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.

Agricultural Implements and Industrial Machinery for Export & Domestic Use. R. H. Allen & Co., N. Y.

How to lay out the Teeth of Gear Wheels. Price 50 cents. Address E. Lyman, C. E., New Haven, Conn.

Wanted—Inventors of Harrows and Harrow Teeth, to send samples of teeth, descriptions, and price for right, to "Harrow Co.," Dayton, Ohio.

Wanted—At low prices, good small 2d hand Iron Planers, Lathes, Drill Presses, and other Machine Tools. Send particulars to J. & H. Kelsey, 186 Kentucky Avenue, Indianapolis, Indiana.

Owners of Steam Engines—We guarantee 25 per cent extra power or an equal saving in fuel, by applying the Ransom Syphon Condenser. T. Sault, Consulting Engineer, General Agent, New Haven, Conn.

Wanted—A first class mechanical draughtsman. Address, with particulars, Draughtsman, Box 639, Providence, R. I.

Steel and iron drop forgings all shapes, ¼ oz. to 5 lbs., far superior to malleable and steel castings. Steel slide wrenches a specialty. Call before purchasing elsewhere. Wm. Rose, Bro. & Co., 36 & Filbert sts., W. Phila.

Wanted—A man (fully competent) to erect and take charge of a Cotton Batting and Wadding Factory. Address, with references, J. M. Ferguson, 440 Prytania St., New Orleans, Louisiana.

We have on hand a large lot of Machinist's Tools, second hand, which must be sold in order to close up an old partnership. For pamphlet, giving full description of each tool, address Steptoe, McFarlan & Co., 214 West 2nd St., Cincinnati, Ohio.

Wind Mill Rights Cheap—One county in each State to give for introducing the mill. For terms, &c., address E. S. Smith, Good Hope, Ill.

Wanted—Address of Makers of Papier Maché Ceilings. Address J. Parmelee, Des Moines, Iowa.

The French Files of Limet & Co. have the endorsement of many of the leading machine makers of America. Notice samples in Machinery Hall, Centennial Exposition. Homer Foot & Co., Sole Agents, 22 Platt St., New York.

Wanted—The agency of some good Engines, Boilers, Machinist's Tools, and Wood-working Machinery; also Steam and Gasfitter's Tools, Brass Goods, &c. Address G. H. B., 213 North Fourth St., Philadelphia.

Top for Baby Carriages—Pat'd March 14, 1876. Rights for Sale. Address W. E. Crandall, 569 3d avenue, New York city. See notice on page 281.

Second Hand Machinery—Large Stock of Iron and Wood Working Machinery in Store at Great Bargains. George Place, 121 Chambers and 103 Reade Sts., New York.

Vertical Tubular Boilers, all sizes. Send for price list. Lovegrove & Co., Philadelphia, Pa.

For 2nd Hand Portable and Stationary Boilers and Engines, address Junius Harris, Titusville, Pa.

Corrugated Iron—Iron Buildings, Roofs, Shutters, Doors, etc. Moseley Iron Bridge and Roof Company, Office, 5 Dey St., New York. Send for circulars.

Bung Machine Makers—Please send address or circular to W. H. F., Box 773, New York city.

Bargains in new and second hand Machinery. Send for our printed list, No. 5, describing 300 machines. Forsaith & Co., Manchester, N. H.

Centennial Exhibitors, buy your Belting in Philadelphia, from C. W. Arny, 148 North 3d St., and save freight and trouble. Satisfaction guaranteed.

Wanted—2d hand battery for Electric light; also Induction Coil. Particulars to J. T. O'Connor, 151 West 41st St., New York.

Wanted—Charge of Weaving Department, Cotton or Satinet, by a practical, experienced man. Address A. B. C., P. O. Drawer No. 5, Greenville, N. H.

Wanted—Tubular Condenser. Boston P.O., 3396.

Wanted—Steam Pump, about ½ horse power, to use Kerosene for fuel. Box 1, Andover, Mass.

Wanted—To purchase the Patent of a good and cheap Burglar Alarm, or will manufacture and pay royalty. Address, with full particulars, B. H. Robb & Co., 186 Vine St., Cincinnati, Ohio.

