

Business and Personal.

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Small Factory wanted in Connecticut, with 20 Horse Water Power. Address Box 3131, New York. Engines 2 to 8 H.P. N. Twiss, New Haven, Ct. For Sale—Steam Saw Mill, Foundry, Machine and Blacksmith Shop, 75 Acres Land, three Dwellings, situated at Maryland, Md. & Del. R. R., Md. Price \$10,000, Cash. Address W. W. McKnett, Maryland, Md. Hearing Restored—A Great Invention. Send stamp for particulars, to George J. Wood, Madison, Ind. Mead's Patent Safety Explosive Bullet Cart-ridge, all sizes. Circulars sent. John P. Moore's Sons, 204 Broadway, New York. Wanted—A Second Hand Stave and Heading Machine. Address Senn & Ehrsam, Enterprise, Kan. For Sale—Receipt to Plate Zinc Articles with Brass without Batteries. Silverplating Glass, two minutes. Samples sent. Address 250, Bristol, Conn. A graduate of a German Polytechnic School, of practical experience, speaking English fluently, desires a situation in a machine shop, where the results of his study and practice may be mutually advantageous. H. Bilgram, 147 South 4th St., Philadelphia, Pa. A full set of the Scientific American, from Vol. I, for Sale. L. V. Badger, 219 Ashland av., Chicago, Ill. What skilled Machinists say about Judson's Patent Lathe Chuck. "I never saw so good a chuck, and prefer it to the Universal.—M. M., of Wason Mfg. Co., Springfield, Mass."—"This is the best chuck we ever saw.—Chicago Bolt Works." Dwight Roberts, Manufacturer, Wythe Av. & Hewes St., Brooklyn, E. D., N. Y. Gold Pens made to suit any hand, by C. M. Fisher & Co., 102 Fulton St., New York. 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. Foundry and Machine Shop for Sale. For particulars, address Bodine & Lohman, Jefferson City, Mo. See advertisement, inside page. Vertical Tubular Boilers—All sizes. Send for price list before purchasing. Lovgrove & Co., 121 South 4th St., Philadelphia, Pa. Pulleys, Shafting, Adjustable Hangers, &c. Send for Price List to Tully & Wilde, 20 Platt St., N. Y. Diamonds and Carbon turned and shaped for scientific purposes; also, Glaziers' Diamonds manufactured and reset by J. Dickinson, 64 Nassau St., N. Y. The New Elastic Truss presses uniformly all around the body, and holds the Rupture easy, night and day, till cured. Sold cheap by the Elastic Truss Co., 683 Broadway, New York. Protect your Buildings—Fire and Water proof! One coat of Glines' slate roofing paint is equal to four of any other; it fills up all holes in shingle, felt, tin or iron roofs—never cracks nor scales off; stops all leaks, and is only 80c. a gallon ready for use. Roofs examined, painted and warranted. Local Agents wanted. Send for testimonials. N. Y. Slate Roofing Co., No. 6 Cedar St., N. Y. Teleg. Inst's and Elect'l Mach'y—Cheap Outfits for Learners. The best and cheapest Electric Hotel Annunciator—Inst's for Private Lines—Gas Lighting Apparatus, &c. G. W. Stockly, Scy., Cleveland, Ohio. Woolen and Cotton Machinery of every description for Sale by Tully & Wilde, 20 Platt St., N. Y. Steam Engines—Special Machinery, Shafting, Pulleys & Hangers. D. Frisbie & Co., N. Haven, Ct. L. & J. W. Feuchtwanger, 55 Cedar St., N. Y., Manufacturers of Soluble Glass, Water Glass or Silicates of Soda and Potash in all forms and quantities. Pat. Double Eccentric Cornice Brake, m'fd by Thomas & Robinson Chmn., O. Send for Circular. 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. Stove Patterns to order—Also, for sale a variety of new styles. E. J. Cridge, Troy, N. Y. Treatises on "Soluble Glass," \$1 per copy; on "Nickel," 50c. per copy; on "Gems," \$5.25 per copy; on "Fermented Liquors," \$3.12 per copy. Mailed free by L. & J. W. Feuchtwanger, 55 Cedar St., New York. Temples and Oil Cans. Geo. Draper & Son, Hopedale, Mass. Mining, Wrecking, Pumping, Drainage, or Irrigating Machinery, for sale or rent. See advertisement, Andrews' Patent, inside page. Abbe's Bolt Machines and Palmer's Power Hammers a specialty. S. C. Forsyth & Co., Manchester, N. H. "Superior to all others"—for all kinds of work—Linet & Co.'s French Files. They are better, forged, better cut, better tempered, and cheaper than English files. Send for Price-List. Homer Foot & Co. Sole agents, 20 Platt St., 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. Rue's "Little Giant" Injectors, Cheapest and Best Boiler Feeder in the market. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York. L. & J. W. Feuchtwanger, 55 Cedar St., N. Y., Importers and Manufacturers of Chemicals for Mechanical arts. Brown's Coal Yard Quarry & Contractors' Apparatus for hoisting and conveying material by iron cable. W. D. Andrews & Bro. 414 Water St., N. Y. Parties needing estimates for Machinery of any kind, call on, or address, W. L. Chase & Co., 93, 95, 97 Liberty Street, New York. Iron Steam Boxes for Stave Bolts & Veneer Cutting Machines. T. R. Bailey & Vail, Lockport, N. Y. Partners Wanted—We want to find one or two good careful Managers who have capital, to buy an interest in 746 Acres Big Muddy Coal, heavy Timber and Farm land, who shall superintend the Farming, a Saw Mill and Coal Shaft. Safe investment. See "Iron Age" for Jan., 1874. Address Dobschutz & Abend, Belleville, Ill. For Solid Emery Wheels and Machinery, send to the Union Stone Co. Boston, Mass., for circular. For best Presses, Dies and Fruit Can Tools Bliss & Williams, cor. of Plymouth & Jay, Brooklyn, N. Y.

