

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 H. W. Johns Mfg. Co.'s new colors of Asbestos Liquid Paints are particularly appropriate for large structures, such as manufactories, churches, bridges, etc. We advise all owners of such buildings which require painting to send for samples.

Hartshorn's Self-Acting Shade Rollers, 486 Broadway, New York. No cords or balances. Do not get out of order. A great convenience. Sold everywhere by the trade. See that you get Hartshorn's rollers. Makers and dealers in infringing rollers held strictly responsible.

The only Mechanical Device in existence for purifying water in steam boilers, is the Hotchkiss Boiler Cleaner. Beware of imitators, they are infringers. Circulars free. 84 John St., New York.

Abbe Bolt Forging Machines and Palmer Power Hammer a specialty. S. C. Forsaith & Co., Manchester, N. H.

A competent and rapid Mechanical Draughtsman wants engagement. A. W. R., 76 E. 108th St., New York.

Wanted.—Most economical way of lifting water seven feet for drainage. J. S. Porcher, Eutawville, S. C.

Barber's Positive Rotary Force Pump. No sliding valves or abutments. The best and most durable pump made. For illustrated circular, address G. Lord, Manufacturer, Watertown, N. Y.

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

Baldwin the Clothier sends us the following notice, and desires to add thereto that Baldwin the Clothier is a patented trademark, and it is the exclusive property of O. S. Baldwin. Plagiarists and copyists take notice: LIBRARY OF CONGRESS, COPYRIGHT OFFICE, WASHINGTON.

To wit: Be it remembered, that on the 12th day of January, anno domini 1881, O. S. Baldwin, of New York, has deposited in this office the title of a Chart, the title or description of which is in the following words—to wit, "THREE THINGS," the right whereof he claims as proprietor, in conformity with the laws of the United States respecting copyrights. A. R. SPOFFORD, Librarian of Congress.

List 25.—Descriptive of over 2,000 new and second hand machines, now ready for distribution. Send stamp for same. S. C. Forsaith & Co., Manchester, N. H.

Linen Hose and Rubber Hose suited for all purposes. Greene, Tweed & Co., 118 Chambers St., New York.

For the manufacture of metallic shells, cups, ferrules, blanks, and any and all kinds of 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 metallic novelties a specialty. See advertisement on page 92.

L. Martin & Co., manufacturers of Lamplack and Pulp Mortar-black, 226 Walnut St., Philadelphia, Pa.

Foot Power Machinery for use in Workshops; sent on trial if desired. W. F. & Jno. Barnes, Rockford, Ill.

Large Slotter, 72" x 19" stroke. Photo on application. Machinery Exchange, 261 N. 3d St., Phila.

Burgess' Portable Mechan. Blowpipe. See adv., p. 76.

Books for Engineers and Mechanics Catalogues free. E. & F. N. Spon, 445 Broome St., New York.

Send to John D. Leveridge, 3 Cortlandt St., New York, for illustrated catalogue, mailed free, of all kinds of Scroll Saws and Supplies, Electric Lighters, Tyson's Steam Engines, Telephones, Novelties, etc.

Pure Oak Lea Belting C. W. Army & Son, Manufacturers. Philadelphia. Correspondence solicited.

Within the last ten years greater improvements have been made in mowing machines than any other agricultural implement. It is universally acknowledged that the Eureka Mower Co., of Towanda, Pa., are making the best mower now in use, and every farmer should write to the manufacturers for catalogue, with prices.

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, Eggar & Co., Cincinnati, O.

The "1880" Lace Cutter by mail for 50 cts.; discount to the trade. Sterling Elliott, 362 Dey St., Boston, Mass.

The Tools, Fixtures, and Patterns of the Taunton Foundry and Machine Company for sale by the George Place Machinery Agency, 121 Chambers St., New York.

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

Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole mfrs., H. Lloyd, Son & Co., Pittsburg, 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.

Recipes and Information on all Industrial Processes. Park Benjamin's Expert Office, 50 Astor House, N. Y.

For the best Stave, Barrel, Keg, and Hogshead Machinery, address H. A. Crossley, Cleveland, Ohio.

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

Best Oak Tanned Leather Belting. Wm. F. Forpaugh, Jr. & Bros., 331 Jefferson St., Philadelphia, Pa.

Stave, Barrel, Keg and Hogshead 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.

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

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

The Brown Automatic Cut-off Engine; unexcelled for workmanship, economy, and durability. Write for information. C. H. Brown & Co., Fitchburg, Mass.

National Institute of Steam and Mechanical Engineering, Bridgeport, Conn. Blast Furnace Construction and Management. The metallurgy of iron and steel. Practical Instruction in Steam Engineering, and a good situation when competent. Send for pamphlet.

