

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.

Wanted—Address of Novelty Works. S. Pay, Peoria, Ill. Improved Skinner Portable Engines. Erie, Pa. \$600.—Ent. Pat. Household Art. H., Sta. F., Phila. Wanted—Good Party to Manufacture Improved Store seat on Royalty. Wood or metal. S., Box 1973, Phila. "Rival" Steam Pumps for Hot or Cold Water; \$32 and upward. John H. McGowan & Co., Cincinnati, O. Care for your feet if you would keep comfortable. Use German Corn Remover. Sold by druggists. 25 cts. Skinner's Chuck. Universal, Independent, and Eccentric. See adv., p. 268. Women cry and children shriek for Van Bell's "Rye and Rock" when sick. Engines and Boilers. 16 x 48 and 13 x 30 inch Second-hand Horizontal Engines. Full stock of new Engines; also new and second-hand Locomotive and Horizontal Tubular Boilers. Send for circulars. Belcher & Bagnall, 40 Cortland St., New York. Blake's Belt Studs are the best fastening for Rubber and Leather Belts. Greene, Tweed & Co. Drop Hammers, Power Shears, Punching Presses, Die Sinks. The Pratt & Whitney Co., Hartford, Conn. Portable Railway Track and Cars for Railroad Grading, Sugar Plantations, Mines, etc. F. W. Corey & Co., 162 Broadway, N. Y.; 95, Washington St., Chicago, Ill. Perfection Belt Clamp. Cheapest and simplest clamp in the world for all kinds belting. Not patented. Engineers make it themselves. Full description, 50 cts. R. H. Black, Box 138, Bruin, Butler Co., Pa. When your boiler front is covered with mud from the try cocks, it is a sure sign that no time should be lost in applying Hotchkiss' Mechanical Boiler Cleaner. Send for circular. 84 John St., New York. Beauty in the feet may be found by using German Corn Remover. Sold by druggists. 25 cts. For the best Jig Saw Blades, go to Wm. Cuddy, 108 Hester St., New York. Money to Invest in Manufacture. Box 1084, Batavia, N. Y. Wanted, for Cash, Engines, Boilers, and Wood-working Machinery, in good order. Belcher & Bagnall, 40 Cortland St., New York. Walrus Leather. A choice lot for Polishing Metals. Greene, Tweed & Co., 118 Chambers St., New York. Safety Boilers. See Harrison Boiler Works adv., p. 252. Wanted—Patents and Specialties to sell. Special advantages offered. S. M. Thompson, Providence, R. I. Inventors sending a three cent stamp to Inventors' Institute, Cooper Union, New York city, will receive a copy of the Industrial News free. Rock Drill, with Hose and Portable Boiler. Machinery Exchange, 261 N. 3d St., Philadelphia, Pa. 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 7 Cortland St., New York, are manufacturers of the Newell Universal Grinder for crushing ores and grinding phosphates, bone, plaster, ceywoods, and all gummy and sticky substances. Circulars and prices forwarded upon request. L. Martin & Co., manufacturers of Lampblack and Pulp Mortar, black, 236 Walnut St., Philadelphia, Pa. Pure Oak Leather Belting. C. W. Army & Son, Manufacturers, Philadelphia. Correspondence solicited. Wren's Patent Grate Bar. See adv. page 237. Jenkins' Patent Valves and Packing "The Standard." Jenkins Bros., Proprietors, 11 Dey St., New York. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Wood Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O. The "1880" Lace Cutter by mail for 50 cts.; discount to the trade. Sterling Elliott, 242 Dover St., Boston, Mass. 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. Power, Foot, and Hand Presses for Metal Workers. Lowest prices. Peerless Punch & Shear Co., 52 Dey St., N. Y. National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John 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. For Light Machinists' Tools, etc., see Reed's adv., p. 221. 