

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. The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.

Fire on the Hearth.—Open grate and warm air furnace combined. Circulars by O.S. & V. Co., 78 Beekman St., N. Y. Toulmin's Ellipsograph.—Only instrument that will draw a true ellipse; adjustable to any size. Liberal cash discount. Davis & Watts, M'f'rs, Baltimore, Md.

A Rare Chance to Invest.—A complete outfit for either planing mill or furniture factory. Plenty of power, buildings, land, etc. Price \$6,000. Inquire of E. Keeler & Co., Williamsport, Pa.

Direct Castings of Crucible Steel, of perfect integrity, solid, weldable, tough, strong, durable. Superior in quality to any made in America. Special facilities and skill in plow castings. Agricultural wrought steels and irons of every description. Read, McKee & Co., limited, Pittsburgh, Pa.

Shafting, etc., a specialty. P. Prybil, 467 W. 40th, N. Y. For Pat. Quadruple Screw Power Press, see adv., p. 405.

Telephones repaired; parts of same for sale. Send stamp for circulars. P. O. Box 205, Jersey City, N. J.

Hub Mortisers; latest improved. Witherby, Rugg & Richardson, Worcester, Mass.

Hand Fire Engines, Lift and Force Pumps, for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., and 93 Liberty St., N. Y. city, U. S. A.

Machine Drawing Copies, 10 cents each. Descriptive list and catalogue of scientific books sent free by mail on application. E. & F. N. Spon, 446 Broome St., N. Y.

Hangers, Pulleys, etc. P. Prybil, 467 W. 40th St., N. Y.

The Steam Pipes, Boilers, etc., in the buildings of the New York Tribune, New York Herald, and Harper & Brother, are protected with H. W. Johns' Asbestos Boiler Coverings. H. W. Johns Manufacturing Co., 87 Maiden Lane, sole manufacturers of genuine Asbestos Liquid Paints, Roofing, etc.

Millstone Dressing Diamonds. Simple, effective, and durable. J. Dickinson, 64 Nassau St., New York.

Moulding Machine Wanted.—Manufacturers send full description, with price, to T. Reid, Brush Handle Manufacturer, W. Arlington, Vt.

Forges, for Hand or Power, for all kinds of work. Address Keystone Portable Forge Co., Phila., Pa.

Blake Crushers, all sizes, with all the best improvements, at less than half former prices. E. S. Blake & Co., Pittsburg, Pa.

The Friction Clutch Captain will start calendar rolls for rubber, brass, or paper without shock; stop quick, and will save machinery from breaking. D. Frisbie & Co., New Haven, Conn.

You can get your engravings made by the Photo-Engraving Co. (Moss' process), 67 Park Place, N. Y., for about one-half the price charged for wood cuts. Send stamp for illustrated circular.

Presses, and Dies that cut 500,000 fruit can tops without sharpening. Ayar Machine Works, Salem, N. J.

For Sale.—One Horizontal Steam Engine, 20' x 48'; one 18' x 42'; one 16' x 36'. Atlantic Steam Engine Works, Brooklyn, N. Y.

Empire Gum Core Packing is reliable; beware of imitations called Phoenix. Greene, Tweed & Co., N. Y.

The Baker Blower ventilates silver mines 2,000 feet deep. Wilbraham Bros., 2318 Frankford Ave., Phila., Pa. Steam Excavators. J. Souther & Co., 12 P. O. Sq. Boston.

Park Benjamin's Expert Office, Box 1009, N. Y. Recipes and information on all industrial processes.

To stop leaks in boiler tubes, use Quinn's Patent Ferrules. Address S. M. Co., So. Newmarket, N. H.

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.

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

For Solid Wrought Iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon & Co., 470 Grand St., N. Y.

Bradley's cushioned helve hammers. See illus. ad. p. 406.

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

Noise-Quitting Nozzles for Locomotives and Steamboats. 50 different varieties, adapted to every class of engine. T. Shaw, 915 Ridge Avenue, Philadelphia, Pa.

