

Business and Personal.

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

Dry Steam, dries green lumber in 2 days, and warms houses. Circulars free. H. G. Bulkley, Cleveland, Ohio.

Air Compressors—Manufacturers will please send Circulars to National Mining and Exploring Co., Helena, M. T.

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The most Perfect Power Hammer—Exclusive Right for sale, or built on Royalty. Particulars of Samuel Pennock, Kennett Square, Pa.

Cannon's Patent Dumb Waiter for Dining purposes is admirable. Will remain stationary at any point, loaded or empty, without being fastened. Can be operated from any floor with which it communicates. Price, \$45 to \$80. A. Cannon, Jr., Poughkeepsie, N. Y.

Wanted—A first class 2d hand Screw Cutting Lathe, 6 or 8 ft. bed, 16 or 18 in. swing. A. L. Bender & Co., Wilmington, Del.

A Sample of the Combined Whip and Rein Holder, illustrated in another page, will be mailed by the patentee on receipt of 75 cents.

The Fleetwood Scroll Saw for Amateurs, Wood Carvers, Jewelers, Model Makers, &c. See advertisement page 252. Trump Bros., Wilmington, Del.

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

Wanted—A cheap, simple Boiler, 1/2 H.P., with fixtures complete, to carry from 20 to 30 lbs. of steam;—adapted for use in water mills for steaming wheat. Address P. B. Hunt, Council Bluffs, Iowa, Patentee and Manfr of Hunt's Pat. Wheat Steamer & Dryer.

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

All Fruit-can Tools, Ferracute, Bridgeton, N. J.

Brown's Coalvay 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.

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Temples & Oilcans. Draper, Hopedale, Mass.

Hydraulic Presses and Jacks, new and second hand. E. Lyon, 470 Grand Street, New York.

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.

To Rent—46x146 feet in one room, easy of access and constant power for manufacturing. Within 10 rods R.R. Depot and Erie Canal. Penfield & Tarbox, Lockport, N. Y.

Wanted—Hand Stave Joiner. Address J. Stoney Porcher, Bonneau's Depot, S. C.

Newcastle Grindstones for Locomotive Work. J. E. Mitchell, Philadelphia, Pa.

"The Best Book on Elementary Mechanics." The Apprentice, or First Book for Mechanics, Machinists, and Engineers. By Oliver Byrne. 71 Engravings. 12mo., cloth. \$1.50. Sent post paid, by A. J. Fisher, 98 Nassau St., New York.

Stephoe, McFarlan & Co., No. 212 to 220 West 2d St., Cincinnati, Ohio, manufacturers of Wood-working Machinery and Machinists' Tools. Send for circulars.

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, 30 Platt Street, New York.

A. P. Morris, Northfield, Minn., wishes the address of Geo. Kirchhoff, patentee of machine for Purifying Butter, which was recently illustrated in this paper.

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

Two 50 H. P. Tubular Boilers for Sale (Miller's patent) very low, if applied for soon. Will be sold separately or together. Complete connections and pump. Holske Machine Co., 279 Cherry Street, New York.

Lovell's Family Washing Machine, Price \$5. A perfect success. Warranted for five years. Agents wanted. Address M. N. Lovell, Erie, Pa.

To Capitalists—To be sold, one half of patent Steam Street Car. Will put a car on the road for the benefit of all concerned. For particulars, address W. W. Crane, Auburn, N. Y.

Brass Castings of superior quality. Send your patterns to Bailey, Farrell & Co., Pittsburgh, Pa.

Notice to Inventors—Our Guide Book for the sale of Patents explains new and improved methods for disposing of rights. Send stamp for circular and synopsis of contents. S. S. Mann & Co., cor. Linden Av. and Hoffman St., Baltimore, Md.

Buy Boul's Paneling, Moulding, and Dove-tailing Machine. Send for circular and sample of work. B. C. Mach'y Co., Battle Creek, Mich., Box 227.

Emerson's Patent Inserted Toothed Saws, and Saw Swage. See occasional advertisement on outside page. Send Postal Card for Circular and Price List. Emerson, Ford & Co., Beaver Falls, Pa.

Spools, Button Molds, and all small turned goods made by H. H. Frary, Jonesville, Vt.

Wanted—A first class Machine, known among Hinge Makers as a Slitting Machine. Address Wheeling Hinge Company, Wheeling, W. Va.

Steam Fire Engines—Philadelphia Hydraulic Works, Philadelphia, Pa.

Bone Mills and Portable Grist Mills.—Send for Catalogue to Tully & Wilde, 20 Platt St., New York.

