

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.

In the advertisement of H. W. Johns Mfg Co. in last issue of this paper, the words felt packings should read flat packing. The advertisement as now inserted is correct.

Parties manufacturing Traction Engines suitable for log hauling are requested to correspond with Drew & Buck, Suwannee Steam Saw Mills, Ellaville, Florida.

Mica in sheet and scrap for sale in quantity to suit. Parties using Mica in any form please send for samples. Atlantis Land and Mining Co., Box 2762, Leadville, Col.

A No. 6 Root Blower, steel shafts of extra strength, and used less than four months, in good order. Charles L. Oudesly & Son, 6 Exchange Place, Baltimore, Md.

Wanted.—A live man (engineer preferred) to introduce the "Hydrostatic" Joint, for gas and water mains. A lead joint and the best in the world. A good opportunity for a competent man. W. Painter, 44 Holiday St., Baltimore, Md.

Asbestos Wick Packing for Valve Stems, etc., is one of the most desirable articles ever produced for use around steam. It is practically indestructible. H. W. Johns Mfg Co., 87 Maiden Lane, are sole manufacturers of genuine Asbestos materials.

New Economizer Portable Engine. See illus. adv. p. 108.

A New Fruit Jar. Simple and durable; easily opened; no mouldy fruit. Territory for sale. Address C. A. Barnes, Lockport, N. Y.

Portable Railroad Sugar Mills. Horizontal and Beam Steam Engines. Atlantic Steam Engine Works, B'klyn, N. Y. Portable Forges, \$12. Roberts, 107 Liberty St., N. Y.

For Sale.—Foundry and Machine Shop, third city in State; good business. Box 275, Winona, Minn.

For Sale.—Horse Detaching Patent. Best ever invented. W. R. Kitchen, Willard, Ky.

Hydraulic Jacks and Presses. Polishing and Buffing Machinery. Patent Punches, Shears, etc. E. Lyon & Co., 470 Grand St., New York.

Steam Engine for sale very low. See advertisement on another page.

A Rare Chance.—We have on hand a 40 H. P. Horizontal Oscillating Engine, built for special work, but never used. It is first-class in all respects; has patent guides to prevent wear; has balance wheel, but no pulley. Price \$350. Heald, Sisco & Co., Baldwinville, N. Y.

For Sale.—One Wood Turning Lathe, 20' swing, 14 ft. bed. Jig Saw and Face Lathe, for pattern work; also Blacksmiths' Tools. D. Frisbie & Co., New Haven, Conn.

Campbell's Self-acting Window Shade Rollers are the best in the market. Models and terms to the trade. 85 Centre St., New York.

Cheapest Portable Forges. H. Crumlish, Buffalo, N. Y.

Forsyth & Co., Manchester, N. H., & 213 Centre St., N. Y. Bolt Forging Machines, Power Hammers, Comb'd Hand Fire Eng. & Hose Carriages, New & 2d hand Machinery. Send stamp for illus. cat. State just what you want.

Electrical Indicators for giving signal notice of extremes of pressure or temperature. Costs only \$20. Attached to any instrument. T. Shaw, 915 Ridge Ave. Phila.

Partner Wanted.—See advertisement on inside page.

Instruction in Steam and Mechanical Engineering. A thorough practical education, and a desirable situation as soon as competent, can be obtained at the National Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.

Collection of Ornaments.—A book containing over 1,000 different designs, such as crests, coats of arms, vignettes, scrolls, corners, borders, etc., sent post free on receipt of \$2. Palm & Fechteler, 403 Broadway, New York City.

Best Oak Tanned Leather Belting. Wm. F. Forepaugh, Jr., & Bros., 531 Jefferson St., Philadelphia, Pa.

The Baker Blower ventilates silver mines 2,000 feet deep. Wilbraham Bros., 2318 Frankford Ave., Phila., Pa. 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. Bradley's cushioned helve hammers. See illus. ad. p. 110.

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

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

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.

Sheet Metal Presses, Ferrante Co., Bridgeton, N. J. Telephones repaired, parts of same for sale. Send stamp for circulars. P. O. Box 205, Jersey City, N. J.

Eclipse Portable Engine. See illustrated adv., p. 94.

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

For Sale Cheap.—The entire patent for best Egg Beater ever put on the market. See illustration in this number of the SCIENTIFIC AMERICAN. Address H. C. Mann, Frankford, Pa.

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

Solid and Opening Die Bolt Cutters, Screw Plates, and Taps. The Pratt & Whitney Co., Hartford, Conn.

Silent Injector, Blower, and Exhauster. See adv. p. 109.

