

Business and Personal.

The Charge for Insertion under this head is \$1 a Line.

Matson's Combination Governor—Sold under full guarantee. Address Matson Bros., Moline, Ill.

For Durkee Saw Mills, address the Manufacturers, T. B. Bailey & Vail, Lockport, N. Y.

A. R. Houghton, Jefferson, O., wishes to communicate with manufacturers of kerosene lamp burners.

Wanted, the Management and Manufacture in England of American Inventions that have been introduced in America and are patented in England.

Joheson's Universal Lathe Chuck. Address Lambertville Iron Works, Lambertville, N. J.

Auger that bores a hole two sizes at one time wanted. Address, with description, Jos. Baker, Norfolk, Va.

The Whitmore Patent Engine—4 to 10 H.P. Cheapest, best, and safest. Send for Price List. Lovegrove & Co., Philadelphia, Pa.

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For Sale, \$2,500—Two Patents, saleable. Address H. S. Bail, Spartanburg, S. C.

E. H. Jones, Milwaukee, Wis., desires to communicate with parties who supply Machinery, and know how to make Matches, especially the "parlor matches."

For Sale—Tools of Machine and Boiler Shops. Walter McCollum, 333 Pearl St., New York.

The Lane Mfg Company, Montpelier, Vt., will exhibit Circular Saw-Mill, Rotary Bed Surfer, and Clapboard Planer, at Fair of the Mass. Char. Mech. Association, Boston, Sept. 16 to Oct. 7. Sample machines may also be seen at W. L. Chase & Co.'s, 95 Liberty St., New York City.

18x42, 16x36, 14x30, 12x24, 12x30, 11x14, 11x24, 10x12, 10x15, 9x12, 9x16, 9x18, 8x12, 8x16, 8x20, 7x12, 7x16, 7x20 6x6, 6x12, 5x11, 4x6, 4x8, 3x6, 3x9 Engines, and 25 others 2d hand, thoroughly overhauled, warranted reliable, with upright and hor. Boilers, Steam Pumps, and miscellaneous mach. ery: reasonable figures. S. H. P. Baxter Eng., Air Compressor, Vacuum and Air Pumps. Wilson & Roske, Water and Dover Sts., New York.

Wanted—100,000 of Davis' Hay and Cotton Presses made on royalty. Address O. A. Davis, Ashland, Oregon.

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Baxter's Adjustable and S Wrenches by the Case. Greene, Tweed & Co., 18 Park Place, New York.

To Manufacturers and Amateurs—Solutions for covering all kinds of metals with different metal, either by Electro Plating or chemical process, always on hand, with reliable direction for use. Address Alb. Lovie, 222 N. 4th St., Philadelphia, Pa.

Wanted—Address of Lamp Burner Manufacturers. Milton Church, Pittsburgh, Pa.

Double-Acting Bucket Plunger Steam Pumps, Manufact'd by Valley Machine Co., Easthampton, Mass. N. Y. Store, 45 Cortlandt St.; Phila. Store, 132 N. 3rd St.

Diamond Carbon, of all sizes and shapes, for drilling rock, sawing stone, and turning emery wheels; also Glaziers' Diamonds. J. Dickinson, 61 Nassau St. N. Y.

Electric Bells for Dwellings, Hotels, &c.—Most reliable and cheapest Hotel Annunciator. Cheap telegraph outfits for learners. Inst's for Private Lines, Gas Lighting Apparatus, etc. J. H. Hessin, Sc. Cleveland, O.

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Best Oak Tanned Leather and Rubber Belting. Greene, Tweed & Co., 18 Park Place, New York.

Pattern Letters and Figures, to put on patterns of castings, all sizes. H. W. Knight, Seneca Falls, N. Y.

Inventors can get small plates of sheet steel very cheap, at the saw factory, 108 Hester St., New York.

