

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per Line will be charged.

Alden Engine, 3 cyl. Com. Balance Piston, doubles power of Steam! Circulars free, Farrelly Allen, Pittsb'gh.
"Wrinkles and Recipes" is the best practical Handbook for Mechanics and Engineers. Hundreds of valuable trade suggestions, prepared expressly by celebrated experts and by correspondents of the "Scientific American." 250 pages. Elegantly bound and illustrated. A splendid Christmas gift for workmen and apprentices. Mailed, post paid, for \$1.50. Address H. N. Munn, Publisher, P. O. Box 772, New York City.
Universal Screw Cutting Index & Rule for Compound Gearing. 10c. E. Lyman, C.E., New Haven, Ct.
Best Line Shaft, Pulleys, Dead Pulleys, Couplings, etc., in the country. Catalogue free. A. B. Cook & Co., Erie, Pa.
The Allen Fire Supply Co., Prov., R. I., give special attention to the manufacture of small articles in metal.
For Sale—37 in. x 15 1/2 ft. Lathe, \$300; 18 in. x 12 ft. Lathe, \$250; 20 in. x 8 ft. Lathe, \$200; 48 in. Chucking Lathe, \$195; 16 ft. Planer, \$650; 6 ft. Planer, \$275; 5 ft. Planer, \$250; 36 in. Drill, \$125. Shearman, 45 Cortlandt St., N. Y.
A Mech. Engineer by education, who is a competent draftsman and designer, and has some practical experience, wishes employment. Best References. Address M. E., Jamaica Plain, Mass.
Piles—A sure cure. Sample free, post paid. A trial is its best advertisement. Wonder Worker Medicine Company, Salem, N. J.
Wanted—The address of Metal Shawl Strap Handle and Belt Buckle M'rs. F. Turner, Frankford, Pa.
Solid Emery Vulcanite Wheels—The Original Solid 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, New York.
Wanted—Machines for Knitting Fancy Worsted Webs suitable for berders. H. E. Millingham, 39 and 41 East Broadway, New York.
Wanted, to trade a fine new C. F. Breech L. Shot Gun, new system, for a small St. Engine. Address A. Franke, Wapakoneta, O.
For Sale—A new No. 1 Double Cylinder Link motion, Upright Engine, 4 h. p. For further information, address A. H. Allen, Box 57, Racine, Wis.
Book on Making and Working Batteries, Electrotying, Plating, &c., 25 cts. T. Ray, Box 185, Ipswich, Ms.
For Sale—Largest size Bogardus Mill, for ores, drugs, &c. Cost \$500. Offered for \$250. A pair of heavy Chasers, or Crushers, \$250. Cost \$600. Box 3313, N. Y. P. O.
Wanted—From \$5,000 to \$8,000 capital in a long established and profitable machine business to develop one of the most promising patents ever produced. P. O. 1006, New Haven, Ct.
Proposals for Liquid Vent wanted. Manufacturers, address Liquid Vent Co., Kansas City, Mo.
Wanted—Locomotive Engine, Model size, in perfect working order for steam. Address, stating size and price, T. R., Box 884, New York Post Office.
Wanted—Man competent to take full charge of manufacturing first class Engines in a western city. Best references required. Address F. D., 109 Liberty Street, New York.
For Sale, to Close an Estate—A Valuable Patent Evaporating Pan for Parlor Stoves. For particulars, apply to Box 52, Troy, N. Y.
A Party offers a share of a valuable invention to one who will procure a Patent for the same. For particulars address J. F. Ra, Box 773, New York City.
For Sale—A good manufacturing business, secured by Patent. Address H. R. Van Eps, Peoria, Ill.
1/2, 1, & 2 Horse Engines, \$30, 60, & \$100; Boilers for same, \$75 & \$100. T. B. Jeffery, 253 Canal St., Chicago.
For best and cheapest Surface Planers and Universal Wood Workers, address Bentel, Margedar & Co., Hamilton, Ohio.
Small Steam Yachts, Yacht and Stationary Engines, Shafting, &c. S. E. Harthan, Worcester, Ms.
Steel Castings, from one lb. to five thousand lbs. Invaluable where great strength and durability are required. Send for Circular. Pittsburgh Steel Casting Co., Pittsburgh, Pa.
Use Yocom's Split-Pulleys on all Shafting, same appearance, strength and price as finished Whole-Pulleys. Shafting Works, Drinker St., below 147 North Second St., Philadelphia, Pa.
