

Business and Personal.

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

Dry steam dries green lumber in 2 days, and is the only Cheap House Furnace. H. G. Bulkeley, Cleveland, O.
Hoadley Portable Engines. R. H. Allen & Co., New York, Sole Agents of this best of all patterns.

Hotchkiss Air Spring Forge Hammer, best in the market. Prices low. D. Frisbie & Co., New Haven, Ct.

Wanted—The best Machine for pointing Horse Shoe Nails. William Morehouse, Buffalo, N. Y.

Perfection of Hay Rakes, Friction Self-Dump, without Ratchets, Gears or Springs. Half interest in U. S. Patent for Sale. C. La Dow, Ballston, N. Y.

Saw Teeth Indicator—Showing improved form for filing teeth on Saws for use in different kinds of wood, &c. Sent free for 50c. E. Roth, New Oxford, Pa.

The Newspaper Agency of Messrs Geo. P. Rowell & Co., New York, is becoming quite celebrated over the whole Union, extending their business facilities to every part of the country, and doing their business in a prompt, efficient, and satisfactory manner with their tens of thousands of customers. Those who have advertising business with this journal are referred to them.—[Leslie (Mich.) Herald.]

Wanted—Proposals for diminishing cost of running two pairs of 20x48 Woodruff High Pressure Engines—one pair running at 60, the other at 65 revolutions, 60 lbs. steam. Address Box 3323, New York.

For reduced prices of Surface Planers and Mitre Dovetailer's Machines, send to A. Davis, Lowell, Mass.

"Pantec," or Universal Worker—Best combination of Lathe, Drill, Circular, and Scroll Saw. E. O. Chase, 7 Alling Street, Newark, N. J.

Good Manufacturing Sites and opportunities at Bridgeport, Conn. Address John F. Noble.

For Sale or Trade, Cheap—A half interest in a Machine and Repair Shop. J. A. Campbell, Farmington, Iowa.

Speed Indicator, \$2.00; Drill Gauge, 1 to 60, \$1.00. By mail. Samuel Harris & Co., 45 Desplaines St., Chicago.

The best Varnishes used in this country are those made by Hyatt & Co., New York. They are better, cheaper, and more satisfactory than any of the Imported Varnishes, and are everywhere demonstrating their superiority. Send for their circular.

For Sale—Milling Machine and 3,000 Cold Rolled Rods 5 in. long x 9-16. Myers, 209 Centre St., N. Y.

Blake's Belt Studs are the best fastening for Leather or Rubber Belts. Greene, Tweed & Co., 18 Park Place, New York.

Scale in Boilers Removed—No pay till the work is done. Send for pamphlet. Geo. W. Lord, Phila., Pa.

Suction & Blast Fans, Wood-working Machinery, &c. J. J. Lattimore 31st & Chestnut st., Phila., Pa.

To Manufacturers—Pure Lubricating Oil, Sample Package (24 gals.), \$7. Send to Geo. Allen, Franklin, Pa.

Educational Lantern Slides—Send for Catalogue of Prof. W. A. Anthony, Cornell University, Ithaca, N. Y.

Hotchkiss & Ball, Meriden, Conn., Foundrymen and workers of sheet metal. Fine Gray Iron Castings to order. Job work solicited.

To Purchasers of Engines, Boilers, and Machinery—Special and important information may be obtained, and special inducements will be offered, by addressing Todd & Rafferty Machine Company, Paterson, N. J., or No. 10 Barclay St., New York.

For Sale, cheap—One 60 H.P. Boiler, 40 Engines and Boilers. Address Junius Harris, Titusville, Pa.

Steam and Water Gauge and Gauge Cocks Combined, requiring only two holes in the boiler, used by all boiler makers who have seen it, \$15. Hillard & Hollan, 62 Gold St., New York.

Amateurs and Artizans, see advertisement, page 221. Fleetwood Scroll Saw, Trump Bro's, Manufacturers, Wilmington, Del.

Electric Burglar Alarms and Private House Annunciators; Call, Servants' & Stable Bells; Cheap Teleg. Insts.; Batteries of all kinds. G. W. Stockly, Cleveland, O.

Walrus Leather Wheels for polishing all Metals. Greene, Tweed & Co., 18 Park Place, New York.