The "Scientific American" Office, New York, is fitted with the Miniature Electric Telegraph. By touching little buttons on the desks of the managers, signals are sent to persons in the various departments of the establishment. Cheap and effective. Splendid for shops, offices, dwellings. Works for any distance. Price \$5. F. C. Beach & Co., 263 Broadway, New York, Makers. Send for free illustrated Catalogue.

The Improved Hoadley Cut-off Engine—The Cheapest, Best, and Most Economical steam-power in the United States. Send for circular. W. L. Chase & Co., 95 & 97 Liberty St., New York.

Telegraph Inst's. M. A. Buell, Cleveland, O. Compound Propeller Pumps, for Mines, Quarries, Canals, and Irrigating purposes. Circulars on application to Hydrostatic and Hydraulic Company, 913 Ridge Avenue, Philadelphia, Pa.

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

Portable Engines, new and rebuilt 2d hand, a specialty. Engines, Boilers, Pumps, and Machinists' Tools. I. H. Shearman, 45 Cortlandt St., New York.

For Sale—Two Steam Saw Mills and three Farms, by C. Bridgman. St. Cloud, Minn.

Deane's Patent Steam Pump—for all purposes—Strictly first class and reliable. Send for circular. W. L. Chase & Co., 95 & 97 Liberty St., New York.

Spinning Rings of a Superior Quality—Whitinsville Spinning King Co., Whitinsville, Mass. Send for sample and price list.

The Pickering Governor, Portland, Conn. Mechanical Expert in Patent Cases. T. D. Stetson, 23 Murray St., New York.

Gas and Water Pipe, Wrought Iron. Send for price list to Bailey, Farrell & Co., Pittsburgh, Pa.

Forges—(Fan Blast), Portable and Stationary. Keystone Portable Forge Co., Philadelphia, Pa.

Brown's Coal yard Quarry & Contractor's Apparatus for hoisting and conveying materials by iron cable. W. D. Andrews & Bro., 414 Water St., New York.

For Solid Emery Wheels and Machinery, send to the Union Stone Co., Boston, Mass., for circular.

Lathes, Planers, Drills, Milling and Index Machines. Geo. S. Lincoln & Co., Hartford, Conn.

Saws made & repaired at 108 Hester St., N. Y.

Mining, Wrecking, Pumping, Drainage, or Irrigating Machinery, for sale or rent. See advertisement. Andrew's Patent, inside page.

Automatic Wire Rope R. R. conveys Coal Ore, &c., without Trestle Work. No. 34 Dey street, N. Y.

A. F. Havens Lights Towns, Factories, Hotels, and Dwellings with Gas. 34 Dey street, New York.

Temples & Oilcans. Draper, Hopedale, Mass. Buy Boulton's Paneling, Moulding, and Dove-tailing Machine. Send for circular and sample of work. B. C. Mach'y Co., Battle Creek, Mich., Box 227.

Rue's "Little Giant" Injectors, Cheapest and Best Boiler Feeder in the market. W. L. Chase & Co., 95 & 97 Liberty Street, New York.

For Surface Planers, small size, and for Box Corner Grooving Machines, send to A. Davis, Lowell, Mass.

For Best Presses, Dies and Fruit Can Tools, Bliss & Williams, cor. of Plymouth & Jay, Brooklyn, N. Y.

Price only three dollars—The Tom Thumb Electric Telegraph. A compact working Telegraph apparatus, for sending messages, making magnets, the electric light, giving alarms, and various other purposes. Can be put in operation by any lad. Includes battery, key and wires. Neatly packed and sent to all parts of the world on receipt of price. F. C. Beach & Co., 263 Broadway, New York.

All Fruit-can Tools, Ferracite, Bridgeton, N. J. Peck's Patent Drop Press. For circulars, address Milo, Peck & Co., New Haven, Conn.

Small Tools and Gear Wheels for Models. List free. Goodnow & Wightman, 23 Cornhill, Boston, Ms.

The French Files of Limet & Co. are pronounced superior to all other brands by all who use them. Decided excellence and moderate cost have made these goods popular. Homer Foot & Co., Sole Agents for America, 20 Platt Street, New York.



