

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.

Dr. Scott's Electric Hair Brush has given universal satisfaction whenever used. It is beautifully made, and is well worth the price as a brush without considering its electric qualities. Over 7,000 testimonials from prominent citizens can be seen at the New York Office, 842 Broadway.

Ajax Metals for Locomotive Boxes, Journal Bearings, etc. Sold in ingots or castings. See adv. p. 236.

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New Comb'd Milling and Gear Cutting Machines, large range. C. A. Conde & Co., Makers, Philadelphia, Pa.

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New Method of Graining, etc. J. J. Callow, Cleveland, O.

Inventor's Institute, Cooper Union, New York City. Permanent free exhibition of new machines, inventions, and patents. See advertisement page 252.

Foot Lathes, Fret Saws, &c. 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.

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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.

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Improved Skinner Portable Engines. Erie, Pa.

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

Presses & Dies. Ferracite 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.

Peck's Patent Drop Press. See adv., page 204.

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.

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.

For Mill Machinery & Mill Furnishing, see illus. adv. p. 204.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 206.

Saw Mill Machinery. Stearns Mfg. Co. See p. 205.

Supplee Steam Engine. See adv. p. 204.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's adv. p. 221.

Safety Boilers. See Harrison Boiler Works adv., p. 222.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 221.

Fire Brick, Tile, and Clay Retorts, all shapes. Borgner & O'Brien, Mfrs, 23d St., above Race, Phila., 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.

Ball's Variable Cut-off Engine. See adv., page 238.

Paragon School Desk Extension Slides. See adv. p. 237.

Brass & Copper in sheets, wire & blanks. See ad. p. 236.

The Twin Rotary Pump. See adv., p. 206.

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.

Wren's Patent Grate Bar. See adv. page 237.

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

Berryman Feed Water Heater. See illus. adv., p. 237.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Eagle Anvils, 10 cents per pound. Fully warranted.

Geiser's Patent Grain Thrasher, Peerless, Portable, and Traction Engine. Geiser M'g Co., Waynesboro, Pa.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 236.

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 238.

New Economizer Portable Engine. See illus. adv. p. 236.

Sewing Machines and Gun Machinery in Variety. The Pratt & Whitney Co., Hartford, Conn.

Rollstone Mac. Co.'s Wood Working Mach'ry ad. p. 238.

The Sweetland Chuck. See illus. adv., p. 239.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N. Y. Wm. Sellers & Co.

Wm. Sellers & Co., Phila., have introduced a new injector, worked by a single motion of a lever.

Don't buy a Steam Pump until you have written Valley Machine Co., Easthampton, Mass.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Also manufacturers of Solomon's Parallel Vise, Taylor, Stiles & Co., Riegelsville, N. J. Skinner's Chuck. Universal, and Eccentric. See p. 238

For Machinists' Tools, see Whitcomb's adv., p. 238

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. J. K. asks whether it would make any appreciable difference in the strength of an electromagnet to inclose the coils in brass similar to the usual rubber covers. A. In a magnet of high resistance it would make a difference.

(2) A. A. B. writes: Please give the weight of the largest gun ever cast, also the size of shot and quantity of powder required? A. Several Armstrong 100-ton guns have been made: caliber 17-72 inches; total length 32-65 feet; length of bore 30¾ feet; powder chamber 60-12 inches long by 19-7 inches diameter; powder charge, 551 pounds; weight of projectile (battery shell) 2,500 pounds; muzzle velocity, 1,725 feet a second; total energy 41,333 foot pounds. A Woolwich gun of 160 tons has been projected. We have not heard of its completion.

(3) H. D. asks: 1. What is the meaning of resistance in speaking of wire? A. Electrical conductors of different sizes and different lengths offer a greater or less impediment to the free passage of electricity according as they are small or large, long or short, and it is assumed that the different conductors have a specific power of resisting the passage of the current. This is called resistance. 2. Why do they use thinner wire on long circuits both on line and coils? A. Experience has demonstrated that to obtain the full effects of the current on a given circuit, the helix in which the work is done must, in the matter of resistance, equal the line and battery. 3. I would like to know why telephone companies use such thin wire on main lines. A. Because the secondary current is employed, which does not require a heavy conductor. 4. Could not a piece of carbon be substituted for the convex platinum button in the Blake telephonic transmitter, as is done in the transmitter described in SCIENTIFIC AMERICAN, of March 19, 1881? A. Not with good results. 5. Which one do you think would be the easiest and most inexpensive one to make to be used with a bell telephone? Can a Hughes microphone be used on a short line in connection with a bell telephone? A. Use the Blake transmitter.