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

\$5,000 invested in a valuable invention will give large returns.—A. D., 353 Morris Avenue, Newark, N. J.

Price only \$3.50.—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., 246 Canal St., New York.

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

Peck's Patent Drop Press. Still the best in use. Address Milo Peck, New Haven, Conn.

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

All Fruit-can Tools, Ferracut Wks, Bridgeton, N. J.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon, 470 Grand Street, New York.

Temples and Oilcans. Draper, Hopedale, Mass.

Spinning Rings of a Superior Quality—Whitinsville Spinning Ring Co., Whitinsville, Mass.

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

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

Diamond Tools—J. Dickinson, 64 Nassau St., N. Y.

Steam Pumps 1 to 8. Injectors. Steam Traps and Damper Regulators on trial. Send for Circular. A. G. Brooks, 422 Vine Street, Philadelphia, Pa.

Magic Lanterns and Stereopticons of all sizes and prices. Views illustrating every subject for Parlor Amusement and Public Exhibitions. Pays well on small investments, 72 Page Catalogue free. McAllister, 49 Nassau St., New York.

Water, Gas, and Steam Goods—New Catalogue packed with first order of goods, or mailed on receipt of eight stamps. Bailey, Farrell & Co., Pittsburgh, Pa.

For Sale—Large lot second hand Machinists' Tools, cheap. Send for list. I. H. Shearman, 45 Cortlandt Street, 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 \$6, with good Battery. F. C. Beach & Co., 246 Canal St., New York, Makers. Send for free illustrated Catalogue.

For best Bolt Cutter, at greatly reduced prices, address H. B. Brown & Co., New Haven Conn.

The Barter Engine—A 48 Page Pamphlet, containing detail drawings of all parts and full particulars, now ready, and will be mailed gratis. W. D. Russell, 18 Park Place, New York.

Brass Gear Wheels, for Models, &c., on hand and made to order, by D. Gilbert & Son, 212 Chester St., Philadelphia, Pa. (List free.) Light manufacturing solicited.

"Lehigh"—For information about Emery Wheels &c., address L. V. Emery Wheel Co., Weissport, Pa. American Metaline Co., 61 Warren St., N. Y. City.

Genuine Concord Axles—Brown, Fisherville, N. H.

Faught's Patent Round Braided Belting—The Best thing out—Manufactured only by C. W. Army, 148 North 3d St., Philadelphia, Pa. Send for Circular.

For 13, 15, 16 and 18 inch Swing Engine Lathes, address Star Tool Co., Providence, R. I.

Notes & Queries

A. P. can cement leather to wood by using good glue.—C. F. S. will find a recipe for a red marking ink on p. 129, vol. 28.—G. W. H. will find a good recipe for muclage on p. 251, vol. 33.—H. D. P. will find directions for gilding moldings on p. 347, vol. 31.—G. H. R. will find a recipe for hair wash on pp. 267, 363, vol. 31.—A. W. P. will find a formula for fulminating powder on p. 90, vol. 31.—W. B. and D. A. R. will find directions for proportioning cone pulleys on p. 100, vol. 25.—N. H. H. will find a recipe for filling for millstones on p. 251, vol. 31.—G. W. will find directions for removing peach stains from linen on p. 283, vol. 31.—C. A. B. will find directions for gold and silver plating on p. 405, vol. 32.—J. B. can caseharden his plow moldboards by the process described on p. 42, vol. 33.—F. D. T. will find explanations of the egg-hatching process in the *Science Record* for 1874.—W. R. B. will find directions for grinding a parabolic mirror on p. 276, vol. 30. Silvering glass is described on p. 234, vol. 30.—W. B. I. will find directions for preserving cloth goods from mildew on p. 90, vol. 31. Dyeing wool black is described on p. 75, vol. 32. Dyeing feathers on p. 299, vol. 31.—W. F. R. will find directions for mounting chromos, etc., on p. 91, vol. 32. Cleaning gilt frames is described on p. 27, vol. 31.—W. R. H. will find directions for making fruit jellies on p. 281, vol. 26.—J. C. will find directions for exterminating moths in fur on p. 388, vol. 29.—C. M. W. should read the *SCIENTIFIC AMERICAN*, and he will not then waste his time on the perpetual motion nonsense.—H. B. B. will find a description of the hydraulic ram on p. 269, vol. 31, and one of the construction of windmills on p. 241, vol. 32.—C. S. will find a formula for the dimensions of a fly wheel on p. 288, vol. 28.—C. E. F. will find a full explanation of the ball dropped through the earth coming to rest on pp. 138, 250, vol. 31.—C. H. S. can color paraffin with any aniline dye.—H. Y. will find that the proportions of a fly wheel are given on p. 288, vol. 28. The temperature of compressed air is discussed on p. 123, vol. 33.—H. B. can galvanize iron by the process given on p. 347, vol. 31.—A. Y. S. can waterproof canvas by the process described on p. 347, vol. 31.—E. H. P. is informed that the maximum pressure of steam depends on the maximum temperature. See p. 81, vol. 29.—G. F. G. will find a description of the carving pantagraph on p. 95, vol. 33.—C. W. M. will find directions for making plaster of Paris on p. 399, vol. 29.—C. T. S. can clean rust off an engine by the method described on p. 267, vol. 33.—J. L. B. should not run the risk of spoiling her hair by using nostrums, which are always deleterious.—A. A. D. can make battery carbons by the process described on p. 35, vol. 33.—W. R. should apply to Seth Green, Esq., Rochester, N. Y., for the best method of stocking a stream with trout.—E. H. will find a description of lap and lead on p. 101, vol. 32. Crucibles are described on p. 399, vol. 31.—J. F. W. will find a recipe for axle grease on p. 90, vol. 31.