Boults' Paneling, Moulding and Dovetailing Machine is a complete success. Send for pamphlet and sample of work. B. C. Mach'ry Co., Battle Creek, Mich.
Patent Scroll and Band Saws, best and cheapest in use. Cordesman, Egan & Co., Cincinnati, Ohio.
Our new catalogue of drawing materials will be sent on receipt of 10c. Add. Keuffel & Esser, New York.
Fine Castings and Machinery, 96 John St., N. Y.
Hotchkiss Air Spring Forge Hammer, best in the market. Prices low. D. Friable & Co., New Haven, Ct.
Water, Gas and Steam Goods—Send eight stamps for Catalogue, containing over 400 illustrations, to Bailey, Farrell & Co., Pittsburgh, Pa.
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.
Hotchkiss & Ball, Meriden, Conn., Foundrymen and workers of sheet metal. Fine Gray Iron Castings to order. Job work solicited.
Peck's Patent Drop Press. Still the best in use Address Milo Peck, New Haven, Conn.
All Fruit-can Tools, Ferracute Works, Bridgeton, N. J.
American Metaline Co., 61 Warren St., N. Y. City.
For Solid Emery Wheels and Machinery, send to the Union Stone Co., Boston, Mass., for circular.
Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon, 470 Grand Street, New York.
Spinning Rings of a Superior Quality—Whitinsville Spinning Ring Co., Whitinsville, Mass.
For best Bolt Cutter, at greatly reduced prices, address H. B. Brown & Co., New Haven Conn.
Diamond Tools—J. Dickinson, 64 Nassau St., N. Y.
Temples and Oilcans. Draper, Hopedale, Mass.
Shingles and Heading Sawing Machine. See advertisement of Trevor & Co., Lockport, N. Y.

Notes & Queries

J. H. P. can make a cement for mending rubber boots by following the directions given on p. 203, vol. 30.—S. A. G. will find that the fireless locomotive, described on p. 96, vol. 30, answers his description.—A. V. S. will find a description of the glass-tempering process on p. 402, vol. 32.—P. V. will find an excellent recipe for yeast on p. 183, vol. 33.—M. G. F. will find directions for hardening soap on p. 194, vol. 32.—J. J. M. and others, who inquire as to pisciculture, should address Seth Green, Esq., Rochester, N. Y.—J. A.'s query as to the relative motion of parts of a wagon wheel is answered on p. 298, vol. 31.—W. Y. Jr. is informed that we do not know the copying fluid he mentions.—J. F. M. and others, who ask as to the construction of special machines, should address the manufacturers.—A. R. W. will find a recipe for a deep black ink on p. 92, vol. 33.—W. & S. will find a recipe for a cement for filling millstones on p. 251, vol. 31.—O. C. will find a recipe for a waterproof whitewash on p. 408, vol. 24.—O. C., S. P. B., F. B. P., G. H. R., J. W. D. should consult the Beekeeper's Magazine, 14 Murray street, New York city.—J. W. C. will find a recipe for a good muckage on p. 373, vol. 33.—H. H. B. will find a recipe for aquarium cement on p. 43, vol. 33.—J. J. R. will find some information as to galvanized iron water pipes on p. 218, vol. 25, and on p. 264, vol. 29.—F. J. R. will find a simple recipe for tanning hides on p. 147, vol. 30.—C. L. R. will find a recipe for invisible ink on p. 299, vol. 30.—H. B. will find a description of Professor Tyndall's respirator on p. 178, vol. 32.—G. A. McC. can convert his black ink into copying by adding a little refined sugar.—C. G. W. can repair his rubber life preserver by following the directions on p. 203, vol. 30.—J. A. will find a recipe for black ink on p. 92, vol. 33; for laundry blue, see p. 219, vol. 31.—S. R. S. will find directions for soldering of all kinds on p. 251, vol. 28.—W. L. D. will find directions for building a windmill on p. 241, vol. 32.—E. P. C. will find full directions for making colored fires on p. 165, vol. 24.—L. C. K. will find answers to his questions as to small boilers and engines on pp. 225, 257, vol. 33.—J. D. B. will find the dimensions of the various gages of wire on p. 363, vol. 28. For the relative prices of gold and platinum, see p. 169, vol. 33.—J. C. will find a good recipe for baking powder on p. 123, vol. 31.—J. R. will find directions for scouring castings on p. 139, vol. 31.—W. C. can utilize tinned plate scraps by the method described on p. 319, vol. 31.—J. D. will find a description of Professor Draper's method of silvering glass on p. 267, vol. 31.—J. T. W. will find a recipe for furniture polish on p. 315, vol. 30.—W. N. will find directions for coloring photographs for magic lantern use on p. 390, vol. 30.—W. K. will find directions for laying out a sun dial on p. 409, vol. 29.—R. S. can prevent mildew on canvas by the method described on p. 90, vol. 31.—F. T. will find a recipe for shaving soap on p. 251, vol. 32. The type writer is described on p. 79, vol. 27.—S. N. will find recipes for Worcestershire sauce on pp. 241, 281, vol. 26. Galvanizing cast iron is described on p. 59, vol. 24.—M. G. can make condensed milk by the process described on p. 343, vol. 30.—D. Q. can separate silver from lead by the method described on p. 138, vol. 32.—J. N. can temper millpicks by the process given on p. 202, vol. 31.