(4) W. K. F. asks: 1. What kind of saw band, mulay, sash, circle, or any kind of saw, requires the least power to saw a given amount of lumber? A. We recommend a circular saw mill, as being more simple and effective than either of the others. 2. What is the horse power required to saw on average 1,200 feet hard wood lumber per day (ten hours)? A. An 8 horse power engine would saw 1,200 feet in ten hours; but we recommend you to have not less than 10 horse power.

(5) L. D. D., Jr., asks (1) how to polish horn. A. Dress down with powdered pumice stone, two sizes (the finest last), and water. This may be applied on a wheel—horizontal or buff. Finish with whitening, or, for fine work, putty powder. 2. Is rain water the softest of all water (excepting distilled)? A. Yes.

(6) D. F. writes: I have a new kitchen floor which I wish to wax. Can you inform me how to make the wax? A. Two oz. of pearlsh, 10 oz. of wax, and about half a pint of water are heated to boiling in a dish, which is frequently agitated, until a thick fluid mass is formed, from which, upon removal from the fire, no watery liquid separates. Boiling water is now cautiously added to the mass, until no watery drops are distinguishable. The dish is again set on the fire, but its contents are not allowed to boil (otherwise myricin would separate out), 8 or 9 pints of water being added, little by little, with constant stirring. Coloring matter may be added if desired.

(7) E. E. H.—The following methods of tempering mill picks have proved very successful: 1. Take 2 gallons rain water, 1 oz. of corrosive sublimate,

1 of salammoniac, 1 of saltpeter, 1½ pints rock salt. The picks should be heated to a cherry red and cooled in the bath. The salt gives hardness, and the other ingredients toughness to the steel; and they will not break if they are left without drawing the temper. 2. After working the steel carefully, prepare a bath of lead heated to the boiling point, which will be indicated by a slight agitation of the surface. In it place the end of the pick to the depth of 1½ inches until heated to the temperature of the lead, then plunge immediately in clear cold water. The temper will be just right if the bath is at the temperature required. The principal requisites in making mill picks are: First, get good steel. Second, work it at a low heat; most blacksmiths injure steel by over heating. Third, heat for tempering under direct exposure to the fire. The lead bath acts merely as protection against the heat, which is almost always too great to temper well.

(8) O. R. M. writes: I am much annoyed with dandruff. Can you suggest a harmless and reliable remedy? A. Dandruff (*Pityriasis*) is a chronic inflammation of the skin, characterized by the production of minute white scales or scurf in excessive quantity. The affection is often very rebellious to treatment. Various preparations are sold which are claimed to be beneficial, and physicians sometimes prescribe tonic infusions, purgatives, and the application of sedative lotions. In obstinate cases an internal dose in which arsenic is the essential element is sometimes prescribed. The efficacy and safety of such measures are to be doubted. Probably the best plan is to keep the hair short and shampoo it frequently with a solution of borax in warm water, avoiding rough treatment, which has a tendency to increase the irritation.

(9) A. E. S. asks how to lay off a safety valve lever and place the weight so that the valve will blow off at a given pressure. A. Multiply the weight of the lever by the horizontal distance of its center of gravity from the fulcrum; the weight of the valve by its horizontal distance from the fulcrum; the area of the valve by the steam pressure and horizontal distance of the valve from the fulcrum. Add together the first two products, subtract their sum from the third product, and divide the difference by the weight of the ball.

(10) S. asks: How can I ebonize wood, and what kinds of wood are best adapted to this finish? A. Apple, pear, and walnut, if fine grained, may be ebonized by the following process: Boil in a glazed or enameled iron vessel with water, 4 oz. of ground galls, 1 oz. of logwood chips, and ½ oz. each of green vitriol and crystals of verdigris. Filter while warm, and brush the wood over with this repeatedly. Dry and brush over with strong cold solution of acetate of iron and dry. Repeat this several times, and finally dry in an oven at a moderate temperature, and oil or varnish.