Best Steam Traps made, non-freezing Scotch Tubes and Engineers' Supplies, &c. A. G. Brooks, 426 Walnut Street, Philadelphia, Pa.

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

Steam Fire Engines, R. J. Gould, Newark, N. J.

Peck's Patent Drop Press. For circulars, address Milo, Peck & Co., New Haven, Conn.

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

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

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

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



S. C. C. will find a description of Mure and Clamond's thermo-electric battery on p. 24, vol. 29.—C. R. H. can temper steel plow molds by the process for casehardening described on p. 362, vol. 25.—S. C. C. can brown gun barrels by following the directions on pp. 154, 266, vol. 26.—T. C. and others write to point out that the explanation of the compound lever on p. 11, vol. 30, should be "36x17.5x20, weight balanced at A," and not "36x13x20," etc.—N. K. L. will find recipes for brass lacquer and dip on pp. 219, 282, vol. 29. Booksellers' addresses appear in our advertising columns.—A. W. can arrange his lenses in a wooden telescope, according to the description on p. 7, vol. 30.—H. E. S. will find directions for making paste on p. 280, vol. 28.—A. G. S. will find directions for making cider vinegar in our answer to J. F. A. on p. 53, vol. 30, the process described in which will serve as well with cider as with malt.

H. C. asks: How large should a cylinder be for a circular wrought-iron boiler 18 inches in length, 14 inches in height, with 5 to 7 inch flues, capable of standing 75 lbs. pressure to the square inch? A. Diameter one inch, stroke three.