Trade Marks in England.—By a recent amendment of the English laws respecting Trade Marks, citizens of the United States may obtain protection in Great Britain as readily as in this country, and at about the same cost. All the necessary papers prepared at this Office. For further information, address Munn & Co., 37 Park Row, New York city.

Friction Hoisting and Mining Engines.—J. S. Mundy, 7 R.R. Ave., Newark, N. J.

Split-Pulleys and Split-Collars of same price, strength, and appearance as Whole-Pulleys and Whole-Collars. Yocom & Son, Drinker St., below 147 North Second St., Philadelphia, Pa.

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

Shingles and Heading Sawing Machine. See advertisement of Trevor & Co., Lockport, N. Y.

File-cutting Machines. C. Vogel, Fort Lee, N. J.

Yacht & Stationary Engines, Sizes 2, 4, 6 & 8 H.P. Best for Price. N. W. Twiss, New Haven, Conn.

Inlaying and Fret Sawing in Wood, Shell, Metal, &c. See Fleetwood Scroll Saw, page 188.

$1,000 for any hand sawmill equal to A. B. Cohu's, 197 Water St., New York.

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.

Steel Castings, from one lb. to five thousand lbs. Invaluable for strength and durability. Circulars free. Pittsburgh Steel Casting 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.

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.

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

All Fruit-can Tools, Ferracute W'ks, Bridgeton, N.J.

Notes & Queries.

A. B. can color gold by the process described on p. 363, vol. 33.—P. M. H. will find an answer to his question concerning the commencement of the day on p. 401, vol. 28.—B. H. will find a description of the toughened glass on p. 402, vol. 32.—R. F. B. P. can cement straw boards together with marine glue. See p. 43, vol. 32.—F. B. L. can make an excellent incubator by following the description on p. 273, vol. 33.—J. S. can find a good recipe for cement for glass on p. 379, vol. 31. —F. S. H. can prevent rust on his skates by the method given on p. 169, vol. 33.—W. F. F. can find a description of bisulphide of carbon on pp. 306, 368, vol. 28. The numbers are out of print.—H. E. J. will find full directions for setting shafting, etc., on p. 388, vol. 31.—B. H. will find a recipe for hair stimulant on p. 138, vol. 33.—P. F. will find mention of a process for making gas from coal oil on p.65, vol. 32. Coal gas is purified by passing it through quicklime.—C. A. W. will find directions for taking casts on p. 58, vol. 24. In molding the male human face, the beard, etc., should be well oiled to prevent its adherence to the mold.—W. H. B. will find directions for bluing iron and steel on p. 123, vol. 31.—B. L. can make sulphate of indigo by the process given on p. 250, vol. 31.—B. P. F. will find directions for utilizing bones on p. 251, vol. 28.—D. N. C. will find a recipe for a black enamel on iron on on p. 208, vol. 26.—A. H. S. will find that rice glue is a good cement for making transparent cards. See p. 155, vol. 32.—J. C. S., Jr., will find a recipe for remedying the rancidity of butter on p. 119, vol. 30.—C. H. S. can raise his water by wind power. See p.241, vol. 32.—J. L. W. will find a description of the Russian circular ship on p. 87, vol. 32.— W. E. will find a recipe for rubber cement on p. 203, vol. 30.—H. F. P. can extract silver from waste solutions by the method described on p. 249, vol. 29.—W. C. M. will find directions for making carmine red ink on p. 200, vol. 30.—E. S. A. will find directions for making Professor Tyndall's respirator, which is suitable for his purpose, on p. 178, vol. 32.—X. Y. Z. will find directions for building a windmill on p. 241, vol. 32.—R. D. T. will find a description of soluble glass on p. 315, vol. 31.— E. R. will find directions for making sulphate of indigo on p. 250, vol. 34.—C. C. will find directions for making imitation rosewood on p. 154, vol. 30.— J. P. will find directions for gilding on wood on p. 90, vol. 32.—F. V. D. C., G. W. D., W. K., F. W., and G. R. S., who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

(1) J. H. B. asks: Can you tell me how bevel gears are tapered on a regular gear cutter? A. The chucking spindle is made adjustable, to suit the taper.