Waterproof Enameled Papers—all colors—for packing Lard and other oily substances, Chloride of Lime, Soda and similar Chemicals, Cartridges, Shoe Linings, Wrapping Soaps, Smoked or Dried Meats, and Dried Vegetables, Shelf Papers, and all applications where absorption is to be resisted. Samples on application. Crump's Label Press, 75 Fulton St., New York.

Amateur Astronomers can be furnished with good Telescopes at reasonable prices. For particulars, address L. W. Sutton, Optician, Box 218, Jersey City, N. J.

For descriptive circulars, and terms to Agents of new and saleable mechanical novelties, address James H. White, Newark, N. J., Manufacturer of Sheet and Cast Metal Small Ware.

Paragon Gold Quill Pens—The best in use. C. M. Fisher & Co., 102 Fulton Street, New York.

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., 260 Broadway, cor. Warren St., New York.

Self-Cleaning Lard and Butter Cutter. Sample 30c. Agents wanted. Wm. M. Bleakley, Verplanck, Westchester County, N. Y.

Engines, Boilers, Pumps, Portable Engines (new & 2d hand). I. H. Shearman, 45 Cortlandt St., N. Y.

Automatic Wire Rope R. R. conveys Coal Ore, &c., without Trestle Work. No. 61 Broadway, N. Y.

A. F. Havens Lights Towns, Factories, Hotels, and Dwellings with Gas. 61 Broadway, New York.

Best Philadelphia Oak Belting and Monitor Stitched. C. W. Army, Manufacturer, 901 & 903 Cherry St., Philadelphia, Pa. Send for circular.

Pat. Double Eccentric Cornice Brake, m'fd by Thomas & Robinson, Cinn., O. Send for Circular.

Rue's "Little Giant" Injectors, Cheapest and Best Boiler Feeder in the market. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

A Superior Printing Telegraph Instrument (the Selden Patent), for private and short lines—awarded the First Premium (a Silver Medal) at Cincinnati Exposition, 1871, for "Best Telegraph Instrument for private use"—is offered for sale by the Merch's M'fg and Construction Co., 50 Broad St., New York. P. O. Box 496.

Woolen and Cotton Machinery of every description for Sale by Tully & Wilde, 20 Platt St., N. Y.

Dean's Steam Pumps, for all purposes; Engines, Boilers, Iron and Wood Working Machinery of all descriptions. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Parties needing estimates for Machinery of any kind, call on, or address, W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Machinery for making Gas Fixtures.—Makers of machines used in the manufacture of Gas Fixtures, for tapping, drilling, cock-making, &c., &c. may find a purchaser by sending circulars, with descriptions and prices, to L. L. D., Station C., Philadelphia, Pa.

By touching different buttons on the desk of the manager, he can communicate with any person in the establishment without leaving his seat. The Miniature Electric Telegraph—Splendid for offices, factories, shops, dwellings, etc. Price only \$5, with battery, etc., complete for working. Made by F. C. Beach & Co., 260 Broadway, corner Warren St., New York. The Scientific American establishment, New York, is fitted with these instruments.

Steam Boiler and Pipe Covering—Economy, Safety, and Durability. Saves from ten to twenty per cent. Chalmers Spence Company, foot East 9th St., N. Y.

Diamond Carbon, of all sizes and shapes, for drilling rock, sawing stone, and turning emery wheels; also Glaziers' Diamonds. J. Dickinson, 64 Nassau St., N. Y. Engines 2 to 8 H.P. N. Twiss, New Haven, Ct.



F. N. will find recipes for jeweler's white enamel on p. 107, vol. 30. This enamel can be colored to taste.—C. T. S. We have no information as to the marbleroot of Girard College, Philadelphia, Pa.—F. L.'s queries are not sufficiently explicit.—D. W. can clean his coins by following the instructions on p. 217, vol. 26.—T. H. D.'s query as to the evaporation of ice is incomprehensible.

C. B. H. asks: How can I make imitation pearls? A. These are hollow spheres of very thin glass. A small portion of a pearly substance, found at the base of the scales of the bleak and other fishes, is introduced into each, and is spread over the surface. The sphere is then filled up with white wax or gum arabic.

C. H. G. asks: 1. What substance is most sensitive to atmospheric changes, and will, by expansion and contraction, most readily indicate damp or dry weather? A. A delicate human hair, properly cleaned and arranged. This is used in De Saussure's hygrometer, as improved by Régnault, for measuring atmospheric changes. Animal membranes, vegetable fibers, and pieces of whalebone are sometimes employed. 2. What material is most affected by actual contact with water? A. The chlorides of nickel and cobalt completely change their color.