S. will find directions for making blackboards or slaty surfaces on p. 91, vol. 30.—W. A. G. will find directions for cleaning brass on p. 102, vol. 25, and for bronzing it on p. 331, vol. 29. For removing mildew, see p. 133, vol. 27.—N. V. H. will find full directions for gliding picture frames on p. 75, vol. 28.—C. R. H. can copper his iron wire by the process described on p. 154, vol. 26, or galvanize it as detailed on p. 59, vol. 24.—G. C. L. will find a recipe for black indelible ink on p. 273, vol. 28, and for red on p. 159, vol. 28. Directions for making rubber stamps are given on p. 156, vol. 31.

(1) G. L. H. asks: Of what is the composition made that is used by dentists in filling teeth, in place of gold? Is it of such a nature as to make an electric battery of one's mouth, if gold is used also? What is the probable effect upon the health? A. Improper union of metals in the filling of a tooth is frequently a source of irritation to the dental pulp. Tin foil is sometimes placed in the bottom of a cavity, and the operation finished with gold. In many, not in all instances, this composition produces a galvanic action, which, if not removed, will quickly destroy the pulp.

(2) N. A. W. says: I have a small spring of running water which seems to be a favorite resort for crawfish, notwithstanding my earnest efforts to exterminate them. Is the presence of these crawfish in the spring an indication of pure or impure water? A. Crawfish or crayfish (astacus fluviatilis) are found not only in springs, but more or less in every brook and river. In the Mammoth Cave of Kentucky, a species has been discovered. They are not considered injurious to the water, and their presence is not an index whether the water is pure or not, though they are found more frequently in pure water.

(3) S. A. T. asks: How can I make an attractive light in a store window? A. Use a carbureter, described on p. 579, vol. 30. What can I put in paste to keep the swarms of small flies from breeding in it? A. A little carbolic acid. How can I coat nails with copper? A. A saturated solution of sulphate of copper in water is what is usually employed for this purpose. The articles to be coppered should first be freed from grease by immersion in lye water, washed, and immersed in dilute sulphuric for a short time. Can I nickel plate an article after it has been coppered, simply by dipping for a quarter of a second? A. We can find no record of such nickel plating as you speak of.

(4) E. R. asks: I am using a lamp that has 93 cotton wicks in it, and is about a yard and a half long, burning alcohol, for singeing the long fibers of cloth. As the alcohol is expensive, what oil can I substitute for it that would be safe, cheaper, and yet make little or no smoke? A. We know of no oil that will replace your alcohol. If your place is supplied with gas, a modification of the Bunsen gas lamp might be used with advantage, and would certainly be much cheaper than the method you now employ.

(5) H. S. B. says: I have been studying methods of decomposing kalm into Epsom salts, sulphate of potash, and common salt. Can you assist me to solve the problem? My samples contain sulphate of magnesia 32.50, sulphate of potash 28.52, chloride of sodium 20.55, chloride of magnesia 4.21; the rest is insoluble residue. A. Your best plan would be to state your methods; to write at length the various ways which suggest themselves would require too much space.

(6) D. S. H. says: I have a spy glass with 5 glasses; it is 3 feet long and defines the moons of Jupiter well. Will a telescope with 5 glasses, of the same length, do as well? A. No. 2. Could one be made with 2 glasses, suitable for a beginner? A. No. An object glass must be made in two pieces, one each of crown and flint glass, or the image has colored fringes, is distorted, and injures the eyesight.

(7) E. G. asks: What is the easiest and cheapest way of cleaning dirty cotton waste? A. Boil it in a strong solution of common soda in water, and save the resultant soapy liquid to keep your drills and reamers wet when boring iron.

(8) E. J. K. asks: What is the right process for tempering steel to make it cut French burr stone or hardest flint, or to make it drill the hardest steel, such as rat-tail files? A. Forge your tools, if of English steel, at a moderate red heat, but not hot enough to scale; do not hammer it after it has lost its redness. Heat it to a low red heat; for hardening, dip it in salt water with the cold chisel taken off, and temper it to a brown, dipping it according to the instruction given by Mr. Rose on p. 21 of our current volume. If you are using American chrome steel, heat it to a yellowish heat for forging, to a low red for hardening, and quench right out.