(2) J. M. H. says: The brasses on the forward end of a locomotive's main rods are continually wearing out, not quite so much on one side as on the other. The brasses are hard, yet they do not heat nor cut. I have to chip and file the brasses a great deal too often for the amount of work done. The engine works well and we make good time with her. A. It is probable that your journals have not sufficient wearing surface, or else the brasses are not made of the proper mixture of metal.

(3) G. V. B. asks: At what speed should I run a polishing wheel 2 feet in diameter, on which flour emery is used with oil? A. At 320 revolutions per minute.

(4) X. Y. Z. says: I am preparing a machine to split pieces of wood 2 feet long and 6 inches in diameter by means of two axles working horizontally and connected by an axle with a double crank or a fly wheel. The wood is about as hard and splits like pine. About what size and weight of fly wheel do I need to work the machine by water power? A. If you make a fly wheel 3 feet in diameter, with a rim having a cross section of 12 square inches, we think it will answer. 2, Is there danger to the axle in such an arrangement? A. You need apprehend no danger if you make the axle of ample proportions.

(5) H. F. asks: What is the best water proof cement, that the sun will not affect, for putting glass tiles in iron frames? A. Use a cement made of white lead ground in oil, with as much dry red lead added as will make it to the proper consistence. Cut up some hemp into short fibers, and mix the whole by well hammering and kneading it.

(6) J. A. L. asks: 1. How large a boat would it require to carry 6 or 8 persons? A. Make a boat 18 to 20 feet long. 2. What kind of boiler and engine will be best? A. Use an engine 3 x 3 inches, and a boiler 28 to 30 inches in diameter and 4 feet high. 3. Will the man running the engine have to get papers licensing him to run her? A. It will be necessary to have a licensed engineer.

(7) S. C. H. asks: In heating a large piece of steel to temper it for cutting wood, it scales off. Would it do to put the steel in molten lead instead of heating it in the fire? A. Yes. Heating in lead will answer excellently.

(8) R. P. asks: 1. What would be the striking force of a man weighing 150 lbs., jumping from a railroad train running at the rate of 30 miles per hour, the distance from the car to the ground being 4 feet? A. The amount of work to be overcome in bringing the man to rest would be:
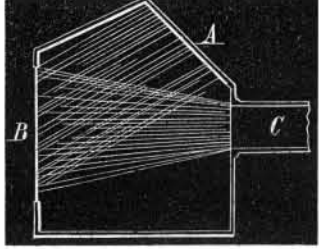
$$\text{His weight} \times \left(\frac{\text{velocity in feet per second with}}{\text{which he strikes the ground}}\right)^2$$
$$\overline{64\cdot4}$$

Now if you can find through what distance this resistance is overcome, by the compression of the earth and of the man, the quotient of the whole work in foot lbs., divided by this distance in feet, will be the striking force in lbs. 2. If 2 men of the same weight jumped from the same hight, could one strike the ground with less force than the other? If so, why? A. From the above answer, you will see that if one jumped harder than the other, or if he or the ground on which he jumped were more compressible, there might be some difference in the striking forces, which would, however, be sufficiently severe in any event.

(9) F. P. asks: How can I make the cores for the steam ways for an engine 1¼ x 3 inches? I have used 1 part clay and 1 part molder's sand, but it falls to pieces. A. Strengthen the cores with wires.

(10) F. E. H. asks: How do you measure a safety valve? I measure it as follows: I hang the lever on a spring balance at the point where the valve rests, the lever and valve showing a weight of 20 lbs. Then I measure the bottom of the valve, which is conical, the bottom being of the size of the pipe on which it is placed. It was 4 inches in diameter, and the weight on the end of the lever was 50 lbs. The lever is 24 inches long in all, the short end being 4 inches from the fulcrum. I calculate as follows: $4 \times 4 = 16 \times 0 \cdot 7854 = 12 \cdot 5664$ square inches area of valve. Lever is 24 inches long, short end 4 inches : $24 + 4 = 6 \times 50$ lbs. = 300 lbs. + 20 lbs. for lever and valve = 320 lbs. $320 + 12 \cdot 5664 = 25 \cdot 4 + $ lbs. steam. Am I right? A. If the valve fits perfectly tight, it is proper to measure the lower diameter; but if it leaks, the steam acts on an area corresponding to the larger diameter. You seem to have made a mistake in your calculation. The weight of the valve and lever acts at their common center of gravity, which can be found by balancing the lever on a knife edge.