(11) E. G. T. asks: 1. Will not a wheel of one pound weight, revolving 100 times per second, be of the same value as a balance wheel as one weighing ten lb., revolving ten times per second? A. The regulating power of a fly wheel is as the weight into the square of the velocity. Hence supposing that in your two cases, the weight travels on the same radius, it will be as weight into the square of the revolutions, or 10,000 in first case and 1,000 in second case. 2. I have two magnets placed together so that their opposite poles correspond. They attract each other with a certain force. Now, if the poles of one of the magnets be reversed, will the magnets repel with the same force as they attracted before? A. The two forces are not the same, the repulsion being the smaller force. 3. I have some copper wire with which I wish to make an electromagnet. In which way will I get the most power, to wind all the wire on one magnet or to have two one half the wire on each? The current is to pass through the whole length of wire in either. A. The greatest force can be obtained from the single magnet under the conditions given.

(12) J. N. W. asks: What ingredients and quantities of each for pattern varnish? A. For pattern varnish cut 4 oz. of orange shellac in 1 pint of alcohol. If black varnish is desired add fine lampblack.

(13) C. L. W. asks: Will a mercurial barometer work as well in a room as it would out of doors? A. Yes.

(14) A. W. H. L. writes: We have recently moved in a house that is overrun with bed bugs and roaches, also ants. My wife has tried everything we have heard of, even wetting the cracks of the flooring with sulphuric acid, but it seems to have no effect on them. They are not in the furniture, as it is all new. A. Try oil of turpentine. It may be introduced into the cracks and crevices infested with the insects by means of a sewing machine oil can. A very small quantity of the liquid, if judiciously used, will suffice.

(15) J. J. asks: Can you tell me of some preparation to clean and polish brass that is exposed to heat, such as brass on a locomotive both in cab and outside? A. Clean the work with emery flour and a little refined paraffine oil; wipe and finish with cotton waste and a trace of oil.

(16) T. Q. asks how to make printer's rollers. I have made a few of them here, but they don't seem to have the proper amount of suction to make work look as nice as I have been accustomed to do in New York city. A. Best white glue, 1 lb.; concentrated glycerine, 1 lb. Soak the glue over night in just enough cold soft water to cover it. Put the softened glue in a fine cloth bag, gently press out excess of water, and melt the glue by heating it over a salt water bath. Then gradually stir in the glycerine and continue the heating, with occasional stirring, for several hours, or until as much of the water is expelled as possible. Cast in oiled brass moulds, and give the composition plenty of time to cool and harden properly before removing from the mould and inking. See that the ink is well spread before bringing the roller in contact with type. 2. Please let me know if the water used in heating the composition should be kept boiling? A. The water in the water bath should be kept boiling.

(17) R. H. B. asks: 1. Do all dynamo-electric machines require to be first charged with an electric battery before they will generate a current?

A. No; the magnetism naturally residing in the iron of the field magnet is sufficient to start the current. 2. How is the candle power determined of any electric lamp or machine? A. By comparison with a standard candle in some sort of a photometer. 3. What work can be had that will give the desired information regarding ohms, volts, webers, ergten, or ergio, etc.? I am making it a special study as far as I can. Have several good works, and keep getting SUPPLEMENTS, which, I think, will help me along, but have not got the right thing yet. A. Ganot's Physics and Prescott's Electricity are good works. 4. Is there any published work on electric motors? Can you send SUPPLEMENTS with illustrated articles on same? A. We know of no work especially devoted to electric motors. The SUPPLEMENT contains many articles on the subject. 5. I took an ordinary U magnet to a painter to have it repainted (red); he painted it, but, as it did not dry, he set it in the sun, but after about twenty trials, he said, by himself and other good painters (considered so), he gave it up as a bad job, and gave it to me still very sticky. What was the trouble? What is it magnet makers produce that bright, fine red with? A. The red varnish is made by mixing English or Chinese vermilion with alcoholic shellac varnish. 6. Is it not possible to see electricity? Is not the spark considered and calculated to be the electricity itself? A. Electricity is known only by its effects. The spark is one of them.

