

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.

A Civil Engineer, for many years resident in South America, a good linguist, desires employment in his profession, or as representative of engineering firms abroad. Address A. B., P. O. Box 773, New York.

Beaumont's Draught Apparatus. See page 291. State and county rights for sale.

Carbon Plates and Pencils. 48 R. R. Ave., Jersey City, N. J. Leather Belting, Rubber Belting, Packing and Hose Manufacturers' Supplies. Greene, Tweed & Co., N. Y.

New Book.—A Treatise on Iron Founding. By Claude Wylie. Written for practical men. Illustrated. \$1.40. Send for our catalogue of scientific books. E. & F. N. Spon, 446 Broome St., N. Y.

Garfield and Family.—Elegant engraving, 19 x 24, sent for 24 cents (stamps). Sheehy & Co., 33 Barclay St., N. Y.

Don't fail to see the New Automatic Engine built by the Lamberville Iron Works, now in operation at the American Institute, New York.

Address Penfield Block Co., Lockport, N. Y., for Pulley Blocks, Sheaves, Store and Baggage Trucks, Hand Hoists, Car Pushers.

Ore Breaker, Crusher, and Pulverizer. Smaller sizes run by horse power. See p. 285. Totten & Co., Pittsburg.

Farmers desirous of utilizing the immense crop of apples this country will undoubtedly be blessed with during the present year, and thus realize a large amount of money, should at once send to Messrs. Boomer & Boschert, 15 Park Row, New York, for their illustrated circulars, with prices, which are reasonable.

Blake's Belt Studs. The best fastening for leather and rubber belts. Greene, Tweed & Co., 18 Chambers St., N. Y. Mechanics' Watch, \$10. Circul's free. Birch, 38 Dey St., N. Y.

Second-hand Upright Engine, in excellent order, for sale. 6 to 8 H. P. Trump Bros. Mach. Co., Wilmington, Del.

A pair of 15 x 24 Engines, good as new, for sale cheap, as they must be removed. J. C. Todd, 10 Barclay St., N. Y. Foot Lathes, Fret Saws, 6c. 90 pp. E. Brown, Lowell, Mass.

"How to Keep Boilers Clean," and other valuable information for steam users and engineers. Book of sixty-four pages. published by Jas. F. Hotchkiss, 84 John St., New York, mailed free to any address.

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. Combination Roll and Rubber Co., 27 Barclay St., N. Y. Wringer Rolls and Moulded Goods Specialties. Cope & Maxwell Mfg. Co.'s Pump adv., page 254.

Punching Presses & Shears for Metal-workers, Power Drill Presses, \$25 upward. Power & Foot Lathes. Low Prices. Peerless Punch & Shear Co., 115 S. Liberty St., N. Y.

Machine Diamonds, J. Dickinson, 64 Nassau St., N. Y. Pure Oak Leather Belting. C. W. Army & Son, Manufacturers Philadelphia. Correspondence solicited.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Wood-Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O. Experts in Patent Causes and Mechanical Counsel. Park Benjamin & Bro. 234 Broadway, New York.

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

Peck's Patent Drop Press. See adv., page 269.

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 10 Cortlandt St., N. Y. Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole mfrs., H. Lloyd, Son & Co., Pittsburg, Pa.

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

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

Presses, Dies, Tools for working Sheet Metals, etc. Fruit and other Can Tools. E. W. Bliss, Brooklyn, N. Y.

Electric Lights.—Thomson Houston System of the Arc type. Estimates given and contracts made. 631 Arch, Phil. Saw Mill Machinery. Stearns Mfg. Co. See p. 269.

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 268.

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

Improved Skinner Portable Engines. Erie, Pa.

The American Electric Co. and Proprietors and Manufacturers of the Thomson Houston System of Electric Lighting of the Arc Style. New Britain, Conn.

See Bentel, Margedant & Co.'s adv., page 285.

For the best Diamond Drill Machines, address M. C. Bullock, 80 to 88 Market St., Chicago, Ill.

Clark & Heald Machine Co. See adv., p. 286.

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.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 286.

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

Gear Wheels for Models (list free); Experimental Work, etc. D. Gilbert & Son, 212 Chester St., Phila., Pa. Gould & Eberhardt's Machinists' Tools. See adv., p. 286.

The Medart Pat. Wrought Rim Pulley. See adv., p. 285.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 286.

For Heavy Punches, etc., see illustrated advertisement of Hiles & Jones, on page 285.

Engines, 10 to 50 H. P., \$250 to \$500. See adv., p. 286.

Barrel, Key, Hogthead, Stave Mach'y. See adv. p. 285.

Drop Hammers, Power Shears, Punching Presses, Die Sinks. The Pratt & Whitney Co., Hartford, Conn.