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

Eclipse Portable Engine. See illustrated adv., p. 389. Forbest Fixtures torun Sewing Machines where power is used, address Jos. A. Sawyer & Son., Worcester, Mass.

Sheet Metal Presses. Ferracute Co., Bridgeton, N. J.

Solid Emery Vulcanite Wheels.—The Solid Original Emery Wheel.—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

Valve Refitting Machine. See adv., page 405.

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

Portable Railroad Sugar Mills, Engines and Boilers, Atlantic Steam Engine Works, Brooklyn, N. Y.

Silent Injector, Blower, and Exhauster. See adv. p. 406.

The Paragon School Desk and Garretson's Extension Table Slide manufactured by Buffalo Hardware Co.

Planing and Matching Machines, Band and Scroll Saws, Universal Wood-workers, Universal Hand Jointers, Shaping, Sand-papering Machines, etc., manuf'd by Bentel, Markedant & Co., Hamilton, Ohio. "Illustrated History of Progress made in Wood-working Machinery," sent free.

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

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

For Superior Steam Heat. Appar., see adv., page 406.

All makes and sizes of Steam Hammers bored out. L. B. Flanders Machine Works, Philadelphia, Pa.

Brass or Iron Gears; list free. G. B. Grant, Boston.

For best Belt Lacings, use Blake's Belt Studs. The strongest fastening for all belts. Greene, Tweed & Co., New York.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in SCIENTIFIC AMERICAN of this week.

The E. Horton & Son Co., Windsor Locks, Conn., manufacture the Sweetland Improved Horton Chuck.

Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 405.

Linen Hose, Rubber Hose, Steam Hose; all sizes. Greene, Tweed & Co., 18 Park Place, New York.

Power Hammers. P. S. Justice, Philadelphia, Pa.

Metallic Pattern Letters to put on patterns of castings, at reduced prices. H. W. Knight, Seneca Falls, N. Y.

For Reliable Emery Wheels and Machines, address The Lehigh Valley Emery Wheel Co., Weissport, Pa.

Steam Engines; Eclipse Safety Sectional Boiler. Lambertville Iron Works, Lambertville, N. J. See ad. p. 406.

Pays well on small investments; Magic Lanterns and Stereopticons of all kinds and prices; views illustrating every subject for public exhibition and parlor entertainments. Send stamp for 80 page Illustrated Catalogue. Centennial medal. McAllister, 49 Nassau St., New York.

Patent Steam Boiler Damper Regulator; most reliable and sensitive made. National Iron Works, New Brunswick, N. J.

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

Electro-Bronzing on Iron. Philadelphia Smelting Company, Philadelphia, Pa.

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,000 lbs. to sq. in. Circulars free. Pittsburg Steel Casting Company, Pittsburg, Pa.

The New Economizer, the only Agricultural Engine with return flue boiler in use. See adv. page 405.

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

Surveying Instruments. G. S. Woolman, 116 Fulton St., N. Y.

Nellis' Cast Tool Steel, Castings from which our specialty is Plow Shares. Also all kinds agricultural steels and ornamental fencings. Nellis, Shriver & Co., Pittsburg, 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. D. writes: 1. The cistern water we have here, when tested with the permanganate of potassa (distilled water solution), is of a brick dust color instead of a rose color. What is the cause of this? Is it due to the tinned roof or to the cement of the cistern? A. Probably the latter. 2. Do you know any method of restoring the red color which has faded on my Russian leather portmanteau? A. No.

(2) C. B. asks for a recipe for making a composition that would be hard enough to make pool balls, that would not be expensive, and also a recipe for coloring. A. Melt together over a gentle fire in an iron pot; pitch, 1 part; gutta-percha, 2 parts; orange shellac, 5 parts; add to this 6 parts of white lead (lead carbonate) in impalpable powder, and stir until a perfectly homogeneous mixture is obtained; then cast and turn out. Color with the aniline dyes mixed with dilute alcoholic solution of bleached shellac.