(1) O. G. says: I have charge of a pair of engines at a coal shaft, and have had a great deal of trouble by the breaking of the teeth in the cog wheels, or rather in the sections of the cogs. The breakages generally occur at the starting and stopping of the engine. The engine is 11 by 25 inches, and our usual speed is 125 revolutions per minute. How can we prevent the accident? A. Make the width of the teeth greater.
(2) J. T. H. says: We cannot get speed enough from our main shaft to run a fan for a cupola. Which would require the most power, to increase the pulley on the main shaft or to use a countershaft, to get the same speed? A. To use a countershaft.
1. I am making a small engine, 2 1/2 inches stroke by 1 1/4 bore. Would 3/8 inch steam ways be large enough? A. This depends on the pressure. 2. Of what size should the fly wheel be? A. About 6 inches in diameter.
(3) H. C. S. asks: Is there any non-conductor that will not be affected by steam at 200 lbs. pressure? A. Yes, charcoal.
(4) D. H. asks: 1. Will plumbago serve to make good cores? A. Yes, if used with sand. 2. Can plumbago be molded at a core for an internal screw, so as to have a perfect thread when the iron or steel is cast? A. Not by itself. 3. What is put into pulverized plumbago or black lead to cause it to mold with facility? A. We are not aware of any substance for this purpose.
Can a good square thread of an internal screw, from 3/8 to 1 1/4 inches diameter, be cast in iron or steel? A. No.
Is there any danger of a kerosene lamp exploding when the blaze is fluttering and shoots upwards two or three inches? A. Yes.
(5) N. H. C. says: R. R. & G. E. say that cut nails are made from bars of iron rolled into widths of the length of nails to be cut, and then they are cut crosswise. I say they are rolled in wide plates, then cut by shears across the end of the plates in widths of the length of the nail, which brings the nail lengthwise of the rolled iron. Which is right? A. You are.
(6) C. F. R. says: A pressure gage on a boiler indicates 15 lbs. Is that the pressure on a square inch of the inside of the boiler, or is the strain 15 lbs.—15 lbs., to balance the air driven out by the steam, = 30 lbs., 15 lbs. of which only is available for working purposes. I hold that the latter is true. A. The total pressure is 30 lbs., and the available pressure 15 lbs., per square inch.

A tubular boiler, used to furnish steam to heat a church, has lost several tubes or flues from a sort of pinhole corrosion, the water side of the flues being very clean when taken out. I contend that the rain water is too pure and dissolves the iron away, thus weakening it, and that they should use well water, partially or even entirely, to retain their boiler longer. Am I right? A. Rain water is generally more pure and better for steam purposes than well water, and it will remove some deposits from boilers.
(7) T. E. says: I am making a wrought iron fence, which I intend to have galvanized; but I find that galvanizing will cost more than the fence. Do you know of any good substitute? A. No, not an effective one.
(8) J. N. P. asks: In putting in a heating apparatus for a greenhouse, we made rust joints with a composition of 2 ozs. powdered sal ammoniac to a keg of iron borings. Is that the best proportion? A. Sal ammoniac 1 lb., sulphur 1/2 lb., iron turnings 100 lbs., is the best proportion.