(11) F. P. asks: Can stereoscopic views be reflected upon a white curtain in a dark room, so that they can be shown and explained to a company of spectators? A. Yes. It can be done by attaching a box, as shown in the accompanying engraving,

to an ordinary magic lantern at A; the picture being placed at B and the objective at C. The light coming from the condenser is reflected from the picture and passes through the objective, and the image is formed on a curtain at a short distance from it in front.

(12) J. D. G. says: I have an upright vessel containing 10 gallons, with a watertight piston on the top. What weight would be required on the top of piston rod to make a pressure of 40 lbs.? A. If you mean a pressure of 40 lbs. per square inch, it would be necessary to have a weight equivalent to the weight of a column of water having the diameter of the vessel, and a hight of about 93 feet. To find approximately the weight of such a column of water, multiply the cross section of the cylinder in square feet by 5,800.

(13) J. L. and others.—In the United States marine engineers are licensed by the government inspectors, after passing satisfactory examination on the principles, management, and repair of steam machinery.

(14) G. A. B. asks: I am going to put up a fountain, and I have no water supply but a well. I propose to put a tank on a shed which is 24 feet high and 60 feet from the proposed location of the fountain. 1. Is it practicable? A. Yes. 2. Would a 40 gallon tank give as much force as a 100 gallon one? A. Yes, if of the same hight. 3. What size of pipe would be suitable? A. Use a ¾ inch pipe. 4. Which would be the best, lead or iron? A. Iron pipe coated with tar and laid 3½ feet in the ground. 5. About how high would it play through a ½ inch hole? A. Not very high. 5. What would you advise me to do? A. To provide a much larger tank and set it much higher, so that your fountain may play higher and the supply of water last longer.

(15) T. S. O. asks: Are the finest fret saws stamped or filed out? A. Stamped.—J. E. E., of Pa.
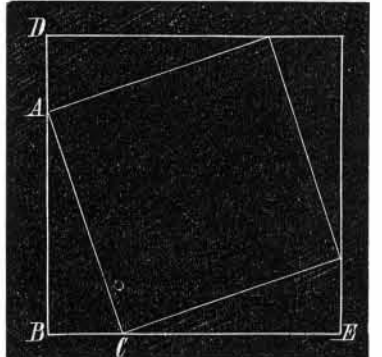
(16) C. S. says: I have put a burglar alarm in a house; it has been in use 3 months and works well, but in one place where the 6 wires run they seem to get eaten off as with acid. It occurs where the wires run through a brick wall. What is the cause? A. It is caused by the electricity which flows across the moisture on the wall and destroys the wire by local action.

(17) A. B. asks: How much silk-covered copper wire and what number of wire do I want to wind on a soft iron core 3 inches long by ⅜ diameter, to lift the greatest weight? A. Use 100 feet of No. 14 copper wire.

(18) E. C. T. asks: 1. If a circular saw, 10 inches in diameter, must run 3,000 revolutions per minute to do good work, how fast must saws 6 and 4 inches in diameter, respectively, run to do good work? A. A 10 inch saw should run at 3,600 revolutions per minute, a 6 inch saw 5,000, and a 4 inch saw 7,300; half the above speed will answer, and the saws do good work. 2. Is it possible to get sufficient speed to run a 4 or 6 inch circular saw, with two pulleys, the driving pulley of 20 inches diameter and 1¼ inches face, weighing 20 lbs., driven by a foot treadle? A. We do not think you can get speed enough unless you use gears, or use an intermediate shaft between treadle and pulley, to increase the speed. 3. Can I successfully run a scroll saw, the treadle furnishing motion to the abovenamed 20 inch pulley, and this pulley to the smaller one by friction, effectively and without slipping? A. We should think so, if well constructed. 4. Should both pulleys be faced with leather or rubber, or only one, and which one? A. Either will answer. Rubber makes an excellent friction face. The large wheel may be faced with rubber or leather, and the small one should be wood or iron. 5. What should be diameter of smaller pulley be? A. About 2 or 2½ inches diameter will answer for the small wheel.

