

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.

Mfrs "Excelsior" Machy, address E.D. Payne, Dayton, O.

Four applications of German Corn Remover cure the worst corns without pain or annoyance. 25 cts. Druggists.

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

It must be good, as bank presidents indorse it. What? Van Bell's "Rye and Rock."

Makers of best Factory Elevators (power) and Automatic Guards, send description and cost to Carr, Ryder & Wheeler, Dubuque, Iowa.

Spring freshets and rain will fill our boiler with sediment and scale, causing foaming and burning. These can be prevented by Hotchkiss' Mechanical Boiler Cleaner. Send for circular. 84 John St., New York.

To realize a portion of the profits of the enormous crop of apples annually produced in the U. S., it is only necessary to purchase one of Boomer & Boschert's Cider Presses. The price is reasonable. Send for illustrated circular to New York Office, 15 Park Row.

Mr. T. P. Pemberton, who is well known to us and many of our readers and advertisers, will sail for England in the early part of July next. As he will visit Liverpool, Manchester, Leeds, and London, any party who may wish to transact business, or obtain information in reference to anything in the manufacturing or mechanical line, will do well to communicate with him. Mr. Pemberton is a native of England, and has had good experience as an educated engineer, draughtsman, and writer for mechanical journals. His address is 5 Dey St., room 13, New York.

A beautiful fit may be secured in boots or shoes without discomfort by using German Corn Remover. 25 cts.

Walrus Leather, Walrus Wheels, Pure Turkey Emery, Star Glue for Polishers. Greene, Tweed & Co., N. Y.

For Sign Lettering Device, address J. J. Callow, 56 Beech St., Cleveland, O.

Wanted.—Plater's Outfit, 2d-hand, including lathes, tanks, etc. Address "Baldwin," P. O. Box 2162, N. Y.

Robinson Machine Works, Poughkeepsie, N. Y., build and place in market patented articles.

Combination Roll and Rubber Co., 27 Barclay St., N. Y. Wringer Rolls and Moulded Goods Specialties.

Houghton's Boiler Compound contains nothing that can injure the iron, but it will remove scale and prevent its formation. Houghton & Co., 15 Hudson St., N. Y.

Tarred Roofing and Sheathing Felts. A. Wiskeman, Paterson, N. J.

Portable Railway Track and Cars. Contractors, Planters, Miners, send for circulars. Francis W. Corey & Co., 7 Dey St., New York; 59 & 61 Lake St., Chicago, Ill.

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.

Improved Skinner Portable Engines. Erie, Pa.

"Rival" Steam Pumps for Hot or Cold Water; \$32 and upward. The John H. McGowan Co., Cincinnati, O.

The Eureka Mower cuts a six foot swath easier than a side cut mower cuts four feet, and leaves the cut grass standing light and loose, curing in half the time. Send for circular. Eureka Mower Company, Towanda, Pa.

The Newell Universal Mill Co., Office 34 Cortlandt St., New York, are manufacturers of the Newell Universal Grinder for crushing ores and grinding phosphates, bone, plaster, dyewoods, and all gummy and sticky substances. Circulars and prices forwarded upon request.

Pure Oak Leather Belting. C. W. Arny & Son, Manufacturers, Philadelphia. Correspondence solicited.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

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

Experts in Patent Causes and Mechanical Counsel. Park Benjamin & Bro., 50 Astor House, New York.

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

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

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.

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

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

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna line, crucibles, 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.

Blake "Lion and Eagle" Imp'd Crusher. See p. 350.

Gardiner's Pat. Belt Clamp. See illus. adv., p. 349.

For best Duplex Injector, see Jenks' adv., p. 849.

C. B. Rogers & Co., Norwich, Conn. Wood Working Machinery of every kind. See adv., page 349.

Eclipse Fan Blower and Exhauster. See adv., p. 348.

4 to 40 H. P. Steam Engines. See adv., p. 349.

Peck's Patent Drop Press. See adv., page 366.

Long & Allstatter Co.'s Power Punch. See adv., p. 365.

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 364.

Saw Mill Machinery. Stearns Mfg. Co. See p. 364.

Saunders' Pipe Cutting Threading Mach. See p. 366.

For Sequeira Water Meter, see adv. on page 364.

For Machinists' Tools, see Whitcomb's adv., p. 364.

The American Electric Co., Proprts Mfrs of Thompson-Houston System of Electric Lighting the Arc Type.

See Bentel, Margedant & Co.'s adv., page 381.

Clark Rubber Wheels adv. See page 380.

The Twin Rotary Pump. See adv., p. 350.

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

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

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.

Telegraph, Telephone, Elec. Light Supplies. See p. 380.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's adv. p. 381.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 381.