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

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad., p. 60. For Separators, Farm & Vertical Engines, see adv. p. 61.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 60.

For Patent Shapers and Planers, see ill. adv. p. 60.

The I. B. Davis Patent Feed Pump. See adv., p. 76.

Moulding Machines for Foundry Use. 33 per cent saved in labor. See adv. of Reynolds & Co., page 76.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 77.

Saw Mill Machinery. Stearns Mfg. Co. See p. 77.

The Sweetland Chuck. See ill. adv., p. 76.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Also manufacturers of Solomon's Parallel Vise, Taylor, Stiles & Co., Riegelsville, N. J. Silent Injector, Blower, and Exhauster. See adv. p. 92.

The American Electric Co., Proprietors and Manufacturers of the Thomas Houston System of Electric Lighting of the Arc Style. See ill. adv., page 92.

Rollstone Mac. Co.'s Wood Working Mach'y ad. p. 92.

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

See Bentel, Margendant & Co.'s adv., page 92.

Diamond Tools. 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.

Frank's Wood Working Mach'y. See ill. adv., p. 92.

Eclipse Portable Engine. See illustrated adv., p. 93.

Peerless Colors.—For coloring mortar. French, Richards & Co., 410 Callowhill St., Philadelphia, Pa.

Special Tools for Railway Repair Shops. L. B. Flanders Machine Works, Philadelphia, Pa.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See ill. adv. p. 93.

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

For Heavy Punches, etc., see illustrated advertisement of Hilles & Jones, on page 93.

Comb'd Punch & Shears; Universal Lathe Chucks. Lambertville Iron Works, Lambertville, N. J. See ad. p. 90.

Best Band Saw Blades. See last week's adv., p. 93.

Reed's Sectional Covering for steam surfaces; any one can apply it; can be removed and replaced without injury. J. A. Locke, & Son, 40 Cortlandt St., N. Y.

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

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.

Penfield (Pulley) Blocks, Lockport, N. Y. See ad. p. 92.

4 to 40 H. P. Steam Engines. See adv. p. 93.

Tyson Vase Engine, small motor, 1-33 H. P.; efficient and non-explosive; price \$50. See ill. adv., page 92.

Use Vacuum Oil Co.'s Lubricating Oil. Rochester, N. Y.

Wiley & Russell M'f'g Co. See adv., p. 60.

For Machines Tools, see Wm. Comb's adv., page 73.



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) W. R. E. inquires: Is there any process whereby we can recover the hydrochloric acid from a solution of chloride of zinc which we have as a by-product in the manufacture of one of our colors? I can recover the acid from chloride of barium, by the use of sulphuric acid, but sulphate of zinc, being a soluble salt, does not precipitate in the same manner as sulphate of barium. A. We fear that there is no method short of an expensive and complex series of reactions and decompositions by which the hydrochloric acid could be recovered, and which would necessarily be too expensive to be profitable. From the fact that a solution of chloride of zinc possesses the property of rapidly decomposing sulphide of ammonium and the organic matter of miasmata which convey disease, it forms a valuable disinfectant and deodorizer, and we suggest the desirableness of the waste product alluded to being turned to account in this direction. Its value as a disinfectant has been thoroughly established.

(2) T. R. writes: In making a curve on a railroad, which rail is the highest, the inside once the

outside? Is it not the outside one that is raised, and the inside rail left level? A. Generally the outer rail is raised, but engineers differ somewhat in their practice. 2. Is it necessary to raise either where the speed is not over three miles an hour? A. No.

(3) G. E. P. asks: 1. What is the best cheap protection for rough wood work against fire (sparks and light flame inside of building)? A. Saturate the wood with a strong aqueous solution of tungstate of soda. 2. Which is the best, something applied like paint directly to the wood, or sheathing the same with sheet tin? A. The tin or sheet iron.

(4) C. D. A. asks: Is there any way to extract a portion of a glass stopper which has been broken off down in the neck of the bottle? A. Repair the broken glass by means of a little Armenian cement or stratina. (See SCIENTIFIC AMERICAN SUPPLEMENT, No. 158.) Then heat the neck of the bottle quickly but moderately, so as not to heat the stopper. The heat will expand the neck of the bottle so as to loosen the stopper, which may then be removed.