(19) J. D. L. says: The following is, I believe, a new solution of the well known Pythagorean problem, Euclid I,47: The square of the hypotenuse of a right angled triangle is equal to the sum of the squares of the other two sides. In the tri-
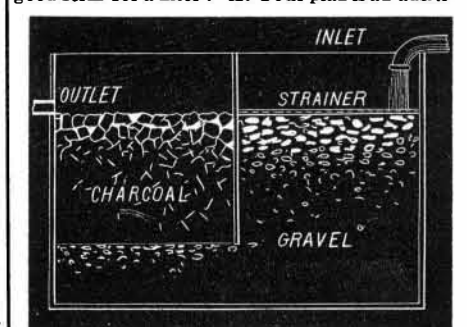

angle, A B C, prolong B A to D, making A D equal to B C; prolong B C to E, making C E equal to A B, and complete the square. Erect a square on A C. Then we have (A B + A D)^2 = area of larger square. But this area is composed of the area of the four triangles (which, having the sides equal, each to each, are equal to each other) and the square of A C; hence (A B × A D) + 2 × 4 + A^2 = area of larger square. Then D B^2 = A B^2 + 2 (A B × A D) + A D^2 = 2(A B × A D) + A C^2. Therefore A B^2 + A D^2 = A C^2.

(20) L. K. asks: I have a box made of black walnut. Some parts of it are nicely covered with a fine coat of copper. How is it put on? A. By first covering the box with wax, then with black lead, and then depositing by the regular electrotype process.

(21) G. E. Y. asks: What is the difference if any, between the temperatures of steam and water in a boiler, at from 10 to 50 lbs. per square inch? A. In ordinary practice, there is probably only a difference of a few degrees in the two temperatures: but by depriving the water of air, and heating it gradually, the temperature of the water has been increased more than 100° above the temperature of the steam.

(22) W. M. says: A girder has the load uniform and top flange with sectional area uniform, the lower flange being a parabola whose vertex is at A. Should the sectional area of lower flarge be constant, or increase towards P? A. Constant, if you are speaking of a girder of uniform strength.

(23) F. W. S. says: I am using hydrant water for brewing purposes; but it is contaminated by mud and organic matter. Can I get rid of the organic matter by filtering, and would this be a good form for a filter? A. Your plan is an admir-

able one, and, we think, will answer all the requirements of the case. The columns of sand and charcoal should be about 10 feet high and about 5 feet in diameter. Use well washed gravel and only perfectly carbonized charcoal. If the latter provision is not carefully attended to, the water may become still more contaminated by contact with the green charcoal.

(24) J. H. T. asks: I wish to make a relay for a short telegraph line. I have about 6 ozs. No. 22 silk-covered wire. Will you please tell me of what size and length the iron core should be to get the best results, the current being very weak? A. About ⅛ inch wide by 5 inches long. 2. Does it take more wire to magnetize a ½ inch bar than it does a ¼ inch one with the same current? A. Yes.

(25) W. W. asks: Is there anything in the form of a one half balance wheel applied to the shaft of a sawmill? A. The half balance for a sawmill shaft is old. It is a very common way of counterbalancing the weight of gate and pitman. —J. E. E., of Pa.

(26) J. D. W. asks: Do thermostats made of brass and steel last or act well for a considerable time? A. If properly constructed they do.

(27) J. F. R. says: I am building an icebox 8 feet deep, 8 feet high, and 5 feet wide, ice being suspended in a grate. There is an air chamber inches wide all round it. Is ventilation necessary? A. A certain amount of ventilation is necessary. We would suggest an opening 3 inches in diameter upon oue side at the bottom, and a like opening upon the opposite side at the top, these openings should be covered with wire cloth. The openings should communicate with the interior and not with the 2 inch space.