(18) N. P. H. asks: Which is best to use in a cylinder, a good oil or tallow? Will tallow or any animal grease injure the inside of a cylinder? A. Use good oil. Tallow as generally supplied to the market, contains an acid which attacks the metal.

(19) H. E. B. asks: How fast can an engine with 10 inch cylinder, 30 inches stroke, 60 lb. steam, be run with safety to run a circular saw 700 revolutions per minute; and what size of pulley on saw arbor would it require, pulley on engine being 96 inches in diameter and belt running direct? A. If well balanced and adjusted, 100 revolutions per minute. Diameter of pulley 13¾ inches nearly.

(20) W. W. C. writes: 1. This town wishes to put in a system of water works. We can procure 99½ feet head. The spring is very large and distant some two miles. If we start with a large main, say 8 inch, and at one-half the distance reduce it one-half, will not the force be greater, and the hydrants throw a higher stream? A. No. 2. What height of stream can we procure here from mouth of hydrant with a conical hose on nozzle? A. Much depends upon size, length, and course of pipes, but probably 68 to 76 feet. You are mistaken about the effect of reducing the main; it would be injurious rather than beneficial.

(21) T. K. asks: What quantity of cork would be required to sustain a man of average weight in the water? A. The steamboat law requires 6 lb. good block cork for life preservers.

(22) A. S. L. asks for the cheapest and best possible way of constructing, and the cost of, a reservoir with a capacity of 30,000 gallons of water. A. This will require a reservoir 16 feet square and 16 feet deep. Cost depends on nature of soil and position. Any good mason will advise you.

(23) J. A. asks if it is usual to give lead to the valves of express passenger engines, and if so, how much. Also the lead necessary for freight engines. A. Steam lead is generally one-eighth of an inch to three-sixteenths of an inch. All engines should have lead.

(24) J. N. H. writes: I have a cupola, 24 inches in diameter, with two tuyeres 5 inches in diameter. Would anything be gained if the tuyeres were set by one another, so as to give a spiral direction to the blast? A. We do not think the advantage would be appreciable except with a weak blast.

(25) F. W. H. asks what the meaning of the word "pitch" is in speaking of a propeller screw. A. The advance which would be made by the angle of the blade if turning in a solid.

(26) A. B. S. writes: In the SCIENTIFIC AMERICAN, No. 12, September 17, page 186, in answer to (5) J. A.'s inquiry, you told how to make tin look like crystals or like frost on windows in winter. May I ask if the same may be done on silver, and by what method? A. No; silver has not the peculiar crystalline structure of tin. Frosting is sometimes done by a revolving tool in a lathe. 2. How is the water and fire proof paint that we see on the cottages made? A. See Water-glass, page 16, No. 2, current volume.

(27) C. F. K. asks for some varnish, paint, or enameling process for covering a plate iron tank to protect it from the joint action of grease, alkali, and water. Or, again, what is the best mode of preventing corrosion under such circumstances? A. We know of no satisfactory coating that could be applied to the iron. The tank might be lined with thin sheet lead.

(28) C. S. G. writes: 1. I would like any information you can give in regard to nickel plating. I have a bicycle I would like to plate. A. Use ammonia nickel sulphate, three quarters of a pound to the gallon of soft water, for the plating bath. Cleanse the wire with hot potash and cyanide solutions and pumice stone, as directed in article on nickel plating, page 153, vol. XLIII, and having connected it with the zinc pole of the battery, draw it slowly through the plating bath between nickel anodes (connected with the copper or carbon pole of the battery), and under rubber pulleys so arranged as to keep it immersed in the liquid. For details respecting the management of such baths see the article referred to. 2. Is there such a thing as water-proof glue? A. You will find good receipts for water-proof glue under Cements, page 2510, SUPPLEMENT, No. 158.

(29) J. N. M. asks: Is not a good injector more economical than a good pump, for a factory engine of uniform speed? In this particular instance the injector would be non-lifting. A. Under the conditions you name there is very little difference in economy between an injector and a pump with a good heater. But the injector has the advantage that you can feed the boiler when the engine is not running.