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. Rollstone Mac. Co.'s Wood Working Mach'y adv. p. 337. 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. For Mill Mach'y & Mill Furnishing, see illus. adv. p. 237. Clark Rubber Wheels adv. See page 236. Saw Mill Machinery. Stearns Mfg. Co. See p. 237. Presses, Dies, Tools for working Sheet Metals, etc. Fruit and other Can Tools. E. W. Bliss, Brooklyn, N. Y. Saunders' Pipe Cutting Threading Mach. See p. 237. For Machinists' Tools, see Whitcomb's adv., p. 237. For the Cheapest Process of Manufacturing Bricks, see Chambers Bros. & Co.'s adv., page 254. Cope & Maxwel M'fg Co.'s Pump adv., page 252. For Pat. Safety Elevators. Hoisting Engines. Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's adv. p. 252.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 252. For Thrashing Machines, Engines, and Horse Powers, see illus. adv. of G. Westinghouse & Co., page 253. Fire Brick, Tile, and Clay Retorts, all shapes. Borgner & O'Brien, M'frs, 23d St., above Race, Phila., Pa. Turbine Wheels; Mill Mach'y. O. J. Bollinger, York, Pa. For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Co., Buffalo, N. Y. The Brown Automatic Cut-off Engine; unexcelled for workmanship, economy, and durability. Write for information. C. H. Brown & Co., Fitchburg, Mass. Brass & Copper in sheets, wire & blanks. See ad. p. 269. The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 15,000 Crank Shafts, and 10,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free. Diamond Drills, J. Dickinson, 64 Nassau St., N. Y. The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. DuGeon, 24 Columbia St., New York. The I. B. Davis Patent Feed Pump. See adv., p. 269. Moulding Machines for Foundry Use. 33 per cent saved in labor. See adv. of Reynolds & Co., page 269. Eagle Anvils, 10 cents per pound. Fully warranted. Akron Rubber Works, Akron, O. Moulded goods and special work of every description. Geiser's Patent Grain Thrasher, Peerless, Portable, and Traction Engine. Geiser M'fg Co., Waynesboro, Pa. For Superior Steam Heat. Appar., see adv., page 269. For best Duplex Injector, see Jenks' adv., p. 269. Steam Engines; Eclipse Safety Sectional Boiler. Lambertville Iron Works, Lambertville, N. J. See ad. p. 253. Pat. Steam Hoisting Mach'y. See illus. adv., p. 268. New Economizer Portable Engine. See illus. adv. p. 268. Rue's New "Little Giant" Injector is much praised for its capacity, reliability, and long use without repairs. Rue Manufacturing Co., Philadelphia, Pa. For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N. Y. Wm. Sellers & Co. Skinner & Wood, Erie, Pa. Portable and Stationary Engines, are full of orders, and withdraw their illustrated advertisement. Send for their new circulars. Wm. Sellers & Co., Phila., have introduced a new injector, worked by a single motion of a lever. The Sweetland Chuck. See illus. adv., p. 269. Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Also manufacturers of Solomon's Parallel Vise, Taylor, Stiles & Co., Riegelsville, N. J. Peck's Patent Drop Press. See adv., page 236. Toope's Pat. Felt and Asbestos Non-conducting Removable Covering for Hot or Cold Surfaces; Toope's Pat. Grate Bar. C. Toope & Co., M'fg Agt., 353 E. 78th St., N. Y. Use Vacuum Oil Co.'s Cylinder Oil, Rochester, N. Y. Don't buy a Steam Pump until you have written Valley Machine Co., Easthampton, Mass. Use the Vacuum Oils. The best car, lubricating, engine, and cylinder oils made. Address Vacuum Oil Co., No. 3 Rochester Savings Bank, Rochester, N. Y. Houston's Sash Dovetailing Machine. See ad., p. 269.