(28) D. P. W. asks: If a tuba mirabilis stop in an organ be weighted 18 inches water gage pressure of wind, what will be the relative pressure on a steam gage? A. About 0·65 lb. per square inch.

(29) A. C. C. asks: Does the friction increase with the diameter of the journal, the weight and the velocity remaining constant? A. Under these circumstances the friction would not vary.

(30) J. E. D. asks: 1. Will quicksilver remove the lead from gun barrels? A. Yes, but the black lead (carbon) and oil with which the bullets are covered, and the percentage of arsenic with which the metal is alloyed, often renders this method unsuccessful. 2. If so, how can the lead be separated from the quicksilver so that the latter can be used again? A. Heat the alloy in a suitable iron retort, the beak of which, or its connection, must dip beneath the surface of a quantity of water. The mercury will distil over and condense beneath the water, while the lead will remain behind.

(31) J. S. O. says: The generally accepted theory of intermittent springs is that a cavity in the earth has two water channels, one leading into it, the other out, the former being the smaller, as in the engraving, which represents the section of an intermittent spring. Let A be the outlet, 2
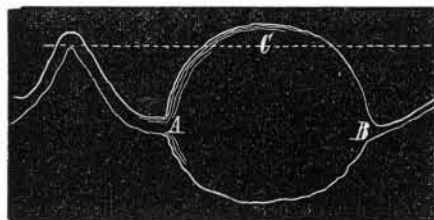
inches in diameter, and B the inlet. If water flows in through this channel, it will rise to the level, C, and instead of filling the channel, A, which is necessary to create a siphon, it will flow out in a steady stream as long as water flows in at B. Can any one give another theory to take the place of the long accepted but evidently incorrect one? A. In accounts of several intermittent springs which we have seen, it is stated that the water first issues with great velocity, and runs for some time with a continually decreasing velocity. It would not be difficult, therefore, to believe that the cavern might be so supplied as to be full at times,the supply being sometimes greater than the discharge and sometimes less. Perhaps some of our readers have devoted more attention to the subject than we have, and will send us their views.

(32) W. F. T. asks: 1 How high will an hydraulic ram raise water? A. In general, it should not be more than 15 times the head under which the ram works. 2. If I attempt to raise all the water that runs from my spring with an hydraulic ram, what proportion of the water will the ram raise? A. It may raise from ½ to 1⁄10 the whole amount. 3. Can an hydraulic ram of any size be made to work, or is there a limit to the size at which it can be made to operate successfully? A. As a general thing, the size of a ram is approximately fixed by the conditions under which it has to work. You will find the whole matter fully explained on p. 259, vol. 31.

(33) B. W. S. says: The head of a horse rake, being green when manufactured,has warped in drying. How can I remedy the defect? A. Possibly by steaming the wood, and securing it in the proper position, you may give it the original shape.

(34) M. W. H. asks: At what angle should a rifle be held to throw a ball to the greatest distance over level ground? A. A general value would be difficult to ascertain. In practice, the angle will probably be between 30° and 40°. Can a horse do more work walking at 30 or at 60 yards per minute, in both cases pulling his best for the space of one minute? A. He could probably do more, for a short time, at the greater speed. What steam pressure would a vat (made of grooved and matched 2 inch oak plank, of 10 feet hight and 8 feet diameter, sustain, being bound with nine ¼ x 2 inches iron hoops? A. Between 30 and 40 lbs. per square inch.

(35) R. H.—If, as we understand you, the thrashing machine runs with sufficient steadiness at present, we do not see that any advantage would be derived by using a heavier cylinder.

(36) C. W. C. asks: 1. Is a screw steamer, of 1,000 horse power, faster or slower than a side wheeler of the same power? A. In still water the screw would have no great advantage; but in the case of adverse winds and heavy seas, its superiority over the side wheel is very decided. 2. Is a two-bladed screw more powerful than one with more blades, other things being equal? A. Experiments seem to show that screws with two blades are not as efficient as those having three or four, other things being equal.