(3) G. R. asks how to blue gun barrels. A. This is best done by submitting the barrel to heat until the required color is secured; but it may be done in a manner by applying to the barrel a little nitric acid, and allowing it to act upon the iron until a blue film appears, then wash the barrel thoroughly and oil it.

(4) J. G. asks: 1. Is there an ink that will dry quickly, or if there is not, can there be one compounded that will dry quickly, and print as nicely as that used in printing bank notes? A. Try the following: Shellac, 6 ounces; borax, 1 ounce; water, q. s.; boil together until perfect solution is effected, and triturate with this enough good iron black or nigrosin, to produce the desired color. A little alcohol will make the liquid flow more readily and dry quicker, but an excess must be avoided. 2. Please explain the principle of the steam injector? A. For a full explanation of the injector, see p. 99, Vol. 40, of SCIENTIFIC AMERICAN.

(5) E. P. M. asks: What would be the proper distance to place a bell from the ground, in order to convey its sound the greatest distance? A. A bell should be placed well above surrounding buildings, and if possible above trees. This subject is fully treated on p. 299 of current volume of SCIENTIFIC AMERICAN.

(6) P. B. asks: 1. What should I use to give a white and smooth surface to statues of plaster of Paris, after coming from the mould? A. Warm the cast and suspend it in melted white wax. The operation should be repeated until the wax is no longer absorbed. It is then allowed to become perfectly cool, when it may be polished. 2. How long should plaster of Paris be mixed with water before casting into the mould? A. Sprinkle the plaster into the water with which it is to be mixed. As soon as it settles to the bottom pour off most of the water, stir the mixture, and pour it immediately. 3. Please state what kind of stuff is used to make the plaster figures have a yellow tint (straw color)? A. Mix a little finely ground yellow ochre with the plaster, or stain the dry cast with a tincture of annatto or turmeric.

(7) "Woodworker" asks: Is there any danger of explosion from fire coming in contact with the fine dust of poplar and hard wood, blown through a Sturtevant blower into a shaving receiver or room? Can you give an instance of explosion of fine wood dust? A. There was an explosion of fine wood dust in the Pullman Palace Car Works in Detroit, Mich., a few years since. It occurred under about the same circumstances as you describe.

(8) C. F. C. asks what is the equivalent of a horse power. A. 33,000 lb. raised one foot high per minute.

(9) C. R. P. asks: Can you give us a substitute for alcohol for heating shoemakers' tools? It must heat well and not smoke the iron. A. There are several heaters in market using kerosene as fuel.

(10) W. W. S. asks: Is a building roofed with tin, corrugated iron, or other metal covering, less liable to be struck by lightning than if shingled, and if so, why? A. A building roofed with tin is not less liable to be struck by lightning than a shingle roofed building. If neither house were provided with a lightning rod, the tin roofed building, if struck, would be the safer, because the lightning would be likely to divide and spread over the metal, and find its way to the earth by several different paths on the exterior of the building, water leaders, gutters, etc. The wooden roof offers no such facility as metal for the spread or division of the electric charge, but is apt to tear its way through the building to the ground in one path.

(11) S. H. writes: 1. I have a spring which has 20 feet fall, with 500 feet of 3/4 inch pipe running to my house; how much pressure have I? A. 9 lb. per square inch nearly. 2. Will it run a 6 gallon churn, and what kind of a wheel would be best? A. Address makers of water motors who advertise in our columns.

(12) O. J. H. asks: 1. Will the painting of wrought iron steam pipes with one coat of asphaltum varnish diminish permanently the heat-radiating power of such pipes. A. No. 2. Is there any other painting material preferable to asphaltum varnish for the purpose of giving the steam pipes a better appearance and making it easier to keep them clean? A. No. 3. Considering only the economy in fuel consumed for heating by steam, would it be advisable to use no paint of any kind at all? A. All radiating surfaces should have a dark color. Paint will do no harm provided it is dark and not too thick.