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-papery Machines, etc., manuf'd by Bentel, Markedant & Co., Hamilton, Ohio. "Illustrated History of Progress made in Wood-working Machinery," sent free.

Linen Hose and Rubber Hose of all sizes, with or without coupling. Greene, Tweed & Co., New York.

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

Machine Diamonds. J. Dickinson, 64 Nassau St., N. Y.

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

For Superior Steam Heat. Appar., see adv., page 110.

For Pat. Quadruple Screw Power Press, see adv., p. 108.

Steam Cylinders bored from 3 to 110 inches. L. B. Flanders Machine Works, Philadelphia, Pa.

Valve Refitting Machine. See adv., page 110.

Cut Gears for Models, etc. Models, working machinery, experimental work, manufacturing, etc., to order. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Walrus Leather, Solid Walrus Wheels; Wood Wheels covered with walrus leather for polishing. Greene, Tweed & Co., 18 Park Place, New York.

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

The E. Morton & 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 45.

The Best Truss ever used. Send for descriptive circular to N. Y. Elastic Truss Co., 683 Broadway, New York.

Power Hammers. P. S. Justice, Philadelphia, Pa. p. 77.

For Shafts, Pulleys, or Hangers, call and see stock kept at 73 Liberty St., N. Y. Wm. Sellers & Co.

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

Hydraulic Cylinders, Wheels, and Pinions, Machinery Castings; all kinds; strong and durable; and easily worked. Tensile strength not less than 65,000 lbs. to square in. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

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

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.

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

Ore Breaker, Crusher, and Pulverizer. Smaller sizes run by horse power. Seep. 77. Totten & Co., Pitts'g.

Comb'd Punch & Shears; Universal Lathe Chucks. Lambertville Iron Works, Lambertville, N. J. See ad. p. 108.

Inventors' Institute, Cooper Union. A permanent exhibition of inventions. Prospectus on application. 733 Broadway, N. Y.

NEW BOOKS AND PUBLICATIONS. MILLS' DIRECTORY OF STEAM BOILER AND ENGINE OWNERS, ENGINEERS AND STEAM USERS IN NEW YORK AND BROOKLYN. New York: Jas. N. Mills. Price \$3.

Business men having dealings with engineers and steam users will readily appreciate the value of 6,000 names and addresses in lines in New York and Brooklyn. The book is neatly made.



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) E. F. J. S. B., and others.—The dose of salicylic acid recommended for rheumatism is from 5 to 10 grains two or three times a day.

(2) F. H. H. asks: What danger is there in an ordinary coal oil lamp (lighted) when about one third full, or has a large space between the oil and top of lamp? What does the space contain—explosive gas or atmospheric air? A. Unless the best quality of kerosene is used there is great danger of an explosion, as the lower grades of oils give off vapor at ordinary temperatures which, when mixed with a certain proportion of air, form an explosive which requires only fire to develop its power. Many lamp burners are so constructed that it is possible for fire to run down in the wick tube and ignite the explosive below.

(3) C. F. A. asks: Will you be so kind as to inform me, through the columns of the SCIENTIFIC AMERICAN, the relative cost and economy of the rotary engine as compared with other forms of the steam engine? A. While the cost of rotary engines is generally

somewhat less than that of the reciprocating, they have never yet been made to equal the latter in economy. The relative economy depends upon the character and construction of the rotary.

(4) E. H. M. asks: Will shellac varnish form a sufficient insulator for the wire in the helix of a magnet for telegraphic purposes? A. Yes, if carefully applied and wound before it becomes so dry and hard as to crack.

(5) P. S. asks whether it is possible to obtain an electric shock by simply holding the poles of a battery, or must I have a machine? A. You will require an induction coil like that described on p. 203, Vol. 39 (14), SCIENTIFIC AMERICAN.

(6) W. H. writes: I have a job in which there is one radiator that fills with water for about 30 minutes; it cracks and makes a great noise. Please tell me the reason of water and noise, and how to remedy it. I will give you the way the pipes are placed. I start from the boiler with a 2 inch main to the first riser to 1 radiator, then I reduce to 1 1/2 pipe to the next riser to 1 radiator, and then reduce to 1 1/4 to next riser to 1 radiator, and from this to the fourth and last radiator I reduce to one inch; there is about 30 feet between the two last radiators. It is the last or furthest from the boiler that is not working right, the second and third risers go to radiators on the third flat; the first and last are on the ground floor or store; the full length of the main from boiler is 65 feet. A. You do not send sufficient data for an intelligent reply, but judging from the action of the water and the noise, your pipes must be too small, or reduce in size too soon. According to the description given, a 1 1/2 inch pipe has to supply steam to every radiator except the first one. When the area of a 2 inch pipe is represented by 4, a 1 1/2 inch pipe is represented by 2 1/4, which in practice for long lengths should not be valued higher than 2. On page 356, No. 23, Vol. xii., it says: "Mains which have given the best results leave the boiler of sufficient size, and reduce very slowly, if at all, until very near the end."