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

For the manufacture of metallic shells, cups, ferrules, blanks, and any and all kinds of small press and stamped work in copper, brass, zinc, iron, or tin, address C. J. Godfrey & Son, Union City, Conn. The manufacture of small wares, notions, and novelties in the above line, a specialty. See advertisement on page 381.

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. 381.

Safety Boilers. See Harrison Boiler Works adv., p. 381.

The Medart Pat. Wrought Rim Pulley. See adv., p. 381.

For Heavy Punches, etc., see illustrated advertisement of Hilles & Jones, on page 381.

Steam Engines; Eclipse Safety Sectional Boiler. Lambertville Iron Works, Lambertville, N. J. See adv. p. 381.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 381.

Lathes, Planers, Drills, with modern improvements. 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 & Hefernance, Williamsport, Pa.

Rollstone Mac. Co.'s Wood Working Mach'y adv. p. 380.

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.

Ore Breaker, Crusher, and Pulverizer. Smaller sizes run by horse power. See p. 381. Totten & Co., Pittsburg.

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) L. H. asks for a good method of waterproofing cloth. A. Saturate the fabric with a strong hot aqueous solution of soap, press out excess, and transfer to a second bath consisting of a strong aqueous solution of sulphate or acetate of alumina or acetate of lead, for several hours. Repeat if necessary, press out excess of liquid, and dry, not too rapidly, in the air.

(2) J. M. asks for a reliable receipt for violin varnish. A. Coarsely powdered copal and glass, each 4 oz.; alcohol, 64 o. p. 1 pint; camphor, ½ oz.; heat the mixture, with frequent stirring in the water bath so that the bubbles may be counted as they rise, until solution is complete, and when cold decant the clear portion. When oil varnish is used it is made as for artists' virgin copal.

(3) E. R. J. asks how to make a large number of copies of manuscript in black ink. A. Try the following: Use the gelatine pad made with a large proportion of glue. Soak writing paper in alum water to saturation and dry carefully. Write with any ink on the prepared paper, and use as in the gelatine pad process; the parts of the gelatine surface not protected by the ink will be affected by the alum so as to leave a stencil which can be used by inking with a roller as in the electric pen process.

(4) A. R. T. asks how to proceed to bleach gutta percha. A. Dissolve the gutta percha in twenty times its weight of boiling benzole, add to the solution plaster of very good quality, and agitate the mixture from time to time. By reposing for two days the plaster is deposited and carries down with it all the impurities of the gutta percha insoluble in benzole. The clear liquid decanted is introduced by small portions at a time into twice its volume of alcohol of 90 per cent, agitating continually. During this operation the gutta percha is precipitated in the state of a pasty mass, perfectly white. The desiccation of the gutta percha thus purified requires several weeks' exposure to the air, but may be accelerated by trituration in a mortar, which liberate moistures which it tends to retain.

(5) S. G. inquires how to remove grease spots from clothing. A. According to the *Pharmacists*, fatty oils have a greater surface tension than oil of turpentine, benzole, or ether. Hence, if a grease spot on a piece of cloth be moistened on the reverse side with one of these solvents, the tension on the greasy side is larger, and therefore the mixture of benzole and fat or grease will tend to move towards the main grease spot. If we were to moisten the center of this spot with ben-

zole, we should not remove it, but drive the grease upon the clean portion of the cloth. It is, therefore, necessary to distribute the benzole first over a circle surrounding the grease spot, to approach the latter gradually, at the same time having blotting paper in contact with the spot to absorb the fat immediately. Another method, namely, to apply a hot iron on one side while blotting paper is applied to the other, depends upon the fact that the surface tension of a substance diminishes with a rise of temperature. If, therefore, the temperature at different portions or sides of the cloth is different, the fat acquires a tendency to move from the hotter parts toward the cooler.

(6) E. N. B. writes: My main shaft runs 85 revolutions per minute. I want to belt on to a counter shaft and from there to a pulley 12 inches in diameter, which must run 500 revolutions per minute. I want to know the diameter of the pulley on the main shaft, also of those on the countershaft. What is the simplest rule you know of for figuring this? A. Your 12 inch pulley is to make 800 revolutions per minute. You can assume such diameter of the driving pulley on the countershaft as best suited for the work, say 60 inches; this will give the speed of the counter shaft one-fifth, or 160 revolutions per minute. You have now the speed of the countershaft 160 revolutions per minute and the driving shaft 85 revolutions per minute; the two pulleys must have the same proportion. If we assume the countershaft pulley 30 inches diameter, we then have 85:160::30:diameter of driving pulley—or $160 \times 30 \div 85 = 56.5$ inches. So the driving pulley will be 56.5 inches on to 30 inches and 60 inches on countershaft, driving 12 inches.