Notes & Queries

HINTS TO CORRESPONDENTS. No attention will be paid to communications unless accompanied with the full name and address of the writer. Names and addresses of correspondents will not be given to inquirers. We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question. Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration. Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) J. A. M. asks: Is there any instrument made for determining the moisture of soils? A. We know of no special instrument for this purpose. The moisture is usually determined by weighing accurately a small average sample of the soil and then drying it at 212° Fah., until it ceases to lose weight. The difference between the first and last weights corresponds to the weight of moisture.

(2) H. K. T. asks for a formula for a paste which will cause labels to adhere to tin without first brushing the surface of the metal with hydrochloric acid. A. Try the following: Water, 1 pint; borax, 1 oz.; shellac, 5 oz.; boil until the latter is dissolved. Thin with boiling water if desired. It works most satisfactorily while hot.

(3) E. P. M. asks: Can you give the formula for preparing good common logwood chrome ink? A. Distilled water, 1,000 parts (by weight); logwood extract, 15 parts; carbonate of soda (cryst.) 4 parts, chromate of potassium, 1 part. Dissolve the logwood extract in 900 parts of the water by aid of heat, and let it stand to settle; draw off the clear liquid, heat to boiling, and add the carbonate of soda; lastly add, drop by drop, with constant stirring, the chromate (yellow chromate) previously dissolved in 100 parts of water. The color is not fully developed at once, but on standing for a few hours gradually deepens to a full bluish-black. The ink thus prepared flows well and dries quickly. The addition of a trace of clover oil will prevent mouldiness.

(4) S. R. J. asks (1) for a receipt for silver wash. A. The following bath for silvering by cold dipping gives excellent results: Dissolve in a small quantity of cold water an ounce of fused nitrate of silver, and gradually add, with constant stirring, a strong aque-

ous solution of good bisulphite of soda until the precipitate at first formed is just redissolved. A momentary immersion of the thoroughly cleaned articles (copper, brass, or bronze) is all that is necessary. 2. Electro silverplating. A. See article on Electro-metallurgy, page 81, current volume.

(5) J. K. asks (1) if there is any such thing as waterproof powder. A. We know of no waterproof gunpowder. Dynamite, duann, gun cotton, and other blasting substances are not affected by water, but they are unsuitable for use in fire arms. 2. How long will powder last in an air-tight cartridge? A. If put up in a dry airtight cartridge ordinary powder will remain unchanged for an indefinite period. 3. Give the name of the best powder to use. A. Common war powder—a. Saltpeter, 75 parts; sulphur, 10 parts; charcoal, 15 parts. b. Saltpeter, 75 parts; sulphur and charcoal, each 13½ parts. Sporting powder—Saltpeter, 76.9; sulphur, 9.6; charcoal, 13.5. Blasting powder—Saltpeter, 62; sulphur, 20; charcoal, 18. See column of Business and Personal and Hints to Correspondents.

(6) E. K. B. writes: 1. Referring to SCIENTIFIC AMERICAN SUPPLEMENT, No 160, what are the long terminal points of the induction coil made of? A. Brass. On a large coil they might be tipped with platinum with advantage. 2. How are carbons made as for Bunsen battery? Will you please give the degrees of heat, etc.? A. Powdered coke or gas carbon is mixed into a uniform paste with thin coal tar, moulded by pressure, dried slowly in an oven, and then gradually heated to whiteness in muffles which exclude air. Repeated soaking in thin tan and reheating makes the surface hard and dense.

(7) C. F. M. asks: 1. Can dry plates be worked by Newton's process in a room lighted through yellow panes of glass? A. Yes. 2. In any photographic process, what is the exact color and shade of the glass which should be put in the window of the dark room? A. A clear dark yellow approaching orange. 3. Will not colored sheets of gelatine do as well as glass? A. Yes.

(8) E. F. C. writes: Some time ago you published a formula for a concentrated fertilizer to be used on potted plants, etc. Among the ingredients was bisphosphate of ammonium. As no drug store or chemist's shop here has this chemical in stock, and no work on chemistry that I have consulted makes mention of it, I would be obliged to you if you would give the formula for making it. A. Macerate, for twenty-four hours or more, 81 lb. fine bone ash with 147 lb. strong sulphuric acid: dissolve 24 lb. carbonate of ammonia (or a quantity of ammonia water containing 18 lb. real ammonia) in 15 gallons of soft water, and gradually stir in the paste. After standing several hours draw off the liquid portion, agitate the remainder with a little fresh water; let settle, draw off the clear liquid, add it to the first liquid drawn off. If desired boil down this solution of acid ammonium phosphate until it will solidify on cooling. The portion insoluble in water is chiefly lime sulphate.