(9) L. M. D. asks: What is animal charcoal? A. Animal charcoal is made from bones and animal matters, and is a very valuable substance, on account of the extraordinary power it possesses of removing coloring matters from organic solutions; it is used for this purpose by the sugar refiners and scientific and manufacturing chemists.

What is animal glycerin? A. It is obtained by the action of alkalies on natural fats. Stearin, for instance, when boiled with a caustic alkali, is converted into a stearate of the alkali metal and glycerin. It is now produced in very large quantities and perfect purity in the decomposition of fatty substances by means of superheated steam. Glycerin is a nearly colorless and very viscid liquid, of specific gravity 1.27. It has no action on vegetable colors.

(10) P. M. S. O'F. asks: Are a perspective drawing and photograph, of the same object, from the same point of view or distance, identically alike? A. No.

(11) B. B. B. asks: 1. Why does some water eat or corrode the lead pipes in wells? What property must be in the water in order to dissolve lead? Is water drawn through lead poisonous? A. Lead is acted upon by distilled water and by rain water. Water, by reason of its affinity for the oxide of lead, acts like an acid upon metallic lead. Lead pipes through which such water passes in a short time become covered with a pellicle of carbonate of lead, which is an energetic poison. The presence of a very small quantity of foreign matter in the water, and especially of sulphate of lime, usually arrests this action, and renders the use of lead pipes in a majority of cases not hazardous. 2. Is galvanized iron pipe injurious to the water? A. No. In this case a film of the oxide is formed on the zinc, which is insoluble in water, and, for this reason, protects it from further oxidation. 3. What kind of pipe is the best through which to draw water for drinking purposes? A. Pipes lined with block tin.

(12) J. W. S. asks: How are photographic impressions transferred to lithographic stones in order to be printed from? A. Osborne's process is to take a negative on glass coated with collodion, as usual. A piece of gelatinized paper is now exposed to the action of light under the negative. The copy is covered with transfer ink; this is done by running it through a press in contact with a stone which has already received a coating of such ink. The paper, thus blackened, is made to float upon the surface of boiling water, the blackened side up. It is next taken out and washed with a sponge; the parts acted upon by light hold fast to the ink, while all other parts are completely washed off. A stone is now slightly warmed and put in the press; upon it is placed the positive print (inverted) after it has been dampened. The whole is then pressed. On removing the paper the ink is found attached to the stone and a reverse picture is made on the stone. 2. Are gelatin prints more readily transferred to stone than silver prints? A. Yes. You should consult a practical lithographer as to your other questions.

(13) E. V. W. says: About a year ago I replaced a small lead pipe with a 1 inch galvanized iron pipe. To my great annoyance, this iron pipe has almost closed with a hard substance resembling iron ore. How can I clear the pipe? A. The pipe probably has become filled with carbonate of lime, magnesia, iron, etc., deposited by the spring water, especially the carbonates of lime and iron. If it is practicable, muriatic acid could be used to dissolve the deposits. But the trouble is in the mineral constituents of the water and not in the tube. If the excess of lime and other salts which the water contains were previously precipitated out of it (as is sometimes done by the addition of lime water in a settling reservoir), the difficulty might be overcome.

(14) J. A. asks: 1. Will a current from a common magneto-electric machine induce magnetism in an electro-magnet? A. Yes. 2. If so, how does it compare in power with the Daniell battery current? A. This depends upon the size of the machine used. 3. If a magnet supports 5 lbs. in contact with its poles, how much will it support at 1/2 inch and 1/4 inch distance respectively? A. The attraction would vary inversely as the square of the distance from the poles. 4. In a Daniell battery, having 3 square feet of copper surface, and also 3 square feet of zinc surface, the whole comprising only 1 cell, how much sulphate of copper and how much zinc will be required to keep it in its most powerful state of action for a week? A. Enough sulphate of copper to keep the outer solution constant saturated. Sulphate of zinc is not necessary. 5. How long must the silk-covered No. 22 copper wire (covering the iron cores of an electromagnet) be to obtain the greatest magnetic force of such a battery? The battery is to be but 2 feet from the electromagnet. A. You have forgotten to state the size of core.