(7) I. M. asks: 1. What is the horse power of an engine; cylinder diameter, 18 inches; stroke, 20 inches; revolutions per minute, 165; boiler pressure, 80 lb? A. If you call the average pressure on the piston 50 lb.—=212 horse power. 2. Where can I get and what is the best work on mechanical engineering and management and care of steam engines and boilers, and what will it cost? A. "Roper on Land and Marine Engines," "Edwards' Catechism of the Marine Engine," for sale by industrial publishers who advertise in our columns.

(8) J. C. J. asks what books to buy on steam engineering. A. See reply to I. M., above.

(9) C. H. C. writes: I have six cells of a battery, the outer cup or jar is glass, and into this fits a porous cup containing a carbon core and some other ingredients. I also put in the bottom of the cells salammoniac, to produce the electricity. The point I desire to ascertain is, How much salammoniac should I keep in the cells to insure it in a working condition at all times? A. Enough salammoniac should be placed in the cell to form a saturated solution. It will do no harm if some of the crystals are left undissolved in the bottom of the jar.

(10) "Printer" asks: 1. Will a windmill run a cylinder printing press having a reverse motion unlike others? A. We think the speed would be too irregular. 2. Does a windmill always run machinery in the same direction? A. Yes. 3. Can it be regulated as regards speed by anything like a governor? A. Yes; governors are generally used in connection with the best windmills.

(11) H. L. B. asks: 1. Are the wheels of the Hudson River steamers Vibbard and Powell placed precisely amidship? A. They are not precisely in the middle of length, and we do not know their exact position. 2. What are the Powell's dimensions and size of engines and boilers? A. Length 290 feet by 34 feet beam, out to out, by 9 feet 4 inches hold; engine, 72 inches cylinder by 12 feet stroke; 2 boilers, 10 feet diameter of waist, and 25 feet in length.

(12) J. P. M. asks: 1. Is there anything better than a lever to secure a great power in a small space where but little motion is required? A. You might employ the principle of the hydraulic press. 2. If a system of compound levers is used, and not enough motion, can any arrangement be made that will give the increased motion without diminishing the power? A. No.

(13) C. M. writes: I see in No. 2 of SCIENTIFIC AMERICAN of 1880, in query No. 11, of W. S. W., how to find the cubic contents of a cylinder, your answer is to multiply the diameter by the decimal 0.7854. I wish to make a correction. It is to multiply the square of the diameter, that is, the diameter multiplied into itself, by the decimal 0.7854 to get the area, then multiplying by the length you get the cubical contents. [You are correct. By some oversight the diameter was given for the square of the diameter.]

(14) H. S. C. asks: 1. How many bushels of coke will it take to melt 1,000 lb. iron in an ordinary medium sized tuyere cupola? A. From 240 to 280 lb. to one ton. Much depends upon the form and proportions of cupola. 2. How many pounds of coal will it take to melt same amount under same circumstances, had in both cases to be counted in; whole heat to melt about 10,000 lb. iron, in four charges? A. With anthracite coal and good furnace, from 10 to 12 lb. iron are melted to the pound of coal consumed. 3. About how many bushels of coke will a ton of bituminous coal make if coked to best advantage? A. From 60 to 75 per cent of weight of coal.

(15) E. S. E. writes: A company of gentlemen have agreed to ask your opinion upon a question which hopelessly divides them. I maintain that the reason a railroad engineer is placed upon the right side of his locomotive (thereby compelling him to use his left hand to control the levers) is because it is natural for him to do so; that is, the instinctively uses his left hand for many delicate operations, and his right where

strength is the main requirement. In violin, and occasionally in piano playing, this appears. My opponents, say that the mentioned peculiarity of locomotives is accidental. I contend that there is a reason for it, and that it is only a recognition of a fact, which though not explainable, is patent to all. A. There is no special reason for the position of the engineer except habit and custom. Some years since, on several railroads the engines passed on the left side of each other, that the engineer might have a clear view of approaching trains; but we believe that in every case they have now changed to pass on the right, as is now the rule.