(7) J. M. writes: 1. I have four cells, one gallon each, of Fuller's battery, as described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 157, Fig. 33, and I want to magnetize some compass needles. Please tell me the size of magnet required to correspond with the battery. A. Use soft iron cores, five-eighths of an inch in diameter 3 inches long, and wind with six to eight layers of No. 18 wire. 2. How is the magnetizing of compass needles done? A. By placing them against the poles of the electromagnet or by rubbing them on a permanent magnet. 3. Is my battery large enough for such work? A. Yes. 4. Is there any difference in lifting power of two magnets, both of the same size of core, same size of wire, and both having the same number of layers, one magnet being made like the letter U, the other being made in three pieces with a yoke? A. No, providing the yoke in the latter case is well fitted to the cores. 5. Which is the best, to dissolve the bichromate of potash in warm water before putting it in the cell, or to put in the crystals? A. It is best to make a good solution and pour it into the cell. 6. Is there any objection to mixing a solution of bichromate of potash with sulphuric acid, if mixed when the solution is warm? A. The acid should not be added until the solution cools. 7. Is it unhealthy to sleep in a room where Fuller's batteries are used? A. There is no special danger if the room is well ventilated; it is better, however, to not have them in the bedroom. 8. How long will carbons last in the Fuller battery? A. If they are properly prepared they should last indefinitely. 9. Will my battery work on board of a vessel at sea as well as on shore? A. Yes, providing you can keep the solutions from spilling or mixing. 10. In winding a magnet does it make any difference if I wind the core with a separate piece of wire and connect the inner ends after winding, or wind the two cores with one piece of wire? A. It makes no difference. 11. Do compass needles lose their power in course of time? A. Not generally; they may, however, under certain conditions.

(8) A. B. P. asks: What book will I want for instructions and what materials will I want to make assays for gold and silver, as I am going to New Mexico, and expect to mine, prospect, and assay? A. See article on assaying in No. 22, current volume. Consult Rickett's "Assaying and Assay Schemes."

(9) W. McK. B. asks: 1. Which is better for cemetery purposes, American or Italian marble? A. Some of the hard (slaty) Pennsylvania stones last much longer than Italian marble. 2. Is there machinery made for washing sand to make glass? What is the cheapest and best method of screening sand for above purposes? A. Yes. See "Glass" and "Screens," Knight's "Mechanical Dictionary."

(10) W. E. J. asks: 1. How is vulcanized rubber acted on by sulphuric, nitric, and muriatic acids? Does it lose its properties? A. The dilute acids scarcely affect hard rubber or vulcanite; the undiluted acids, especially nitric and sulphuric, attack and decompose it. 2. Is there any metal or other substance suitable for making pens that is not destroyed by these acids? A. Gold pens are not affected by these acids (pure) when used singly.

(11) C. E. R. writes: 1. I have one pound of No. 36 naked copper wire, and wish to construct a large an induction coil as the wire will permit. What size of spool shall I use, and what size of primary wire? Can I construct the coil on the plan of the one described in SUPPLEMENT, No. 160? A. Yes. Follow directions given in SUPPLEMENT, No. 160. 2. How large a condenser shall I use? Also how many quart cells Grenet? A. About 25 square feet of condenser surface and three to four cells of battery. 3. Will a two-quart cell, Grenet, containing three zinc and four carbon plates 4x6 inches, heat ½ inch of platinum wire, 36 size, hot enough to explode gunpowder? A. Yes.

(12) W. C. asks: What is used to hold together the edges of paper composing writing pads? A. It is a mixture of glue and thick starch paste with a trace of glycerine, and aniline red to color.

(13) S. H. B. asks as to the dynamo-electric machine of No. 161, SCIENTIFIC AMERICAN SUPPLEMENT. 1. Should the change from one spring to the other on the commutator occur when the armature stands with its poles within the hollows of the field magnet, or when it is at right angles to a line joining the poles of the field magnet, or in neither? A. If the machine runs slowly it should happen when the poles are at right angles to a line drawn across the poles of the field magnet; if it runs rapidly it should happen a little earlier.

2. I have made one which I think ought to work, but does not give such results as I expected. I used, as in original direction, seven layers of No. 16 on field magnet and No. 18 in armature. I intend soon to measure the resistance of each and also its current. Should the wire of the field magnet be wound in separate layers so as to join up in series or not as required? A. Yes. 3. I made the armature of cast iron, but propose to make one of soft wrought iron. A. You will probably get better results with wrought iron.

(14) A. W. S. asks: Can you tell me of any simple method by which I may determine whether water is hard or soft? A. Dissolve half an ounce of good white soap in a pint of hot rain water, let it cool and settle, and mix about an ounce of this with a pint of the water to be tested and let it stand a few minutes. If the water is soft it will remain clear, if hard it will become opalescent. 2. Is there any way to render rain water wholesome for cooking purposes without the use of a water filter? A. Put a few bushels of coarsely granular, well burned charcoal, free from dust, into the reservoir. 3. Where can I obtain a water filter? A. See column of Business and Personal.