Where is the fallacy in the following demonstration that 2 equals 1? Let x=1 and y=1. Then x=y, x^2=xy, and x^2-y^2=xy-y^2. Dividing the last equation by x-y, x+y=y, or y+y=y or 2y=y, 2=1. A. In dividing the equation, x+y=y + (-y^2)/(x-y) and not x+y=y, x^2-y^2=xy-y^2 divided by x-y is equal to x+y+y+(-y^2)/(x-y).

(15) W. R. asks: 1. To be a machinist, should I continue practice in drawing? A. It is important that you should understand the art of drawing. 2. Which branch of figures ought I to study? A. For facilitating calculation, you should master arithmetic, algebra, geometry, trigonometry, and logarithms. 3. What books shall I read on mechanics, etc.? A. You will find a good elementary treatise on mechanics in Silliman's "Physics."

(16) R. K. says: In Mr. J. Rose's recipe for case hardening, he says: Use 1 gallon urine to a certain quantity of bone, etc. Would a certain quantity of sal ammoniac do as well? A. The urine is the best, and the hoof and leather process is better than the bone dust.

(17) C. G. M., Norrtelje, Sweden—We doubt whether birchwood sawdust has any value. It might be well for you, however, to insert a notice in our "Business and Personal" column.

(18) X. X.—The electrical treatment under the care of an experienced physician will doubtless benefit you.

(19) J. H. H. asks: What ought I to do in order to be a good engineer? A. It will be necessary for you to have education and practice, to become a good engineer. There are numerous good schools for giving the former, and shops for the latter.

(20) F. L. asks: At what speed should a 50 inch circular saw run in oak, elm, and cotton wood? A. Between six and seven hundred revolutions a minute would be a good speed.

(21) J. J. says: Mr. Rose in his late article on vice work says that, if his instructions are followed a polish may be obtained much finer than by using of stone, or by any other method. Can filing be done so fine that the marks are not visible? A. Yes.

(22) W. S. J. says: I suggest the following for car ventilation: Air to be received at the head of engine by funnel-shaped apparatus, and carried back to the cars by proper connections. Suitable means for distributing it to be placed in the cars, so as not to create too much draft. In winter the air could be passed through the engine furnace for the purpose of warming it. What are the objections to this? A. The idea is by no means novel.

Our place is supplied with water by the Holley system. In drawing water I have often noticed regular pulsations in the flow, which I attributed to the pumps situated a mile from town. How long does it take to transmit the above pulsation? A. It is instantaneous. Can you give an explanation of the duplex system of telegraphy? A. You will find it clearly explained in Pope's work on telegraphing.

(23) G. says: I send you two specimens of tyre turnings (one from each end of a piece 65 feet long, which broke at the point indicated) turned from a locomotive driving wheel 4 1/2 feet in diameter. Have you any knowledge of longer turnings? A. Your specimen of turnings is an excellent one, on account of its thickness. We have seen longer ones, up to 170 feet long, but considering the coarse feed your shaving was cut at it is an unusually fine specimen.

(24) W. J. W. asks: 1. Is it a practicable thing to use a rubber hose to carry steam to an engine that is movable, the boiler being stationary? A. Yes. 2. How far can it be carried, out of doors, with the thermometer at -20° Fah.? A. It would not be economical to carry it any distance without covering it well.

(25) E. C. H. says: The balloon Buffalo ascended from that city on July 4. I estimate that the cost of filling this balloon (91,000 cubic feet) with hydrogen gas would be upwards of \$2,000. Is this a correct estimate? What kind of gas was this balloon inflated with, and what did it cost? A. Balloons are ordinarily filled with illuminating gas, which costs about three dollars a thousand cubic feet.