(9) J. M. H. asks: 1. Is there any difference in a troy ounce and an avoirdupois ounce? A. The troy pound contains 5,760 grains, the avoirdupois pound 7,000 grains; the troy pound contains 12 ounces of 480 grains each, the avoirdupois pound 16 ounces of 437½ grains. 2. What is the lifting capacity of one cubic yard of hydrogen gas? A. A cubic yard of air at 60° Fah., weighs about 11 ounces (avoirdupois), a cubic yard of hydrogen about ¾ ounce; the difference or "lifting power" is therefore about 10¾ ounces per cubic yard of gas. 3. Will hydrogen penetrate common tin, or waste if confined in such a vessel? A. Hydrogen will not penetrate tin or tinned iron.

(10) E. E. T. asks: 1. How can I take a gallon of silver solution and find out how much silver and cyanide it contains? A. Draw off two half-ounce samples, and to one add gradually (in the open air to avoid inhaling the fumes) about two ounces of pure hydrochloric acid, shake together, heat to boiling, and let settle. Decant the liquid, throw the precipitate on a small filter, wash with hot water, cover and set aside in a warm, dark place to dry; when dry weigh on an accurate balance, and multiply the weight by 153.6—the result is the weight of metallic silver (approximate) per gallon of solution examined. Evaporate the other half ounce to dryness, weigh, multiply by 192, and deduct the weight of silver found. The result (if the bath was plain silver potassium cyanide solution) will indicate the weight (approximately) of cyanide of potassium per gallon of solution. 2. Will the same rule work on a copper and gold solution? A. No. 3. What can I dip brass into to turn it black without destroying the surface of the metal? How do they get the deep yellow color so much worn on jewelry? A. Dip the article bright in nitric acid, rinse, and place it in the following solution until it turns black: one ounce each white arsenic and iron sulphate and twelve ounces of hydrochloric acid; rinse, dry in sawdust, and polish with black-lead or lacquer. See article on Electro-metallurgy, page 116 current volume.

(11) A. F. writes: My table gives size of drive pipe for No. 5 hydraulic ram, 2 inches; discharge pipe, ¾ inch. My friend claims I cannot use a larger discharge pipe. I claim it makes no difference what size is used after leaving nozzle of ram, whether ¾ inch or 3/8 inch, save that there would be less friction in using the larger pipe. Which is right? A. You are right. Strictly, the proper proportions depend upon the relative height from which the water is received and that at which it is delivered, but makers have satisfied themselves that for general use, the delivery pipe should be about half the diameter of the receiving pipe, and so make them.

(12) R. Q. T. writes: 1. We desire to supply our town with water; have a reservoir about 150 feet above the town, 4¼ miles distant—area 100 acres, depth 30 feet. What size of pipe will we need to supply, say, six hydrants in case of fire? A. 10 inches. 2. To what elevation can water be thrown? A. About 70 feet, depending upon length of hose. 3. What should be the size of the mains to furnish water to a population of 10,000? What would be the probable consumption

for three months in the winter? A. Allow 35 gallons per day for each inhabitant. The above are only approximate. If you wish accurate information you should employ a hydraulic engineer to survey, examine, and estimate.

(13) W. M. A. wants information in regard to preparing brimstone in a paste form. I am engaged in working what they call locust timber into wagon hubs, and I want something to fill up the cracks or checks in the timber. Brimstone is cheap and it is the same color and it becomes hard. A. Heat the sulphur in an iron pan over a moderate fire until it melts to a thin liquid; too much heat thickens it. On cooling the sulphur regains its former appearance and qualities. It can be used advantageously in the liquid form as a filler.

(14) J. C. A. asks: How may I increase the cold of an ice box? My experiments teach me if I apply salt to ice in open air the ice will melt. Now, if I should make an ice box, and confine the ice crushed with salt, mixed in tubes, would the salt have the same effect on the ice, or would it have the opposite tendency and save the ice? A. Other conditions being equal, salt will liquefy ice in a closed tube as quickly as in the open air. The volume of salt ice water resulting will not absorb a greater total quantity of heat than the ice from which it was produced, though the salt liquid will be sensibly much colder than ice at first. Ice liquefied by salt in tubes will freeze water surrounding them, but the ice thus produced will be considerably less in quantity than the ice melted by salt to produce it. There is no way by which ice may be melted by chemical means without making the ice water unfit for potable purposes. See Tyndall's "Heat as a Mode of Motion."