1. I notice on a locomotive a rod running from the cab to the base of the smoke stack, joined to a lever that runs into the smoke stack. What is it for? A. To open and close the blast pipe to assist the draft. 2. Suppose a locomotive be standing with no steam in the boiler, what is the quickest method to set the valve without removing the steam chest cover, there being no center punch marks? A. It cannot be properly done. 3. What is the quickest method of placing the crank of a locomotive on the exact center when she is standing on an incline? A. An answer to this question would require too much space for these columns. We may probably before long elucidate the question.
(9) M. H. C. asks: Will a rotary pump, running at a slow rate of speed, force a stream of water through a hose with a very small nozzle, without loss of power by the water striking back into the supply pipe? A. Yes.
(10) O. A. Jr. asks: In setting up motion with gearing say, from 1 revolution of driver to 36 of driven pulley with 6 gear wheels, is it best to divide the motion equally along the train, or to gain more motion on the first pair of gears? A. Gain most motion on the last pair of gears.
1. I am using best boiler plate iron for steam boilers for agricultural purposes, 1/4 inch thick for shell, and 3/8 inch for heads. How much can I reduce the above thicknesses by using cast steel? A. Make the shell 3/8, heads 1/2 inch thick. 2. Will a boiler made of steel plates in above proportions last any longer than an iron boiler? A. Yes.
(11) T. S. asks: Is there a way to temper iron wire from No. 6 to No. 21? A. No, except by casehardening it.
(12) R. A. McC. says: 1. I wish to put a whistle on the roof of my elevator, which is 38 feet from boiler. Would a whistle work as well as at a shorter distance from boiler? A. The whistle would work well, but not as well as if close to the boiler. 2. Would felt covering on pipe be any help in regard to keeping lead pipe warm? A. Yes, felt covering would answer well.
(13) J. B. asks: Please let me know the simplest rule for finding the diameter of pulleys to run a machine at a certain speed: for instance, main shaft has 90 revolutions and pulley on machine is 14 inches diameter. What size of pulley will I require on main and counter shafts? A. Multiply the diameter of the driving pulley by the number of its revolutions per minute, and divide by the number of revolutions you require your machine pulley to run at, and the quotient will be the required size of the latter.
(14) A. S. says: My doctor pump runs from right to left, and the plungers and stuffing boxes wear to one side. I have examined the pump and found it to be correctly in line, and level. In order to put the wear on the opposite side, could I not set the eccentric of the cut-off round, so that the pump will run in the opposite direction, namely, from left to right? A. We do not think the alteration would affect the wear to one side if the parts are in line.
My partner claims that putting 3 or 4 pieces of wood in the furnace, and then putting on a heap of coal, prevents the falling through of the small coal, the grate bars being 5/8 of an inch apart. I claim that putting one piece of wood into the furnace, and putting a heap of coal on it, will prevent the waste better than his way: because in my way the coal will form a cake, which, when stirred up, will give a good fire, and thus save fuel, time, and labor. Please give us your opinion. A. If the coal cakes, either plan will answer.
(15) E. S. E. says: A practical railroad engineer sometimes dashes water into the furnace, with the result that the sulphur and offensive gas came out in the form of pure white steam. The great draft would make the furnace able to bear a constant jet of water. Can you give any reason why it would not serve as an extinguisher of the objectionable smoke, which now issues from the locomotives? A. The injection of steam into a firebox has been applied for the object proposed, with partial but not complete success.
(16) H. P. O. asks: Of what use is the air receiver on a double-acting steam pump? A. It increases the suction and makes it more uniform.
A friend says that steam at any temperature can be tested by applying a thermometer. I say the thermometer will not indicate the latent heat of steam, or steam above 212°. Who is right? A. You are.
1. We have two shafts sunk to a vein of coal, and a level driven from one to the other, a distance of 1,100 yards. The one shaft ventilates the other. The upcast shaft stands 100 feet higher on surface than the downcast. My boss says that, if there is 10 lbs. per square inch on the mouth of the downcast shaft, there must be the same on the top of the upcast. I say: No, there is not the same

amount; for I assert that there is an amount of the pressure lost by friction in traveling. Which are you in favor of? A. You are right. 2. Is the current the same in each direction? A. No.
(17) J. D. B. asks: Is there any difference between the American screw gage and the American wire gage? A. Yes, and the American wire gages of various makers differ.