(37) I. J. H. asks: Can I cover steel-pointed poles with any preparation that will prevent their attracting lightning? I want to use those I have to make a garden fence, but am half afraid to do so. A. Metals do not attract lightning. The idea that they do is a popular delusion.

(38) F. A. S. asks: Can you inform me what is the best contrivance for grinding centers in a lathe? A. A revolving emery wheel.

(39) F. N. W. asks: In connecting a tank in the top of a building with the standpipe from the pump, will there be any difference in the pressure on the pipe whether it be connected at the bottom or at the top of the tank? A. If the tank is kept full, there will be no difference. This also answers S. F.'s plumbing question.

(40) S. C. says: I offer the following as an easy method of dividing circles. In a given circle (Fig. 1) divide the diameter, A B, into as many equal parts as you wish the figure to have sides;
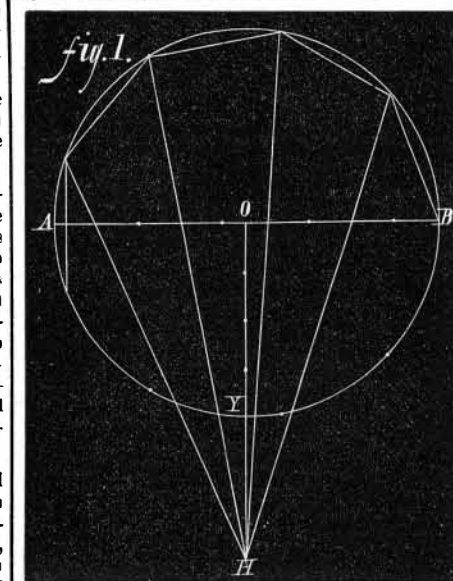
erect the perpendicular; O H, divide the radius into 4 equal parts, and set off 3 of these parts from Y to H; draw lines from H to each division on diameter, and produce them to cut the circumference. Join any two of the points by a chord, and it will be the side of required polygon. When the polygon is to have an even number of sides, divide diameter in half the number and draw from H through each division. Join any two points where they cut the circumference, and the chord so drawn will be the side. To do the same (Fig. 2) when each side is to be a definite length: Divide 360° by the number of sides in polygon, deduct the
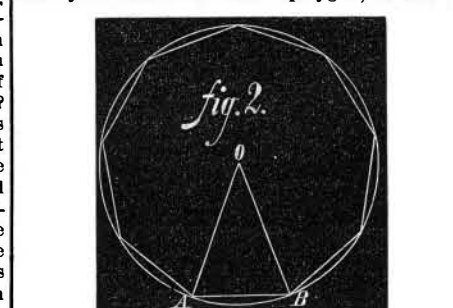

quotient from 180°, the remainder will be the number of degrees in each polygon; at the points, A and B, one inch or whatever length you wish for a side apart make the angles, O A B or O B A, each equal to half the angle of the polygon; from O as a center,with O A or O B as radius,describes circle, in which place A B continually.

(41) M D. asks: Can you inform me what colors or combinations of ingredients I must use to produce a silver color, like silver leaf, on leather? A. Try the bisulphide of tin. Apply with a hot iron.

(42) W. C. asks: Will dry steam, taken from a generator, at 100 lbs. pressure, passing into water in a closed boiler, the blow-off valve being set at 80 lbs., evaporate that water,or will the steam from generator condense and increase the quantity in closed boiler? A. After the water is heated up to the temperature due to the pressure, the steam would merely escape through the blow-off valve.