(15) A. A. D. writes: In the SCIENTIFIC AMERICAN, of February 5, 1881, page 87, in article entitled "Filtration and Decolorization," by C. G. Pfander, London, occur the following sentences: "Three parts dried clay to four of blood, sometimes vegetable charcoal is added. The mixture is moulded into lumps, dried, mixed with equal bulk of granulated clay, and then carbonized in a retort." If blood is carbonized are not its peculiar cleansing qualities destroyed? I supposed the albumen of blood, coagulated by heat, formed a drag net or screen, which swept impurities to the surface of the liquid. Would not clay mixed with molasses and then carbonized answer as well as clay mixed with blood and then carbonized? It would obviate objections and difficulties. A. The product is similar in its action to the animal charcoal used extensively in sugar refiners' filters. It does not depend upon the action of albumen, but upon the decolorizing action of animal charcoal in a finely divided state. Blood or albumen clarifies by removing suspended impurities; charcoal chemically deprives of coloring matter, etc. Clay and molasses would not answer as well.

(16) A. G. asks for a recipe for a preparation known as Allen's crystals for the bichromate battery. A. To 3½ oz. of finely powdered bichromate of potassium (or ammonium) gradually stir in 1 oz. cold sulphuric acid, and rub thoroughly together.

(17) J. C. asks for a decolorizer for benzine and the proportions. A. Agitate it violently and repeatedly with about three per cent of sulphuric acid, let stand a few hours, draw off the clear portion, and slowly redistill, the vessel receiving the distillate being replaced by another from time to time. Select the contents of those receivers containing the portions free from odor and discard the other portions.

(18) H. F. B. asks: 1. How are the leather packings for hydraulic jacks pressed or formed to prevent furring at the edges? A. The leather is well softened in water, and then pressed in cast iron formers and dried. 2. How can I straighten a long two-inch brass tube which is slightly bent? A. Draw the tube carefully on the hollow side.

(19) M. B. asks (1) how to braze steel wires without a blowpipe. A. This is sometimes done by placing the wires, properly charged with flux and silver solder, between two white hot blocks of cast iron. 2. Is there a composition of some kind of a hard solder which, if kept in a molten state in a crucible, we could put on, and in which we could dip the ends of such wires for a moment for the purpose of brazing them? The blow pipe takes out temper. A. Brazing cannot be done in the manner proposed, and it cannot be done in any way without destroying the temper. The blowpipe method of brazing or soldering small articles is the best.

(20) J. K. writes: 1. I have sunk a tube well to the depth of about forty feet through blue clay, on to what is termed hard pan, which seems very hard and unyielding, so that I can drive deeper only with great difficulty. Now, how shall I proceed to drive clear through that hard pan, under which I expect to find plenty of water that will not be affected by drought? A. We think you should use a drill (inside the tube) to drill through the hard pan, before driving the tube. 2. How can I take the first muddy and sandy water from the tube? My pump will not work on account of mud and sand, which stop up the openings in the screen at the bottom, thus preventing the water from entering the tube, also works up into pump cylinder and locks the pump. A. Use a rough sand pump that will not clog. 3. How can I tell when deep enough down and when to stop driving, so as to leave the screen or bottom of tube in the best bed or supply of water, and thus obtain the best well? There is water in the well now, but I cannot pump it on account of mud that accumulates on the point which adheres and sucks into the openings of the screen so close that the water cannot enter the tube, but is shut out so perfectly and complete that the suction of the pump is not sufficient to suck it through into the screen and pump. This is the main difficulty; is there no remedy? A. We know of no way except by trial. You had better consult some one of experience in putting down drive wells.

(21) T. R. asks (1) how phosphorus is made from white burnt bone. A. The ground bone ash is mixed into a cream with twice its weight of water and a quantity of sulphuric acid (bone ash, 100; water, 200; acid, 78 lb). In twenty-four hours more water is added, and the mixture is heated in a leaden pan until it has lost its granular character. It is then diluted largely