(5) J. H. P. writes: My neighbor has a medium sized hot air furnace with indirect draught, which he controls by check draught in smoke pipe, by slide in door at bottom of furnace, which when open admits air through the fire, and he also opens a space in feed door equal to four square inches, admitting air over the fire, which he claims is necessary to supply oxygen for the combustion of the coal gas. I claim that so much cold air passing over the fire is not only unnecessary, but to the expense of fuel, as in heating, cools the fire and the radiating surface of the furnace, lessens the degree of heat in the hot air chamber, and then passes through the flues into the chimney. I also claim that, as furnaces are commonly fitted, a closer approximate to the necessary amount of oxygen required for the combustion of the coal gas can be obtained through an opening to the fire from below, together with that passing to the fire through the joints to doors, than would result from opening a space to admit air directly to and above the fire. A. If the draught is good the introduction of a small amount of air over the fire may effect a saving in fuel, without decreasing the heat. With thick fires burned slowly, much carbonic oxide (CO)—a combustible gas is formed by the partial decomposition of the carbonic acid (CO₂), formed near the grate, in its passage through the body of fuel. If air is not admitted above the fire much of this gaseous fuel may escape unburned up the chimney. Your neighbor may therefore be correct.

(6) C. C. writes: The SCIENTIFIC AMERICAN SUPPLEMENT No. 253, contains a rule for estimating the horse power of a high pressure engine, by a practical engineer. But he does not give the *modus operandi* of obtaining the average pressure from expansion (except by the indicator). A. If you have no indicator, you can get the average pressure approximately by assuming that the entering steam has a pressure of 3 to 6 lb. less than the boiler pressure, and that this is the pressure in the cylinder until cut off; the terminal pressure will depend on the point of cut-off—that is, if cut off at one-half the terminal pressure will be one-half the entering pressure—if cut off at one-third, one-third, etc. For example, suppose the boiler pressure 63 lb., then the initial cylinder pressure would be 60 lb.; and if cut off at one-half the terminal pressure, would be 30 lb.; and if cut off at one-third, 20 lb. Next add together the initial and the terminal pressures and divide by 2 the quotient is the approximate average pressure, $60+30 = \frac{90}{2} = 45$ lb.

average and $60+30 = \frac{90}{2} = 45$ lb. average.

(7) C. D. N. writes: I made a copying pad after receipt in SUPPLEMENT, No. 225, using 18 ounces of glycerine and 3 ounces of gelatine, and maintaining the heat for about four hours, and in making the ink I used half an ounce aniline, half an ounce alcohol, and 3½ ounces of water, and I cannot take over 3 or 4 copies. What is the matter? A. Try an ink with less alcohol and more aniline violet. See that the latter is pure, not mixed with dextrine, as is very frequently the case.

(8) H. S. asks: 1. Why do engineers say 28 or 30 inches vacuum instead of pounds? A. 28 or 30 inches of mercury is only equal to 14 or 15 lb. Vacuum gauges are usually marked in inches. 2. Where is the most pressure in a boiler? A. The pressure at the bottom of legs is as much greater than that in the steam chamber as is due to the head of water. 3. Why are all gauges tapped into the drum? A. Gauges are usually located where most convenient for engineers.

(9) J. S. M. asks how to proceed to wear the inside of a steam cylinder smooth after it has become cut by running dry or from other cause. A. You can restore the surface by grinding out the cylinder with a true segment of lead and sand or emery, but great care must be taken that it is so done as to leave the cylinder true.

(10) E. F. R. writes: 1. I am building the hand power electric machine described in SUPPLEMENT, No. 161. Please tell me about how much No. 16 cotton covered wire it will take to wind the electromagnets. A. It will take about 1 lb. to each arm of the magnet. 2. What is meant by a resistance of two or three ohms? A. An ohm is the unit of electrical resistance, and is about equal to that of a pure copper wire one-twentieth of an inch in diameter and 250 feet long. 3. How are wires connected to the binding posts, etc., under the base? A. A screw provided with a copper washer passes upward through the base into the binding post, and clamps the wire between the washer and the underside of the base. 4. In making the induction coil in SUPPLEMENT, No. 160, shall I need 40 square feet of tin foil or 20 ditto; or, in other words, in counting the surface do you count both sides of a sheet? A. One side only is counted. Use 40 square feet.

(11) J. M. H. writes: 1. I wish to construct a telephone line of about one mile in length. Will the telephone as illustrated in Figs. 2 and 3, SUPPLEMENT, No. 142, work successfully on a line of that length. A. Yes. 2. What kind of wire will be the best to use for the line; will No. 14 galvanized telephone wire do? A. No. 14 will answer, but No. 12 would be better. 3.

How is the silk covered wire fastened to the binding screws? A. The end is stripped and soldered to the heavy wire which is clamped between the shoulder of the binding post and the wood of the telephone handle. 4. Will the plate such as is used by artists for tin types do for the diaphragm. A. Yes. 5. Should the wire as used for the line be attached direct to the telephone? A. Yes. 6. Is the coil in the connecting wire, as shown in the engraving, necessary? A. No. 7. Must the spool be of the same size and dimensions as in the engraving? A. The size is correct, but may be varied somewhat without seriously affecting the working of the instrument. 8. Will it answer to attach the ground wire to an iron pipe that runs into a well, and how should it be attached? A. It would probably answer. Solder the wire to the pipe. 9. Would a bar magnet 9 inches long and weighing 15 oz., threaded at one end, answer any better in place of the horseshoe magnets and the iron core? A. No; the telephone with the three-eighths bar magnet is the best of the two forms shown.