Pays well on small investment.—Stereopticons, Magic Lanterns, and Views illustrating every subject for public exhibitions. Lanterns for colleges, Sunday schools, and home amusement. 118 page illustrated catalogue free. McAllister, Manufacturing Optician, 49 Nassau St., N. Y. Safety Boilers. See Harrison Boiler Works adv., p. 285.

Telegraph, Telephone, Elec. Light Supplies. See p. 285.

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

Supplee Steam Engine. See adv. p. 270.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 286.

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.

4 to 40 H. P. Steam Engines. See adv. p. 254.

The Porter-Allen High Speed Steam Engine. Southwork Foundry & Mach. Co., 430 Washington Av., Phil. 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) A. W. P. asks: Will you please give your readers some facts in regard to kerosene lamps and oil? Is it essential that a kerosene burner have any airvent? I have one that has no perceptible vent, yet it burns beautifully. I have another that has a hole big enough to run a No. 8 wire through it to the oil; that lamp sings and flickers, and when I blow it out it will fluctuate several times before it will go out. Now, is not that lamp dangerous? I would stop the vent if you think it advisable. Why does a lamp sing and why it flickers in a close room where there is no draught of air to disturb it? If the socket that fits on to the lamp gets so hot that it burns your fingers, is it not dangerous? If the oil will not flash up when a match is thrown into it, but burn for several seconds before the oil takes fire, is that oil a safe oil to burn, or had the oil ought to be as hard to ignite in the same manner as lamp oil? Can you inform us whether there is any sign of danger from a lamp preparatory to its exploding? A. All kerosene burning lamps should be provided with some kind of air vent, but it is not desirable to have too large a vent. In some the aperture formed by the wick wheel is all sufficient; in others a small flat vent tube is soldered to the side of the wick tube. If the vent is too large a slight disturbance of the oil causes flickering. The "singing" and flickering may be due to an imperfect air supply, poorly fitting wick or chimney. As ordinarily constructed the brass burner and collar of lamps often get heated to 100° Fah., or over, especially if allowed to burn low for several hours. If good oil is used there is little danger attending this. With regard to what constitutes good burning oil and what are the conditions of safety in using it, see Non-Explosive Kerosene, page 112, current volume.

(2) C. A. B. speaks of his saw mill. I would say that a large amount of his power is lost in driving so much useless gearing. A thirty-five inch Leffel wheel making some 100 to 140 revolutions, if the water is clean and free from anchor ice in winter, may be fitted with a bevel mortise (wooden cogged) wheel on its shaft of four feet or more in diameter (better larger so as not to get the pinion too small), working into an iron pinion of one-fourth or fifth on the saw mandrel, and do good work, if only driving the saw, and its appurtenances. He may drive his 48-inch saw 700 revolutions or more to do the best work. I know of a saw thus rigged doing fair work with only ten feet head. Of course more head would be better.

(3) W. A. writes: I am in business here and am under considerable difficulty regarding the best mode of heating tires for cart and other wheels. Would you please, through your valuable columns, explain the best sort of furnace for the purpose? A. Heating tires for shrinking on wheels, as generally practiced here, is by laying the tire on a large cast iron plate with a hole cut out of the center, say 2½ feet diameter; a wood fire is then built all over, and covering it and kept burning until properly heated.

(4) L. H. C. says: I want to make T's out of India-rubber tubing. What kind of cement can I make the joints with? How must the cement be mixed? A. The cement commonly used by rubber manufacturers for piecing rubber goods is prepared by dissolving purified gum rubber in benzine. The benzine may be put into a large, narrow necked bottle, and this suspended in a vessel of warm water (away from fire). The rubber is added gradually with occasional agitation until a liquid of the consistence of thick molasses is obtained. The parts to be joined are thinly but uniformly smeared over with this, and exposed to the air for a few minutes before bringing the pieces together. The joint should be placed under pressure in a warm place for forty-eight hours or more before using. Gutta percha cements, also marine glue, can often be advantageously employed in place of the rubber cement. See Cements,

page 2510, SUPPLEMENT, No. 158. Where the joint has to sustain rough handling or strain, it is usually preferred to insert in the joint a thin T-joint of hard rubber or metal.

(5) F. A. W. asks for the simplest method (or the usual method) of filling a large number of small (one-eighth ounce) bottles. When the bottle is opaque, I should suppose something to permit only enough to fill the bottle flow out would be necessary. A. One of the simplest arrangements for filling vials with liquid is the following: A is a piece of glass tubing graduated as to contents by file marks. The lower end, drawn out somewhat, is connected by a short piece of rubber tubing with the T-shaped glass tube, B, the other limbs of which are closed by rubber tubing and spring pinch cocks, *a a'*. D is a small glass delivery tube, connected by the rubber tubing with B. The end of the rubber tube, C, is connected with the reservoir of liquid, so that when *a'* is opened and *a* closed, the liquid will flow into the graduate, A, and when *a'* is closed and *a* opened, a measured quantity flows out through D into the vial.