(1) J. A. M. asks: How can I clean stone ware jars that have had muriatic tin crystals in them, so that they can be used for fruit, etc.? A. The tin may be removed by muriatic acid.

(2) J. M. H. says: The phenomena referred to on p. 193, vol. 33, can be easily and satisfactorily explained by supposing that the boiler in the first case was quite hot and not of very large size, but of thick iron; and the water being introduced—not very rapidly—the small quantity became heated intensely, producing the 190 lbs. pressure indicated. In the other case, it is probable that the boiler was not so much heated as supposed, or the boiler iron not so heavy, or both, or the water may have been introduced much faster than in the first instance. If the boiler was not very hot and the water was introduced quite rapidly, it would have had precisely the effect stated. The first water introduced would be converted instantly into steam, which was suddenly condensed by the rapid cooling of the boiler and its contents by the working of the pump. These are the several conditions which, I think, would, separately or together, have produced the results stated. A. Our correspondent is entitled to especial commendation for the clear and satisfactory explanation here given. Of course the causes of such occurrences must be matters of theory to a great extent, but J. M. H.'s views are very reasonable.

(3) J. P. M. says: Having had a conversation with the late chief engineer of the United States Navy, he says tallow or grease of any kind should never be used in the cylinder of any engine, only a little pure beeswax on the piston rods. Ought we to stop using tallow, as we now do? A. If you are sure that the tallow is pure, you may continue to use it without fear. But in general, we think it is preferable to use good oil.

(4) A. B. C. asks: There are two boilers in Rensselaer county, N. Y., which are running without safety valves or steam gages. Is there any law to prevent this? They are old boilers, but have recently been repaired. A. We do not think

there is any law, and we can scarcely believe that any one would be foolhardy enough to carry much pressure under such circumstances. We wish you would send us further particulars. If the owner of the boilers is running them in entire ignorance and carelessness of the pressure, you will be doing good service by sending us his name for publication. We may add that, in the absence of a special preventive law, the owner of these boilers can be prosecuted on the complaint of any one who thinks that he is conducting his business in a manner that is dangerous to the community.

(5) J. A. D. asks: How can I polish wrought iron? A. Warm your goods till they are unbearable to the hand; then rub with new clean white wax. Heat the goods again so that the wax may soak in them; then rub them over with a piece of serge.

(6) G. R. asks: Is there a practical way of determining when an engine is precisely on the center, independent of the guides? A. Strike on the end of the crank a circle of the same size as the crank pin; then (for a horizontal engine) place the crank pin as near the center as the eye will direct, then place a straight edge with one end resting on the crank pin and the other even with the corresponding diameter of the circle. Upon the straight edge rest a spirit level, moving the crank till the level stands true. If, however, the cylinder is not set quite level, first place the spirit level on the piston rod, note how the bubble stands, and then move the crank pin till the bubble of the spirit level, applied as directed, stands as upon the rod.