J. K. asks: 1. In using steel bars instead of bells, how large and of what shape should a bar be to make as much sound as a bell weighing 1,000 lbs.? How should it be suspended? How large a hammer would it need? A. In a properly constructed bell, the cavity of the bell reinforces the fundamental note and greatly increases its sonority. Moreover, the material is so distributed as to get the largest possible sounding surface. For these reasons a bar should be of large size to give as great an amount of sound as a bell weighing 1,000 lbs. How large it and the hammer should be must be determined by experiment. The bar should be firmly secured at one end.

J. C. F. asks: What is the best preparation to preserve the skins of stuffed birds? Is anything better than arsenic? A. Carbolic acid answers well for temporary purposes, but arsenic is the best permanent preservative. 2. What is the best treatise on the art of stuffing birds? A. The best treatise is in the form of instructions published by the Smithsonian Institution for the guidance of collectors on exploring expeditions. Apply to Professor Baird, at Washington, D. C.

Z. B. asks: Has the first link of a train of cars the whole pull or weight of cars on it? A. Yes. 3. If a link of 1 square inch section will pull 30 cars, will a link one hundredth part of an inch section pull 1 car? A. Yes.

A. T. says: 1. Please give me a recipe for transparent cement, not soluble by dampness? A. Use powdered mastic and heat. 2. What is the difference in the heat of a room heated by steam pipes, and one heated by a wood or coal fire? Is not the heat from steam pipes more searching and dry than heat from either a wood or a coal fire? If so, why is it? A. Steam pipes give a mild, diffused heat, but at the same time arrangements must be made to supply moisture to prevent dryness. This is sometimes effected by attaching small escape cocks to allow a little steam to enter the room. 3. What is the thermometric difference in heat radiating from a steam pipe with 70 lbs. pressure per square inch and one with 10 lbs. pressure per square inch? Will it be nearly the difference in the temperature of steam at 10 lbs. pressure and at 70 lbs. pressure? A. No. It would be proportional to the more rapid flow of steam through the pipes at the greater pressure.

G. W. E.—Write to John Casey, 24 Beek man street, New York city, for the article.

H. C. P. says: A belt traveling at a certain speed, size of both pulleys being given, how can I find the size of pulleys to cause the belt to run at any other specified speed, either faster or slower? A. The circumference of either pulley, multiplied by the number of revolutions per minute, gives the speed of the belt; and if the number of revolutions remains constant, the speed of the belt can readily be changed by changing the size of the pulley. For instance, if the pulley is to make 60 revolutions per minute, and the belt is to have a speed of 1,000 feet a minute, the circumference of the pulley is found by dividing 1,000 by 60, or it will be 16-2/3 feet.

F. E. C. says: I. We are making a steam engine, the size of the cylinder is 1/2 inch diameter, 2 1/2 inches stroke; about what power would it have? A. Multiply pressure on piston in pounds by speed of piston in feet per minute, and divide the product by 33,000. 2. We have an old fire extinguisher for a boiler; will it be safe? How can we test it? A. Fill the boiler with cold water, and heat it, until the expansion of the water produces the desired pressure. 3. Are there any small steam gages that would do for it? A. Yes.

J. M. asks: Where was the first railroad bridge built across the Mississippi river? How many railroad bridges are there now over it, and how many were there in the year 1859, and where are they situated? A. The first bridge was at Rock Island. There were no bridges erected previous to 1859. There are now 10 bridges over the Mississippi, at the following places: Winona, Dubuque, Clinton, Rock Island, Burlington, Keokuk, Quincy, Hannibal, Hastings, St. Louis.

H. C. D. asks: If a person should fasten a stick to a smooth board large enough, when placed at some convenient spot, for the light of the sun to make a shadow of the stick on said board for the space of one year, if pencil marks should be made on the board parallel with the shadows, once a month for one year, at the rising or setting of the sun: would not the earth in its orbital yearly motion produce shadows diverging from the center all around like the spokes of a wheel? A. The different shadows would diverge from the center, but not all around like the spokes of a wheel, but between the limits of earliest and latest sunrise on one side, and earliest and latest sunset on the other. In this latitude, there is a little more than 3 hours difference between earliest and latest sunrise, and the same difference between earliest and latest sunset.

B. asks: Do the winds always blow in an exact horizontal line? If not, what inclination do they assume? A. They do not. The direction varies, but in general follows the outline of the earth's surface.