(6) G. A. H. asks: 1. Is the current from a dynamo electrical machine as at present made capable of decomposing water with the same facility as the galvanic current? A. Yes. 2. How many cubic feet of each gas could be produced by a small machine, say, one-half horse power, per hour? A. It would depend altogether on the construction of the machine. 3. Providing the latter could be run by water power, storing up the gases during the day, could not the calcium light be produced for evening use almost without expense? A. This is impracticable.

(7) F. R. F. asks: What gum is used in the preparation of the so-called "ready mixed or patent" paints? A. You should send a labeled sample of the paint referred to.

(8) W. A. T. asks: Will you please explain why the symbol for nitric acid is "A₂O₃HO," instead of "N₂O₃HO," in the article on the "Manufacture of Oxygen from the Air," in your issue of October 1, 1881, on page 4784? A. It should read "N₂O₅H₂O," or "(HNO₃)₂" and not "A₂O₃HO."

(9) C. E. S. asks: 1. Will sulphate of copper cell, four quart size, answer for electroplating small articles? A. If the objects to be plated are small, such a battery will answer. 2. Can plain work done with such battery be burnished with an ordinary burnisher? A. Not very well. Gold and silver can be deposited so as not to require burnishing. Electroplated work is usually finished by buffing. 3. How expensive are the batteries such as you described in a recent number of SCIENTIFIC AMERICAN as capable of maintaining one arc light with flannel envelope, etc.? A. Such a battery can be constructed for \$20. 4. Can it be used for electroplating? A. Yes, if properly adjusted to suit the requirements of the work.

(10) O. P. L. asks: 1. Can water be heated higher than 212° Fah., under any circumstances? A. Yes; we do not know that there is any limit to the temperature to which it can be raised under pressure. 2. If a belt be connected from a fly wheel of an engine to another wheel of same diameter on a shaft the same diameter as the engine shaft, which shaft will bear the most resistance? A. The shaft of the prime mover.

(11) E. S. asks: 1. How can I make a mucilage for gumming the backs of labels to prevent them from cracking when dry? A. Try the following: Gum dextrine, two ounces; water, five ounces. Heat the water to boiling, and gradually sift in the powdered gum and stir until all is dissolved. If the solution is not thick enough on cooling, add more gum—and vice versa. It should not be too liquid. Dampen the paper well before gumming. Put under strong pressure when dry. See article on Postage Stamps, page 212, current volume. 2. How can I silver articles that have already been silvered, but from which the silver has worn off? A. For information on silverplating see silver deposit, p. 81, vol. 44. 3. The proportions of tartaric acid and bicarbonate of soda for making soda water? A. Common lemon soda, without a machine, is prepared as follows: Put into each bottle 2 drachms of sugar, 2 drops of essence of lemon, half a drachm bicarbonate of potash, and water to fill the bottle; then drop in 35 or 40 grains of tartaric or citric acid, and cork immediately, placing the bottles in a cool place, or on ice.

(12) W. G. L. asks: 1. What are the ingredients, and how is the cylinder oil known as "valvoline" made? A. We are unable to give you the composition of the lubricant. 2. Is it a patented article? A. We believe not. 3. Are the substances known to oil dealers as French de gras and French grease the same thing, and where and from what are they made? A. Yes.

(13) D. F. asks: Will you please tell me how so-called cameo painting on glass is done—I mean the kind that is done between two pieces of convex glass, and the picture appears larger than the one it was taken from? A. The transparent colors used are Prussian blue, gamboge, carmine, verdigris, madder brown, indigo, and crimson lake. The semi-transparent include raw sienna, burnt sienna, cappa brown, and Vandyke brown. The vehicles used are oil, megilp or gum water, or warm gelatine solution. With the latter some of the coal tar dyes are available, but though producing rich effects, most of them are apt to fade on exposure to light. The colors are applied with a camel's hair pencil. The magnifying effect is due to the lens-shaped glass covers.

(14) F. J. M. says. Referring to your reply to R. E. M., describing method of taking cast of human face, how are the eyebrows, lashes, and the long hair of a female subject prepared so as to keep them from bedding into the soft plaster? I hardly think that oil would be sufficient. A. Smooth the hair as evenly as possible, moisten the surface with gum tragacanth water, and when this has dried, oil. Wax and soap may also be used.

(15) H. C. asks: Will you please state how much I can practically compress a gas without changing its nature? To explain: suppose I have a vessel of one cubic foot capacity, how many cubic feet of gas can I force into said vessel? A. Pressure does not alter the nature of gases. A gas may be compressed up to its point of liquefaction. A pressure of a few atmospheres is sufficient to liquefy some of the gases, while others remain in the gaseous state (at ordinary temperatures) under pressures equal to twenty tons per square inch.

