistle of medium high pitch, one that will not be wheezy? A. If you have dry steam, the whistles made for the trade in the Eastern States are generally clear, or may be made so by adjusting the bell nearer or further from the aperture, which can be done by loosening the nut and turning the bell up or down on the threaded spindle. The requisite instructions for making a whistle could not be given without drawings.

Find a good toned whistle in use and study its construction.

(11) E. G. W. asks: What is the theory of elliptical wobble saws, and for what purpose are they used? A. These are circular saws set at an angle upon the spindle for the purpose of cutting grooves. For instance an ordinary saw set upon a spindle, so as to wobble an eighth of an inch each way from the natural plane of motion, will cut a groove a quarter of an inch wide. If the saw is trued up in this position, and all the teeth brought up sharp, it will cut a square angled groove. Upon measuring the two axial diameters of the saw, it will be found slightly elliptical. Hence its name.

(12) G. F. S. and S. B. ask: Can you give us any data with regard to the heating or steam producing qualities of petroleum oils and other liquid fuels? A. The following table by Professor Rankine will probably afford the information desired:

For one pound of	Heat units.	Quantity of heat available for producing steam.	Quantity of water heated from 60° Fah. to 212° Fah. and converted into steam at 212° Fah.	Temperature of the flume.
Crude petroleum	20,000	15,847*	15	4,616*
Crude paraffine oil	20,000	16,847*	15	4,616*
Heavy oil from shale or coal.	20,000	16,847*	15	4,616*
Dead oil or creosote	16,680	14,697*	13	4,405*
Coal	14,893	10,001†	8.95	2,500*
		10,817	9.67‡	2,500*

(13) P. E. writes: I got a mercury barometer some eight months ago. The mercury has since remained stationary at the same height. By sufficiently inclining the instrument the mercury in the tube rises to the very top, the air has free access to the mercury in the cistern. The tube has not over a quarter of an inch internal diameter. Perhaps adhesion of the mercury to the glass is the cause of this. What can be done to render the barometer efficient? A. The mercury will sometimes slightly adhere to barometer tubes of small diameter by capillary attraction; this should not interfere materially with its movement, provided that on tipping the tube the mercury strikes the top with a sharp click, assuring you that there is no air in the tube. In some seasons the range of the barometer is very slow, and will not be easily noticed unless an index is attached and adjusted at each observation. We would recommend you to give it a thorough trial by the index.

(14) E. G. S. writes: In making a dynamo-electric machine, such as is described in SUPPLEMENT, No. 161, will it answer to make the electro magnet of hard cast iron while the bell magnet is made of soft cast iron? Will it not answer to cast the journal of the bell magnet and the bell magnet in one piece, but have the journal run in brass? A. Soft iron should be used as in dynamo for both magnet and armature. 2. What is condensed petroleum or petroleum mass? Can it be made by carefully boiling kerosene? A. You probably refer to petroleum "foot," the tarry residue from the distilling crude petroleum. It cannot be obtained in the way you propose.

(15) W. G. S. wants to know how to braze a bend saw so as to make a good joint without burning the saw. A. The best material for brazing these saws is the silver solder used by jewelers. Small coin will answer if you cannot get the other. Rolled sheet brass is better than copper. If the saw is not too large, use a blow pipe and oil or alcohol lamp, with wick about three-quarters of an inch diameter, the same that jewelers use, or a Bunsen gas burner. Bind the scarf ends together with small wire, and pin the saw upon a piece of charcoal or pumice stone, rubbed down flat on one side, and a depression under the place to be brazed, to let the flame pass under freely; apply borax ground to a cream in water, place the solder at the edge of the scarf, throw the blue point of the flame strongly upon the underside so that the solder may draw through when it melts. This will make a clean joint and heat no more than is necessary to accomplish the work.

(16) F. A. W. asks: What can I use to make linen, damask, etc., semi-transparent—something that will not stain and can be readily washed from the cloth? A. Try castor oil or water-glass.

(17) K. B. writes: Can you inform us of any better way of preparing leather to make cups for air pumps (3 inches diameter) than be following: We soak the leather in water until it becomes soft, then press it into moulds, and afterwards soak in neatfoot oil for several days; but it will get hard, and shrink away from