W. W. W. asks: 1. What must be the diameter of a spherical balloon which, when filled with hydrogen, will have an ascensional force of 80 kilogrammes, the balloon itself weighing 30 kilogrammes? A. Make it so that the weight of the balloon and gas is 80 kilogrammes less than that of an equal volume of air. 2. How much zinc and sulphuric acid are required to produce hydrogen to fill a cylinder 2 feet long x 9 inches in diameter? A. A trifling amount. You can calculate from the reaction. H2SO4 + Zn = ZnSO4 + H2. 3. Please give me the prescription to make yellow, bronze, and golden ink. A. See p. 130, vol. 32.

N. J. asks: 1. How many pounds can a horse of average strength pull, I mean to lift by pulling? A. It is generally considered that a horse of average strength, moving at the rate of 2 1/2 miles an hour, can exert a tractive force of 100 pounds for 10 hours of a day. 2. Can you give a simple explanation of the question: Which runs faster, the top or bottom of a wheel of a wagon? A. You will find this explained, by means of a diagram, on p. 362, vol. 28.

R. M. asks: Can I melt iron in a crucible on a blacksmith's forge, to mold iron points in plaster of Paris? Will a crucible last any length of time, so that it would pay to melt iron in it? A. To both the questions, yes.

G. J. asks: What, in your extended experience, is the nearest approach to perpetual motion ever accomplished by an inventor? Is there anything on record in the Patent Office, that is, has any person yet manufactured or arranged a machine, or invented any mechanical object, that would operate from a propelling power inherent in itself, without springs, steam, or other motor known to mechanics, for a basis? If so, did it prove to be of any force or power, or did it promise anything useful? Please inform a reader of your paper and a well wisher to the American inventive faculty. A. The nearest approach to perpetual motion is the example of the man who placed himself within a tub and, by a steady upward pull on the handles, expected to rise in the air. But he found that the tub was pushed down by his feet just as much as it was pulled up by his hands, or, in other words, that action and reaction are equal, and therefore he failed to ascend. He has had many successors, who have aimed to overcome the difficulty by interposing levers or cogged wheels, arranged either to pull against each other, or placed between the hands of the operator and the handles of the tub. The principle is the same in all such cases, consequently the thing won't work. The simplest tub is the nearest approach to success because it is attended with less friction. The interposition of wheels or levers wastes a portion of the force. The jet of a fountain, for example, will most nearly reach the level of its supply if allowed to rise in the air unobstructed. If the jet is compelled to turn a wheel or operate a lever, its height is of course diminished.

J. K. asks: 1. What is meant by a high pressure and a low pressure engine, and by a low pressure engine and boiler? A. Non-condensing and condensing. 2. What is meant by link motion, and what by valve motion? A. The mechanism for operating the valve. 3. If I boil away one cubic inch of water, in a box of one foot cube, will I have any pressure in the box? A. Yes. 4. Will I get any by further heating it? A. Yes. 5. Can I explode the box? A. It depends up on the strength of the box.

E. M. C. asks: 1. Is plating with aluminum successfully practiced? Why would it not be, for many ornamental purposes, superior to nickel, and (as the metal may be derived direct from clay) possibly cheaper? A. The cost of extracting aluminum from clay is still too great. 2. Can you tell me of any way in which magnesium can be used (without too expensive apparatus) for making signals at sea? The wire or ribbon will not burn continuously, and requires the aid of an alcohol flame to insure continuous combustion, even where not exposed to drafts. If burnt in a lantern, the glass is soon coated with the condensed magnesia; and if not thus protected, the wind blows the whole thing out. Is there any way of using it (simple or combined with other materials) in torches to burn

from one to three minutes, and which would not blow out or drop sparks? A. There is a magnesium lamp which can be successfully used for illumination and lanterns, which is constructed to remedy these defects. 3. What would be the most convenient way of generating electricity for the electric light in a compact machine, easily portable? What amount of power is necessary for a light visible five miles? A. The most convenient way to obtain the effect desired would be to use 40 flat Bunsen cells and an electric lamp. 4. Would the electrical machines used for medical purposes have sufficient power? A. No.

D. Y. H. asks: Which is the most economical steam engine, (1) one in which the cut-off is at 1/4 or 1/2 of the stroke, and the momentum is obtained by the governor and throttle valve, or (2) one in which the cut-off is regulated by the governor, and the regular momentum is obtained by large and small expansion? Which is the most economical, (3) high pressure and large expansion, or (4) low pressure and small expansion, if all other things are equal, with well covered cylinders, pipes, etc.? A. As we understand your questions, the second and third cases will be more economical than the others.

D. M. asks: What is the material to use to prevent a hardened polished steel plow from rusting and allow it still to retain its luster? I have been using clear varnish, but it is not effectual. A. It will be necessary to keep it covered with oil, when not in use.