(16) E. L. W. asks: Can you inform me how water glass is made and how the sirupy solution of water glass is prepared? A. You will find the information required in article on Water Glass, page 16, No. 2, current volume.

(17) E. H. L. says: I have just painted an iron fence with a paint composed of boiled linseed oil, asphaltum and naphtha. The work showed at first a very brilliant black coat. The first rain colored it dirty brown, destroying the gloss. Can you suggest any addition—inexpensive preferred—to retain in a measure the gloss on exposure to the weather? I have always understood asphalt to be much better than coal tar. The work was perfectly dry before it was touched by the rain. A. We know of no cheap substance the addition of which would make the gloss permanent. Lampblack will make the paint blacker. Such paints or varnishes are greatly improved by boiling the oil and bitumen together for twelve hours or more before thinning down for use. A good iron work black is prepared as follows: Put forty-eight pounds asphaltum into a capacious iron pot, and heat to boiling for four hours; during the first two hours introduce seven pounds of red lead, seven pounds of litharge, three pounds of dried copperas, and ten gallons of boiled linseed oil; add one eighth pound run of dark gum, with two gallons of boiled oil. After pouring the gum and oil continue the boiling for two hours, or until a sample of varnish will roll up into hard pills when chilled. When cooled somewhat take it out of doors and thin down with about thirty gallons of oil of turpentine. 2. What substitute cheaper can I get for outside ink in place of boiled linseed oil? Some drying oil, I suppose, is needed. A. Linseed is the best and cheapest oil for this purpose.

(18) J. H. asks: Will you please inform me of the best method of preparing cloth so that by placing it between two sheets of writing paper and writing on the top sheet with a pencil or other sharp instrument it will make a copy on the under sheet? A. Manifold paper is prepared as follows: Mix with cold lard a sufficient quantity of lampblack or fine ivory black to produce a thick smooth paste, smear this over the cloth (or paper-unglazed), rub it in with a cloth pad, and then rub off any excess with a piece of flannel. For blue use Prussian blue instead of the black pigments, for green chrome green, for red cochineal or vermilion.

(19) D. C. asks: Can you give us a good recipe for enameling or porcelain lining for iron hollow ware such as wash bowls, sinks, etc.? A. Flint (quartz), calcined and ground, one hundred pounds; borax glass (anhydrous borax) ground, fifty pounds. Mix, fuse together in a crucible, and let it cool slowly. Powder and mix forty pounds of this glass with five pounds of kaolin (white potter's clay), and grind the mixture to a fine paste in water; pickle the vessel in dilute sulphuric acid, and scour with sand to thoroughly cleanse its surface; then line it with a coating of the above paste about one-sixth of an inch thick, and let it stand in a warm room until the coating has partially dried. Next dust over the surface of the paste coating (still moist) the following powder, and dry in an oven at 212° Fah.: White glass, free from lead or arsenic, one hundred and twenty-five pounds; borax, twenty-five pounds; carbonate of soda, fused, powdered, moistened with water and dried, twenty pounds. To forty-five pounds of this add one pound soda. Mix thoroughly with a little hot water, dry, and reduce to fine powder. When the coating on the iron has dried, the vessel is put in a muffle and the heat gradually increased until the glaze fuses, when it is taken out, more glaze powder is dusted on, and after a second heating allowed to cool very slowly. Some of the glazes employed consist of arable mixtures of felspar, sodium carbonate, borax, and oxide of tin. Felspar is also sometimes added to the enamel body.

(20) W. F. S. asks: What can I use on polished brass to prevent tarnishing, etc.? Is there any thing better than alcohol and shellac? A. See Lacquers for Brass, page 209, vol. xlv.

(21) A. B. says: I have a lot of nearly dry alcoholic fruit and root extracts. Could these be used advantageously for fertilizing purposes in an orange grove? If not could anything be added to them that would make them available for the purpose? A. Such extracts contain nothing that would make them valuable as fertilizers, and we know nothing that can be added to them that will make them specially useful for this purpose.

(22) E. D. S. asks: Would three gravity batteries placed in a cellar where there is milk make it sour? A. No.

(23) H. L. writes: I am running an engine of 20 inch bore and 36 inch stroke about 55 to 60 revolutions per minute with 65 to 70 pounds steam pressure. Said engine has a valve at each end, and the ports are 10 inches wide and open one full inch. The steam pipe is 5 inches in diameter. Are the ports in proportion to the size of engine as also to the steam pipe? A. We think both your ports and steam pipe should be at least one half larger, and would be better if double the present size.