(16) F. H. L. writes: 1. Suppose a windmill built with sails in the ordinary manner, but not turning to face the wind, and suppose friction, etc., reduced to a minimum. Would the number of turns per minute vary as the velocity of wind, when the wind was in the direction of the axis? That is, if n=number revolutions per minute, v=velocity in miles, and C some constant, should we have n=Cv? A. Yes, the pressure is as the velocity. 2. If the wind made an angle, A, with the axis, should we have n=Cv cos A? A. Whatever angle the course of the wind makes with the axis, the speed will vary as the velocity of the wind so long as the direction is unchanged.

(17) H. M. asks: 1. What are the chemical properties of telegraph wire? Which of its separate properties act as a conductor of electricity? A. All metals, as well as many non-metallic substances, are to a certain extent conductors of electricity. The precise manner in which electricity is transmitted through these is not definitely known. As to the chemical nature of metals, consult some elementary work on chemistry. 2. Is there anything of a transparent nature a conductor of electricity—either a liquid or solid, solid preferred—that will not be affected by the current? A. We know of no such substance. Acidulated water conducts electricity, but slowly suffers decomposition by its action.

(18) Short Hand.—"Student" and others ask: 1. What is the best system of short hand? A. There is no demonstrably "best" system. Any one of numerous systems in use will serve well enough as a basis for the beginner. Ultimately every successful reporter has to develop his own system in accordance with his experience and the requirements of his own hand and mind. The man who has the rare qualifications of quick and tenacious memory, unlimited patience, nice discrimination of form, and capacity for manual skill, requisite for rapid reporting, will succeed with any system. Some of the most successful reporters have based their writing on ordinary script. 2. Can short hand be learned without a teacher? A. Probably nine out of every ten reporters have acquired the art without a teacher. A good teacher, however, will be of great assistance to the learner. 3. How long will it take to learn to report? A. Three months under good instruction, with several hours' daily practice, will suffice for easy work, proper capacity and industry on the part of the learner being assumed. The great majority of those who attempt the art, however, fail to acquire skill enough, after years of practice, to report a fairly rapid speaker. 4. Are there any good books on the subject? A. Any bookseller's list will show numbers of them, each and all guaranteed to be the very best. 5. Is reporting a profitable occupation? A. No, generally speaking. Still there is no occupation which cannot be made to yield a living, often very much more, to any one of proper capacity who will pursue it with prudence, zeal, and energy. Considering, however, the great time and labor required to master the art of short hand reporting, and the low average reward, the occupation is not an inviting one. Nevertheless as an auxiliary to other lines of business short hand is well worth studying by any one who has time for it. The incidental training of hand and eye and memory is valuable.

(19) R. B. N. asks (1) how to cut carbon sticks in the best manner. A. A hardened steel point drawn along a straight edge, and at the same time pressed against the carbon with considerable force, will cut it if the strokes are repeated a sufficient number of times. 2. What mixture with bichromate of potash is used in the battery which consists of a zinc plate suspended between two carbon plates? A. Dissolve 2 parts of bichromate of potash in 20 parts of warm water. When cold add slowly 1 part of sulphuric acid. 3. Is there a cheap device by which I can wind wire on an iron core for an induction coil? A. See directions for making an induction coil, p. 203, Vol. 39, SCIENTIFIC AMERICAN, and SUPPLEMENT, No. 160.

(20) W. H. A. writes: There are being constructed in Illinois a line of towers extending longitudinally across the State, made of wood, frame of pyramidal shape, ranging from 125 to 200 feet high, from 1 to 3 miles apart, as we understand. What is their purpose? A. They are used by the engineers in the United States Survey Service in triangulation.

(21) G. S. J. asks (1) if platinum is fusible in the electric arc of the ordinary carbon lamp. A. Yes. 2. Is there any substance that is not fusible in the electric arc, and at the same time a non-conductor of electricity? A. There is no known substance that has these qualities.

(22) L. M. writes: 1. All our machinery is not having been run more than four months. We have a battery of five boilers, one of which has on the first sheet a flaw in the iron above the fire box about 1-3 of the way up the side of the boiler; it is about 12 inches long and has a ragged appearance. This outside shell is about 1/2 thick. The boiler is of 3/4 plate. We carry 80 to 95 lb. steam. Do you think it is dangerous to run it in this condition? A. Yes; repair your boiler before using. 2. Our hoisting engines are strongly built, size of cylinder 12x20, the best time we can make is 9 seconds; throttle open wide, 90 lb. steam. The coal is hoisted one hundred feet out of a shaft. How can I make the engines quicker, without increasing the steam pressure? The valves have 1/2 lead, 3/8 lap, steam cut-off at 3/4 stroke. A. We think you cannot make them quicker, if you have now proper size of openings. 3. Is there any such an invention as an apparatus for opening the doors of locomotives by means of levers or springs? A. We know of no such thing in practical use.