"Sufferer."—In reply to this correspondent, who asked how knock knees may be cured, Dr. Chapman, of New Haven, Conn., says: After growth has ceased, there is no remedy. The chances of recovery diminish in exact proportion to the age up to the period when full growth is reached, that is, the younger the patient, the better the chance of recovery. The cause is not, as generally supposed in the majority of cases, accident or natural deformity, but an impoverished state of the system in very early life, brought on by disease or improper food. The treatment varies according to the extent of the trouble. If the legs are too weak and the joints too loose to bear the weight of the body, the recumbent posture must be maintained for months; at the same time the legs may be bandaged in such a way as to keep them in the straight position; tonics, such as iron, quinia, and cod liver oil must be taken in one form or another, and electricity may be used to excite the weakened muscles. In cases not so severe as this, or in such cases after the preceding treatment has conditioned up the legs, a different method is followed. The tonics are given and the electricity used, but instead of lying in bed the patient must be up and about like other people; but the legs must still be bandaged in a peculiar way. A stiff and straight iron rod, flattened at each end and padded, of the length of the leg, is fastened to the outer side of the leg. It will touch at two points, on the hip and ankle, and a bandage is placed around the knee and rod, drawing them together or towards each other, and thus keeping the leg in a nearly straight position. For a few minutes every day the rod should be removed so as to allow the weight of the body to fall naturally on the knee. This is the best known treatment; but patience, skill, and good nursing are requisite, for the disease at best is a troublesome and long protracted one.

G. A. D. asks: 1. How can I make the cheapest and simplest battery? I have been trying to construct a galvanic battery, but have not succeeded. I constructed it on the Bunsen plan, but it would not work. A. Use pieces of zinc for one plate of the battery and pieces of gas coke for the other, and charge with dilute oil of vitriol. 2. What is the principle of the kaleidoscope? A. It depends on the repeated reflection of any object, placed between two small mirrors which are at an angle to one another. The pattern and the number of reflections depend upon the angle between the mirrors. 3. To what height can a balloon ascend? A. To such a height that its weight is just equal to the weight of that amount of air which it displaces.

P. and other correspondents ask what is put in starch to give the shirt bosoms a gloss. A. A piece of paraffin or white wax, about the size of a hickory nut, in each bowl of starch. The managers of one large shirt factory, however, assure us that they produce the polish by the skillful use of the said iron only.

J. W. G. asks: How can melted glue be kept liquid when cold? A. Take best pale glue 2 lbs., soft water 1 quart, dissolve in a warm bath; after cooling add (slowly) 7 ozs. nitric acid. When cold, bottle off.

C. R. asks: Is there any way of removing from a steel engraving spots (both in the margin and on the print) caused by the gum in the back boards of the frame in which it is hung? A. No. Such engravings are printed on unsized paper, which absorbs moisture so intimately that its effects cannot be got rid of.

L. H. S. says: In your reply to the question of M. M. in regard to the advantage of raising himself by a rope over a fixed pulley, you say that you think that the friend of M. M. is right, when he says it has no advantage over a single rope. Are you not hasty in your conclusion, and ought not scientific men to be able to give definite answers to questions which admit of proof by experiment or mathematical calculations? I am inclined to believe that M. M. is right when he claims an advantage of nearly one half. And in the same number, in reply to the geometrical question of W. C. L., whose teacher claims that an infinite circle is coincident with a straight line, you show from their equations that this cannot be so; the straight line being of one order, and the circle of another, they cannot coincide. That is all well enough so far as the mathematical discussion is concerned, but do you consider the mind of man to be capable of conceiving of infinity? If an infinite straight line can be conceived of, may not a circle be conceived of also, of which the straight line shall be diameter or chord, and vice versa? When the difference between a straight line and a circle becomes infinitely small, do they coincide? I claim that the mind is incapable of conceiving of infinity, and just so soon as men begin to discuss a proposition which cannot be conceived of, they are over their heads, and utterly at a mental loss. Everything infinite coincides. A. With out going into the metaphysical question that you have raised, we may say that the mathematical demonstration has the advantage, in giving the results without requiring a vivid conception of infinity. The question about the rope is considered on p. 219 of our current volume.

J. T. W. asks: How can I clean silver plate? A. Use prepared chalk in cold water; apply with a plate brush, chamois leather, or soft woolen rags.

W. M. W.—You appear to have both legs of the siphon of the same length. The size of your pipe answers well enough, but it is necessary that the end of the siphon that discharges the liquid should be on a lower level than the end into which it is drawn.