(13) J. A. M. asks how to calculate the proper thickness for cast iron head for wrought iron boiler, 36 inches diameter, 75 lb. pressure per inch. I fail to find it in Haswell or any other work of that kind which I have. A. You will find rules in "Wilson on Steam Boilers." In practice the thickness is more the result of experience than calculation, as much allowance must be made for possible defects in casting; the usual thickness is 1 1/2 inch to 1 3/4 inch.

(14) J. N. H. asks: Are graphite, plumbago, and blacklead one and the same thing? A. Yes.

(15) D. R. asks for a method by which to deodorize some pistachio nut hair oil, held by me in bulk, bought in London in 1872. There is only about a quart left, but it has become rancid, and can undoubtedly be deodorized. A. Try the following: agitate the warm oil with about one per cent each of caustic lime and calcium sulphite (sulphite of lime) in powder, decant, and draw off the clear oil. Repeat the treatment, if necessary.

(16) H. W. writes: I am melting a great deal of pig tin and lead, and soon accumulate a large pile of oxide and dross. Can you give me any information in regard to a proper furnace for smelting this dross, so as to recover the metal in a shape for reusing? A. The metal cannot be recovered from the dross in the way suggested. This dross, which consists chiefly of a mixture of tin oxide and finely divided metal, is usually calcined and sold in this condition as putty powder. The metal can be recovered from the dross by mixing the latter with, say, one third its weight of fine coke or charcoal, and heating the mixture in large luted crucibles gradually to full redness. The reduced metal remaining with the unconsumed carbon may be separated by pounding the mass and sifting out the carbonaceous matters, and remelting the granular metal at a low heat.

(17) F. A. B. asks for the receipt for making what are called Chinese rods, and which upon being burnt diffuse a delightful odor. A. 1. Gum benzoin, 6 parts; balsam of tolu and powdered sandal wood, each 4 parts; powdered tragacanth and labdanum, each 1 part; powdered miter and gum arabic, each 2 parts; cinnamon, 12 parts; light charcoal (limen), 48 parts. Form into a smooth ductile mass by aid of heat, mould and cool. 2. Gum benzoin, oilbanum, and strax-tears, each 12 oz.; miter, 9 oz.; charcoal, 4 lb.; moistened with solution of 2 oz. tragacanth in a quart of rose water. To this may be added, if desired, essence of roses, pure neroli or orange powder, 1 oz. Oils of cloves

and nutmeg, essence of vanilla, cascarrilla, etc., are sometimes added in addition to the foregoing.

(18) G. L. D. asks: What is the greatest depth the sea has been sounded—actual, not supposed? A. 4,635 fathoms by Commodore Belknap, U. S. N., and 4,575 fathoms by the Challenger (English) expedition.

(19) P. C. B. asks: 1. How can eggs be preserved so as to keep good for the winter? A. Pack the eggs in a brine consisting of a saturated solution of salt in lime and water. The lime water is prepared by agitating soft water with enough lime to impart to it a milkiness, allowing this to settle in a covered vessel, and drawing off the clear lime water. 2. How can apples best be kept good from fall to the winter and spring? A. The apples to be preserved should be selected with due regard to their time of ripening. A Rhode Island greening, for instance, which ripens in January, can by the following method be preserved in good flavor until March or April, but not longer, whereas a northern spy, golden, or Princess Russell, or any late ripening variety, can be preserved in full flavor until the following August or September, though they must be promptly used after opening. The method of preserving the fruit is as follows: Select only perfect fruit, envelope each tightly in two separate wrappings of any thin paper, pack them in clean firkins or air tight barrels, and head them in securely, air tight. Thus packed apples may be preserved in a perfectly sound condition for a year or more, though, as before remarked, if kept much beyond their regular time of ripening they will lose in flavor. 3. Which is the best way to preserve whole heads of cabbage so as to keep good in the winter and spring? A. Keep them in a dry place, in well aired barrels. 4. I have a copper ore which assays as follows: Copper, 63.76; iron, 10.50; sulphur, 25.57; gangue, 0.10; total, 99.93. The ore carries about 1.3-5 ounces gold per ton (=0.005 per cent) and some silver. How can I best and cheapest smelt it, say 75 or 100 lb. ore at a time? A. It will probably be necessary to chlorinize the ore and submit it to the amalgamation process. Consult Phillips' "Metallurgy of Gold and Silver."