(7) F. H. D. asks: 1. Is there any difference in the tractive power of a locomotive drive wheel when the crank goes over or under the axle in ascending a grade? A. No. 2. Is the leverage on the axle the only leverage there is in ascending a grade? A. Yes, as we understand your question.

(8) C. A. asks: Why does a ball, fired from a barrel 6 inches long, fail to go straight to its mark at 10 yards distance? A. The barrel is too short to throw a ball with any degree of accuracy to the distance you mention. The resistance of the air to the ball at such a distance also causes deviation.

(9) J. W. K. says: I have been told that some planters in Louisiana employ electricity in the process of purifying cane juice. The juice itself is said to form part of the battery. Is this so? A. We have never heard of such use of electricity, and do not think the statement can be correct.

(10) C. S. R. asks: 1. How can I put a point of metal or iron on a worn-out metal plow point, in a common smith's fire? A. The remains of the old steel or the plow will show the shape of the weld. Use shear or cast steel, using borax as a welding compound; be careful not to overheat the steel. 2. How can I temper cold chisels, and drills for drilling iron and other metals, and stone? A. You will find directions for tempering drills and cold chisels for metal, etc., in "Practical Mechanism," No. 4, p. 21, vol. 31. To temper cold chisels for stone, heat the chisel in a charcoal fire, and temper to a brown color.

(11) E. A. K. asks: What can be added to a tempering solution that will give the steel a bright silver color without impairing the tempering qualities of the solution? A. Nothing.

(12) F. B. M. asks: How can I test gold with acid, and what kind of acid is used for that purpose? A. The touchstone used for this purpose is a piece of black basalt, or even black slate, over which the gold to be tested is drawn so as to leave a streak of the fine particles upon the surface. This streak, of course, remains untouched when moistened with nitric acid; but if a streak of any base alloy (of copper and zinc, for example), made to imitate gold, be made upon the touchstone, the nitric acid will immediately dissolve it. The acid employed in this test is generally mixed with a minute proportion of muriatic acid (98 parts by weight of nitric acid, of specific gravity 1.34, 3 parts hydrochloric acid of specific gravity 1.173, and 25 parts water. The streak is not apparently affected by the acid if the gold is not below 18 carats fine; by making several streaks in succession, or by grinding off a portion of the surface upon the touchstone, any error arising from the thin external coating of fine gold may be avoided; a feather or glass rod serves for moistening the streaks with the acid. In order to determine by the touchstone the proportion of gold which is present in the alloy, the streak is compared with that made by a series of touch needles, composed of alloys containing gradually diminishing quantities of gold. In experienced hands the quantity of gold may thus be ascertained, with an error of not more than one part in a hundred.

(13) G. B. asks: 1. Will a copper ball, made hollow and perfectly tight, float on the water inside a steam boiler with the steam at any desired pressure? A. Yes. 2. Will the heat of the steam injure a brass or steel spring? A. Yes. The injury to a well made spring will be very slight, however.

(14) B. T. P. asks: Please give me directions for tinning wrought iron wire. A. Clean the wire, cover it with a solution of muriate of zinc, and dip into melted tin. I wish to send some dead birds 1,500 miles. How can I prepare them so as to prevent decomposition? A. It will be best to pack them in ice and sawdust or tan bark.

(15) N. A. W. asks: What are hyperbolic logarithms? A. The hyperbolic logarithm of a number is the power to which it is necessary to raise the quantity 2.7182818, in order to produce the given number.

(16) J. J. M. says: A Hunter's screw has a lever 51 feet long. The distance between the threads of larger screw is 1 inch, and between

those of the smaller, ¼ inch. How much weight can a man whose power is represented by 175 lbs. move with such a screw? A. Disregarding friction, the relation of the force to the weight is about as 1 to 1,200, that being the proportion between the distances passed over by each in the same time.

(17) J. A. McC. asks: Is there any kind of steel that may properly be called a natural production? A. Steel is an artificial production, in the sense in which that term is ordinarily employed. There is no native steel.