(12) H. W. L. asks how to burn crude petroleum. Is it burnt in the same manner as kerosene, if not, how? A. Petroleum is a mixture of a large number of hydrocarbons, some very light, some heavy, all combustible. It is neither safe nor economical to burn the crude oil in a lamp or with a wick. For heating purposes the best results are obtained by the use of some form of injector which delivers the oil in a spray mixed with a large volume of atmospheric oxygen. Under such circumstances the combustion is nearly perfect, and the heat is intense.

(13) A. F. S. asks: What coloring matter is best for making transfer paper that will show plainly on black walnut? A. Try chrome yellow, or a yellow lake, made up with a sufficient quantity of melted lard and a little wax.

(14) A. T. G. asks how to make printer's rollers. A. 1. Glue, 8 lb.; molasses, 7 lb.; soften the glue by soaking it in cold rain water for 24 hours; then melt over the water bath and stir in the molasses previously heated, moderately. Heat gently for half an hour, with occasional stirring, let stand to cool somewhat and pour into oiled moulds. Requires from 8 to 10 hours in winter, and longer in summer, to harden. 2. Best white glue and glycerine, equal weights; soften the glue in cold water over night, then melt it over the water bath and gradually stir in the hot glycerine; continue the heat for seven hours, with occasional stirring, to drive off all the water absorbed by the glue. Let cool somewhat, skim and pour into well oiled brass moulds in the center of which the spindle is properly adjusted. Let it stand ten hours to harden before attempting to remove it. Large rollers require longer to harden than small ones.

(15) S. M. asks (1) for the name of a work treating on air pumps. A. There is a good article on the subject in Knight's "Mechanical Dictionary." 2. I desire to make bicarbonate of soda, and would like to get acid from my boiler fire, and think I might draw it by connecting a tight cylinder by a pipe with the fire and allow the carbonic acid to enter at top of cylinder and go to bottom of, say, four feet of water, and by pumping the air out of top of cylinder creating a vacuum, and thus causing the carbonic acid to flow in and wash it in passing through the water. A. The carbonic acid from the combustion of coal under an ordinary boiler contains much sulphurous acid and various hydrocarbons, beside this difficulty, the solution of soda must be kept cool to admit of the absorption of the gas to form the hydro (bi) carbonate.

(16) G. H. A. asks: 1. Would an ordinary oil stove furnish enough heat for a boiler large enough to supply with steam an engine large enough to run a steam carriage that would carry two persons on good roads? A. No. 5. How large an engine would be necessary? A. Probably 3 inch cylinder and 6 inch to 12 inch stroke, depending upon whether geared or not. 3. Would not a boiler built in the sectional plan be better (make more steam with less heat, and be safer) than an ordinary tubular boiler? A. Yes.

(17) W. H. C. asks for a recipe for an invisible ink so that it will only show when heated. A. Dilute a strong aqueous solution of pure chloride of cobalt with water, until, when written with, the characters are invisible after drying at ordinary temperatures. Heat develops a dark blue or purple color. Use a clean pen and sheet of blotting paper.

(18) C. G. asks: 1. Is it possible for feed water to enter a boiler too hot? A. No. 2. Since using a new system of heating feed water, we have been troubled with constant foaming of the boilers, and a gauge cock which is located in the side of mud drum shows at all times half water and half steam. We use river water, and clean out regularly, and until inauguration of heating water by this new system never had any trouble. The water is quite at 200° on entering the force pump. We enter at mud drum. What would be the effect of putting feed water in at water line or above? Give us your views, and tell us the cause of our trouble. A. We think that if you enter the feed water into the body of the boiler nearer the surface of the water you would be relieved of your trouble.

(19) C. D. R. asks: Will a boiler made from galvanized iron be strong enough to run an engine one inch bore by 3 inch stroke, for experiment? A. Yes, if the iron is of proper thickness; but galvanized iron is very poor stuff for the purpose, and should be thicker than if vulcanized.

(20) J. L. asks: What is the simplest way to find out the distance the tail piece on a lathe should be removed from its central position to turn a given taper? Supposing I have a piece of steel one foot long, taper required one-tenth of one inch to every inch, how far would I have to remove the center from its central position? A. Set over the tail center one-half the total taper in the whole length; if it is one-sixteenth of an inch difference of diameter in a piece twelve inches in length, set over the tail center half of twelve-sixteenths or three-eighths of an inch.

(21) C. J. H. writes: In making quantitative blowpipe assay of gold and silver ores, charcoal is