(20) A. C. writes: I have been trying to make some varnish, but have failed so far, and want to know what is wrong. I put two ounces of bleached lac into a bottle, and covered with alcohol; it swelled, and I added alcohol till it filled a pint bottle. It is now a curdy mass with some fluid on the top of it. I warmed it and stirred without effect. What is the matter? A. Try 95 per cent alcohol.

(21) C. R. asks: Could I convey ground tan bark from the mill to leaches by means of a blower; if so, how should it be applied? A. The tan bark can be propelled by a blower if it is dry. If it is mixed with water, a centrifugal pump should be used. If you employ a blower, the bends in the pipe which conveys the tan bark should be of long radius.

(22) S. B. F. writes: We have a machinist that says a belt will slip less on a pulley that has not been turned than on a very smooth pulley. Is he correct? A. According to the experiments of Hoyt & Co., a belt will drive about 50 per cent more on a polished face iron pulley than on one with a rough face.

(23) A. E. F. asks: Why is it that the light side of the new moon appears larger to the naked eye than that portion made visible by the earth's light? The line of the moon's surface is seen in the bright position, corresponding in size to the outlines of the dark side. It being supposed that the moon has no atmosphere, how do the sun's rays produce this effect? A. The phenomenon observed by you is called irradiation. It is due to the fact that impressions of bright objects on the retina extend beyond the outline of the image. Irradiation differs in different people, and even in the same person it is different on different days. It also increases with the luminosity of the object. The electric light affords a marked example of this phenomenon. The source of light, which is scarcely more than a mere point, appears a miniature sun. An incandescent platinum wire looks many times larger than its actual size.

(24) A. B. C. asks for the best compound or simple substance with which to impregnate baked wood for insulators for telegraph lines. A. Plunge the wood for a few minutes in hot paraffine.

(25) E. H. S. asks: Is a telegraph wire a protection to a building if the wire is well insulated and has good ground connection? A. It might be a protection, but it would be very limited, as a telegraph wire of the usual size is not large enough to conduct a heavy lightning discharge.

(26) J. E. K. asks: 1. Does the density of the atmosphere affect the velocity of falling bodies? A. Yes. 2. To illustrate: Suppose a cup of water or oil to be suspended in the top of an air receiver in which there is a pressure of 60 lb. per square inch, if the cup was upset, would it require a longer time for the fluid to reach the bottom than it would if the air was of ordinary atmospheric density? A. It would.

(27) B. A. asks: Which is preferable for bolting foot blocks to joists, overhead—3/4 bolts extending through block and joist with nut on end, or 3/4 wood screws extending through block and into joist 6 or 8 inches, sound hemlock joists—i. e. I mean which would be the easier drawn down or out—joists 12 inches thick? A. Through bolts and nuts are to be preferred; but if you use wood screws they should be at least 3/4 inch larger than the bolts.

(28) B. F. T. asks: 1. How can I make a paint for crockery, etc., that hot water will not wash off? A. Porcelain (or white ware) may be painted in enamel, that is, the design painted in metallic oxides and burned in (see Spon's Practical Receipts). Any ordinary paint that can be applied will not stand much washing, especially if hot water and soap are used. 2. How can I paint on cloth without sizing it and not have the paint spread? A. It is necessary to use size, unless the cloth is waxed.

(29) G. E. W. asks: What mode of measurement do you get the tonnage of a ship? A. You will find rules for tonnage in "Haswell's Engineer's Pocket Book."