(18) F. B. asks: Upon a railroad car in rapid motion, I let fall a ball striking the floor. A friend says that the ball will strike at precisely the same point that it would if the car were standing still. I say the projective force given to me and the ball by the engine ceases to act upon the ball after it leaves my hands until it strikes the floor, hence the floor is a curved line. A. Your idea is correct, but the time of descent is so slight that the curve is practically a straight line.

(19) J. B. F. says: I have a pair of cylinders, 2½ inches bore x 4 inches stroke, and a boiler with 160 tubes of half inch internal diameter; outside shell is 18 inches in diameter by 28 inches high. I want to run a boat 90 feet long by 5½ feet beam. 1. What will be the size of a propeller suitable for this engine and boat, pressure of steam being 150 lbs.? A. Use a propeller of from 28 to 30 inches diameter and of 3 to 3½ feet pitch. 2. What speed could be obtained with the above? A. Probably from 6 to 7 miles an hour.

(20) C. J. A. says: 1. I have a muzzle-loading rifle that carries a ½ oz. round ball, and a 1 oz. conical ball; and with the same elevation of sight, same kind of patch, same charge of powder, and sighted at same object, it will throw the conical ball nearly twice as far as the round one. Why is this? A. The conical ball, on account of its shape, encounters less resistance from the air than the other. 2. In shooting over water for a thousand yards or more, does it cause the ball to fall more than it would over the same distance of land? A. No.

(21) W. H. L. asks: What is the most simple way to make a battery for plating? A. See answer to E. C., on this page.

(22) J. T. H. asks: Who is Darwin, and what is his doctrine? A. He is an English naturalist, and his theory is that all animal forms have a common origin. This is commonly known as the theory of evolution.

A friend says that if a thimbleful of gunpowder be confined in a solid block of steel of 4 feet cube, and ignited, it would burst the steel. I say it would not. Which is right? A. You are.

Suppose I have two tubes with 4 inches of water in one and 10 inches in the other, and I put 1 inch of water more into each tube, will this last inch create any more pressure at the bottom of one tube than the other, the tubes being the same size? A. Yes, as we understand your question.

Will a 3 horse engine do the same amount of work that 2 good horses do? A. An engine exerting an effective horse power can do more work than an ordinary horse in a given time.

(23) F. O. says: The floor of my verandah is made of tongued and grooved boards, and painted over. The boards have shrunk, and water leaks through in rainy weather. I have filled the space between the boards with putty, but would it not be best to cover the whole floor with canvas or duck, tacked on and covered with paint? A. Try asbestos cement, which is procurable from the manufacturers of heavy iron skylights.

(24) J. C. asks: What is the proper way of setting picket fence posts? The posts are 3½ feet above ground, tapering from 5x5 inches to 5 x 3 inches. A. It depends upon what kind of picket fence you wish to build. If the rails are to be sunk into the sides of the posts, in the usual way, and the pickets extend above the top of the posts, set the latter so that they will appear of uniform width from top to bottom when viewing them from the front or back; set the front side of the post perpendicular, and let the incline be entirely on the back.

(25) W. A. asks: Has anything been invented of the nature of a looking glass for discovering anything at the bottom of deep water? A. Marine telescopes for this purpose have long been in use. Some of them are provided with lamps.

(26) N. K. B. asks: Can you give a formula for finding the area of an inscribed regular polygon, when the perimeter of polygon and area of circumscribed circle are known? Can you give formulas for finding the number of its sides? Are the data sufficient when only one polygon will answer the conditions? A. We don't think that direct formulas could be given, but the solution might be made by the aid of properly constructed tables.

(27) A. B. S. asks: 1. Where was the first railroad built in the United States? A. From Milton to Quincy, Mass., in 1826. 2. Where was the first in the South? A. The Baltimore and Ohio railroad was commenced in 1828, and 15 miles were opened to travel in 1830.

(28) A. L. M. asks: What is meant by the number of inches of water used in driving a turbine wheel? A. It refers to the size of the aperture, as generally employed. In a recent issue you say one requisite for an artesian well is that it should be surrounded by mountains or high land. If so, how does it work in a level desert? A. The high land in such a case is at a great distance. Can you explain how logarithms are calculated? A. You will find the formula, in as simple terms as it can well be expressed, on p. 283, vol. 32. The whole subject is well treated in Law's "Logarithms," Weale's series.