(18) C. B. R. says: Some time since a blacksmith was forging a large piece of iron, when some of the sparks came in contact with a piece of old lightning rod that was near the forge. At the instant of contact, there was a loud explosion, and a flash of fire by which an old man, sitting by, was severely burned. A part of the rod was turned blue and smelt strongly of sulphur. The explosive substance, whatever it was, seemed to come from the surface of the iron, which was a solid piece. It was on a clear day without any atmospheric disturbance. What caused the explosion? A. The spark was doubtless a globule of melted iron which, being thrown against the rod by blows from the hammer, naturally enough scattered in various directions. It is possible, also, that the rod was wet at the time.
(19) E. A. W. asks: Can you inform me how to place a chair on a table arranged to have endwise, sideway, and up and down motion, so that the chair will not partake of the motion of the table? A. It cannot be done.
(20) J. A. K. asks: A friend has made a kiln of bricks which are well burnt, but are easily broken, and are too soft to stand the test of time. What will make the best wash or coating for these bricks when exposed to the weather? A. If the bricks are soft and easily broken, they are not well burnt, and you will find it very difficult to treat them with any preparation that will enable them to take the place of well burnt brick. Linseed oil may prevent them from absorbing as much water as they otherwise might, and this will cause them to last a little longer.
(21) H. K. Sr. asks: 1. What is the best speed for a grindstone 5 feet in diameter, to grind plows? A. Run your stone at 300 revolutions per minute. 2. How many horse power should an engine have to drive such a grindstone? A. About 4 horse power.
1. Can you give me a good recipe for hardening plow mold boards? A. To 4 gallons of water add saltpeter 1 oz., sal ammoniac 1 oz., and salt 1/4 lb. 2. Does "Wrinkles and Recipes" contain such information? A. Yes.
(22) E. T. H. asks: 1. I want to make a magnet to place in a fire alarm telegraph circuit. The circuit is composed of about 6 miles of wire, with 15 stations. Of what size shall I make my magnet? A. Make the coils of copper wire, and let the resistance be 25 or 30 ohms for each magnet. 2. In a late number of your paper, Mr. Sawyer says that it requires 10 cups of Grove's cells to heat a fragment of platinum wire. In a former number, in an illustrated description of an hydroelectric lamp, the illustration shows only 1 small cup. What is the smallest amount of battery power required to heat platinum wire to a red heat? A. That depends upon several circumstances. A single cell of bichromate battery (without porous cup) will heat from a quarter to half of an inch of No. 46 platinum wire to a white heat.
(23) H. C. E. asks: 1. Of what diameter should a steam whistle be for a boiler 30 inches in diameter by 48 inches high? A. About 2 1/2 inches. 2. Of what kind of metal should it be made? A. Use a good composition, say copper 80, tin 16, zinc 4 parts.
1. Are spur wheels used for connecting propeller shaft to engine shaft? A. Yes, sometimes. 2. Is a shaft of patent cold rolled iron 1 1/2 inches in diameter strong enough for a propeller 18 inches in diameter, the shaft being 7 feet long? A. It is rather too small in diameter.
(24) A. H. T. says: I have constructed a Jamin magnet, but have failed in magnetizing it on account of its peculiar shape and form, not having been able to apply the electro-magnet to the surface of the steel ribbons. Wishing to construct a magnet of great power, I ask your advice how I am to proceed in magnetizing it. What power of battery, and what form of magnet am I to use? A. We think you should be able to charge it with a bar electro-magnet. Two or three large sized cells will magnetize the latter strongly if the coils are properly constructed.
(25) I. H. C. says: How can I make a battery that will give one a small shock? A. It will require a number of cells to give much of a shock. A small electro-magnetic induction apparatus, often termed a medical machine, will suit you better. For its construction, see almost any school book on natural philosophy.
(26) A. H. asks: 1. What amount of electricity is meant by 0.02 of a weber, and how is it ascertained? A. The weber is an electrical unit by means of which electricians are enabled to convey definite information regarding the strength of a current. Its magnitude is such that the unit of electromotive force, called a volt, divided by the unit of resistance, an ohm, equals one weber; 0.02 of a weber is the strength of current usually employed on telegraph lines to work the ordinary Morse relays. 2. Does the consumption of materials in a battery vary inversely as the resistance of the circuit? A. Yes, aside from local action in the battery. 3. What relation do they sustain in that respect? A. The less the resistance, the greater the action. 4. Would it be economical to insulate the return wire of a short telegraph line? A. No.
(27) T. C. M. says: In a sheet copper vessel, the sulphate of copper solution, after being allowed to stand for a few weeks, has deposited a hard, greenish coat, which prevents the working of the battery of which it forms a part. How can it be removed? A. We have never met with this in our