(43) S. S. H. says: 1. I have a window, the head of which is circular,and the inside casing is on the splay. Is there a rule by which I could cut out a board to bend around it, and make the marks across it so that I can saw-kerf it? A. We presume you have reference to the splayed soffit of your jamb instead of the casing. Let A B be the width and splay of the jamb, and C D a line drawn through the middle of the window, at right
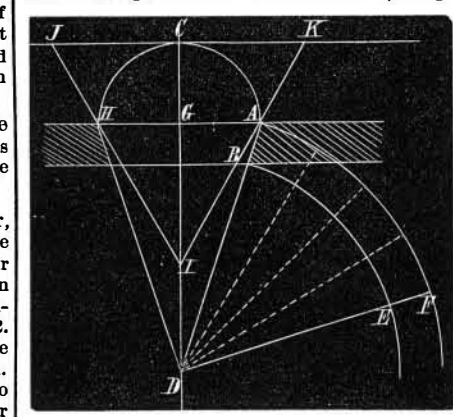
angles to the direction of the wall. Prolong A B to intersect C D at D. With D A for radius, draw the arc, A F, and with D B for radius draw the arc, B E. With G H for radius, draw the semicircle, H C A. Make H I and A I each equal to H A,and from I, through A and through H, draw the lines, I J and I K. Make A F equal to J K, and join F and D. Then A F E B will be the shape of the soffit required. 2. What is a transom? Is it what is called the fanlight over the door, or is it the rail across the head of the door? A. The latter.

(44) F. S. B. asks: Please give me a recipe for cleaning white rubber coats. A. Try rubbing the coat with a little benzine, but do not allow it to remain too long in contact with the rubber. You fail to state with what the material has become stained.

(45) I. H. W., of Ouchy, Switzerland, says: Why is it that many (perhaps all) liquids will percolate more rapidly through two than one thickness of filtering paper? My theory is that, with one thickness, the paper, becoming saturated, adheres to the funnel sides, and checks the circulation of air, whereas, when two thicknesses are used, a circulation is established between the papers themselves. Am I correct? A. Yes.

(46) C. F. M. asks: What is the strongest and best kind of alkali for bleaching oil? A. Use a strong solution of caustic potassa or soda in water.

(47) M. asks: What is a good plan for compressing air on a small scale? A. Try a small air pump or bellows.

(48) W. B. W. asks: What acid will do to bite figures, etc., in mica? A. Try a mixture of strong sulphuric and hydrofluoric acid.

(49) W. L. asks: In casting gun metal or hard brass upon a smooth iron surface, or chill, what is the best coating or parting to put on the iron in order that the gun metal may form a smooth surface in close contact to the iron, without any blow holes? A. Use plumbago for a parting and dry the mold.

MINERALS, ETC.—Specimens have been received from the following correspondents, an examined, with the results stated:

F. W. R.—It is decomposed granite, and the shining scales are small pieces of weathered mica.—H. A. R. Jr.—You are mistaken in supposing the specimen is an ore. It is composed of quartz, mica, and the black portion of hornblende, which is a silicate of alumina, lime, etc, and some oxide of iron.—A. W. S.—No. 1 is silex, alumina, and a small percentage of hydrated oxide of iron. No. 2 is earth containing scales of mica. No. 3 is silex and oxide of iron. No. 4 is silicate of alumina with oxide of iron. The percentage is so small that they are not to be considered as iron ores.—T. L.—No. 1 is graphite (black lead). No. 2 is mostly iron pyrites, but you should send a larger piece and have it assayed.—G. C. R.—It is the American holly (ilex opaca). The deep green foliage is less glossy than that of the European holly.—R. W. R.—It is Epsom salts, as you have stated. The discovery is of the greatest interest and value.—R. M. R.—It is a small fragment of fossil, with clay and oxide of iron.—G. S. M.—It consists mostly of silex with silicates of lime, magnesia, and alumina. It is not of much value.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

On Footprints in the Carboniferous Sandstone By J. L. G.
On a Day's Work. By E. L.
On Saving Life. By M. P.
On Supply and Demand. By W. L.
On the Newfoundland Railway. By H. A. C.
On Machinery and Labor. By W. P.
On Type-Setting Machines. By T. E. A.

Also inquiries and answers from the following:
J. P. S.—P. D.—A. H. L.—W. T. H.—R. L. D.—B. B.—F. H. W.—O. N. S.—B. B.—W. A. R.—W. S. T.—W. E. F.—H.—W. S. G.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: " Who makes toughened glass? Who sells machinery for manufacturing starch? Who sells incubators? Who sells hydraulic rams? Who makes the machines used in the manufacture of friction matches?" All such personal inquiries are printed, as will be observed,in the column of " Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost a y desired information can in this way be expeditiously obtained.