(15) O. S. asks: 1. Will not a cylinder made of heavy sheet brass, three-sixteenths of an inch thick, brazed together with the two end pieces, brazed in and turned up true and the thread cut on it, do as well if left hollow as a solid iron cylinder? A. The hollow cylinder will answer quite as well, providing you apply a fly wheel to the cylinder shaft to render the motion equable. To get the best effects from the phonograph the cylinder must be turned with great regularity. 2. Has any improvements been made on the phonograph since you published the above direction, July 20, 1878, and if so, what is it? A. No essential changes. You might with advantage substitute a piece of stout watch spring for the wooden spring carrying the needle, and you might put a damping spring against the front of the diaphragm with a piece of rubber or felt under it. These changes will improve the articulation somewhat.

(16) J. A. S. asks how to vulcanize rubber to iron. A. In vulcanizing rubber in contact with iron so that the vulcanized rubber and metal will cohere, it is customary to coat the iron all over with a melted mixture of equal parts of genuine asphaltum and gutta percha. Soft rubber containing six per cent of sulphur when firmly pressed into contact with this coating and then vulcanized by steam heat adheres very strongly to the metal after cooling.

(17) G. W. T. asks: Will you, for the benefit of several readers in this city, please give your opinion of gasoline in the household as used in the so-called gas stoves? A. Experience has shown that it is not safe to use gasoline in the house, for gas stoves or otherwise, under any conditions.

(18) C. A. asks: 1. Can you tell me the process of etching on glass by fluorine? A. Heat the glass and coat it with an even film of beeswax or paraffine. Through this to the surface of the glass etch the characters or design with a sharp point or graver. Put into a shallow lead tray a quantity of fluoride of calcium (fluorspar) in fine powder, mix it into a thin paste with strong oil of vitriol, and set the tray on a warm sand bath. Place the glass tightly over the tray so that the hydrofluoric acid (gas) may come into contact with the prepared surface. In ten minutes the parts of the glass not covered with wax or paraffine will be properly etched. The etched lines will be translucent—if it is desired to make the etching opaque (white), the plate should be wet before exposing it. A little benzole will remove the wax or paraffine. 2. Can the materials be procured in New York? A. Yes, see our advertising columns for dealers in chemicals.

(19) J. B. E. asks: What is the cost of graphite and where obtainable? A. From seven to fourteen cents a pound. See our advertising columns for addresses of dealers. Also Hints to Correspondents.

(20) C. F. writes: 1. On a vehicle of three wheels, weighing from 1,100 to 1,300 lb., with two cylinders 2 inches bore by 4 inches stroke, wheels to be 4 feet high, with engines connected to cranks in back axle; what size boiler is required, thickness of iron, etc.? A. The boiler should be a vertical coil tube boiler, having about 70 square feet of heating surface. 2. Is there any way to make a piece of wood more durable than seasoned lumber for chisel handles, etc.? A. Yes, by impregnating the timber with some of the chemical preparations used for preserving timber. 3. I see in the SCIENTIFIC AMERICAN a description of a canal canoe, in vol. xliii., No. 7. What we wish to know is how long, wide, and deep it should be to hold two persons of 160 lb. each? A. About 9 or 10 feet long by 3 feet wide by 16 inches or 18 inches deep to be safe. 4. Shot for guns used to be made by dropping it only four inches. Please describe how it was done. A. Lead shot are made by dropping the melted lead through a series of perforations from a height into a tank of water.

(21) F. P. asks: 1. Will adding clay to quicklime mortar improve it? If so, will I use the raw clay or must it be calcined, and how much to be used? A. The addition of any considerable quantity of raw clay to lime mortar does not improve it materially. A certain quantity of fine silicious clay, when ground with lime and strongly calcined, makes hydraulic cement. See Gillmore's "Cements and Mortars." 2. How can I make a good whitewash for outdoor wood work? A. Well burned quicklime, ½ bushel; salt, 1 quart; rice, flour, and glue, ½ lb. each; water glass (syrupy solution), 1½ pints; water, q. s. Soften the glue over night in cold water, then dissolve it in a small quantity of boiling water. Make the flour into a paste with a little hot water and add it to the glue solution. Dilute the water glass with boiling water and add the salt. Slake the lime with boiling water, then stir in the other materials with enough hot water to reduce the whole to the proper consistence for use. Stir well together, cover, and let it stand several hours before using. Use hot.

(22) C. L. W. writes: I am making a small Marie-Davy quicksilver battery, to be used in a medical machine, and I would like to know if well varnished wood would not answer in place of vulcanite in making the cells? A. Wood, well varnished with shellac or saturated with melted paraffine, will answer very well.