In filling a handsaw, should the file be held level across the saw (for cross-cutting), or at an angle? A. At an angle.

1. What is the history of the gyroscope? A. See p. 91, vol. 31. 2. Is \$5,000 reward offered for a scientific explanation of it? A. No. Is there any machine, for cutting up the odds and ends of cigars, that works satisfactorily without first pressing the bulk to be cut? A. We do not know of any.

(26) J. H. H. asks: What is the amount of coal it will require per hour to retain steam in a boiler at a certain pressure per square inch, said steam being first raised to that pressure? In other words, what amount of coal must be used to restore the heat lost by radiation only? A. This is a question that must be determined by experiment for each individual case.

(27) C. E. T. asks: Can malleable cast iron be welded? A. We believe not.

(28) F. L. P. asks: What distance will a boat travel down stream, if she will make eight miles an hour up stream, and the current is four miles an hour? A. Twelve miles an hour.

(29) J. M. C. says: I have a number of loose tiles, in a large tiled floor. I have had them re-laid in new cement, after chiseling out the old, which was crumbled to powder; but they loosen again. Can you suggest any composition to reset them in, that would be impervious to water and would harden firmly enough to keep them steady? A. Put a little lime into the cement mortar, that it may not set too soon, and grow it in; that is to say, have it so thin that it will flow into all the interstices of the adjoining tiles. Have plenty of depth of mortar under the tiles; and as you lay the latter, press it down upon the mortar, but leave the face of it projecting about 1/4 of an inch above the other tiles: as the mortar hardens, press the tile down, so as to bring it even with the others at about the time the mortar is set.

(30) C. P. says: Suppose that the roof of a building has a span of 100 feet, length 200 feet, and pitch 45°. The weight of roof is 20 or 30 lbs. per square foot. What is the rule to find the required strength of girders and trusses to sustain it? A. For form of truss and rules to determine the size of the various timbers and bolts of which it is constituted, consult Hatfield's "American House Carpenter," article "Framing."

(31) D. B. T. says: I propose to serve compressed air to customers in the same way that gas is now served, only that the air will be under a pressure of 500 lbs. to the inch, more or less. At this pressure, it will have a refrigerating power far superior to that of ice, when allowed to expand in contact with any article which it may be desired to freeze. The mechanical energy contained in the air may be used at the same time that its frigorific powers are expended, which will make it doubly valuable for domestic purposes. The hottest places in our cities could be rendered delightfully cool, at a small cost compared with the use of ice for the same purpose. It would soon be as common to see persons turn on the air to cool their houses, as it is now to see them turn on the gas to light them. A. If you have such a successful air compressor, you will find a large demand for it for operations in which compressed air is at present employed.

(32) W. J. W. says: I am putting up an engine for the purpose of running a cotton gin. I have a well, but the water is brackish. What effect will it have on the boiler? A. It will probably make scale in the boiler if you do not blow off frequently.

(33) I. H. L. asks: 1. When waterworks have a stand pipe, is the water forced to the top of the pipe to get the necessary pressure, or is the upper end of the stand pipe closed and the water forced through the street pipes (or elevated to a reservoir) by compression of the air in the stand pipe? A. A stand pipe is closed at the top. 2. Can you explain the principle of the Chicago water works, which use a stand pipe and a small reservoir built of boiler iron, but not nearly as high apparently as the stand pipe, nor large enough to contain one tenth of the water used. A. In Chicago the water flows through the mains from the reservoir which is kept full by the pumping engine.

(34) R. B. & R. C. say: We are young men wishing to be mechanical engineers. Is the Cooper Institute of New York a good place to get a thorough training? Could we get employment in the trade to enable us to live in New York, for the purpose of studying at the Institute? A. The instruction at the Cooper Institute is free, and is given in the evening, so that if you could get a situation in this city, you could pursue your studies very well.