J. G. asks: What is the percentage of fuel saved by feeding water into a boiler at 200° when before it was fed in at 125°? A. You do not send enough data to enable us to answer this question. We can give you the general method of finding the gain by increasing the heat of the feed water, and you can apply it to your case. Let H=total heat of the steam. F=one temperature of feed. f=higher temperature of feed. Then $\frac{H-F}{F} \times 100$ =per cent of gain by increasing the temperature of the feed water. EXAMPLE: Suppose, in the case mentioned by you, that the steam has a pressure of 60 lbs. by gage. $H=1207.8$ per cent of gain $=\frac{200-125}{1207.8} \times 100 = 6.2$

N. G. asks: Can I transmit the power to a grist mill by friction bevel wheels, one on the horizontal shaft which runs at 225 revolutions per minute, the other on a perpendicular shaft whence a belt leads to the spindle? What would be the dimensions of the wheels, and of what should I make them? A. You do not state how much power you desire to transmit. We think, however, that you would experience trouble in the use of wooden wheels.

J. H. O. says: One of your correspondents states that the heated hydrocarbon vapors are liable to spontaneous explosions when mixed with atmospheric air. May not such explosions occur in ordinary temperatures in the use of any of the light hydrocarbon oils? A. From the great volatility of some of the hydrocarbon compounds, we are inclined to think that what seemed like spontaneous explosion was really caused by some hydrocarbon vapor coming in contact with flame at some distant point. In this respect impure or imperfectly refined kerosene is sometimes more dangerous than gunpowder, the volatile inflammable vapors even at a great distance taking fire in contact with flames, and leading like a train to inflammable fluid. We think, however, that there is a field here for careful experiment to determine the precise conditions under which these volatile compounds inflame or explode.

H. A. W. says: "I read that, to make imitation sapphires, I should take one ounce of paste and mix with two grains of precipitated oxide of cobalt. What does the paste alluded to consist of? What is the oxide of cobalt?" A. The paste you mean is a very fusible, highly transparent, dense glass, also called strass, frit, etc., and is the base of all artificial gems. There are various recipes for making paste; the following is an imitation of the diamond: Rock crystal, 1,600 grains, borax 500 grains, carbonate of lead, 3200 grains, oxide of manganese $\frac{1}{2}$ to 1 grain. Powder each separately, mix together, fuse in a clean crucible, pour into water, separate any reduced lead, and again powder and remelt. Precipitated oxide of cobalt is prepared by adding a solution of carbonate of soda to a solution of sulphate of cobalt, washing, drying, and igniting the powder which falls. This is what gives the transparent paste the blue color, characteristic of the oriental sapphire.

N. A. T. asks: 1. What is the best compound for making artificial ice, and how must it be applied? A. A very convenient freezing mixture without ice may be made by rapidly dissolving 1 part nitrate of ammonia in 1 part of water. This is said to cause a reduction of temperature of 46° Fah., or from 60° to 14° above zero. 2. What is the average cost per hundred lbs. of ice frozen by artificial process? A. Ice in New Orleans manufactured by artificial means is said to be produced for \$3 per ton; but with improved machinery the time is probably coming when it will be made in our great cities for \$1 per ton. 3. Where can I get the best advice on pisciculture? A. See the Science Record for 1874.

A. H. W. asks: 1. What sized wire (insulated) and how much should be used for a helix made of iron one inch by two feet, and bent in the common U shape? Should the iron be painted? A. It is not necessary to paint the iron. The force of an electromagnet varies in proportion to the number of convolutions of the wire, the quantity of electricity in circulation, and the square root of the diameter of the soft iron. 2. Why does water feel so cold, after having per- mitted in your mouth? A. It may be because the nerves are rendered more sensitive.

G. S. R. asks: What is the stowage capacity in cubic feet of a ton of Franklin coal, also of Lehigh coal? A. We gave average values for the space in feet occupied by a ton of coal on p. 60, 135, vol. 29, and stated that there was so much difference of weight in the various qualities that it was impossible to give definite figures without more data.

W. S. M. asks: 1. How shall I proceed to all the boxes for a foot lathe spindle with Babbitt metal? Should the spindle be wrapped with a thickness of paper before the metal is poured in? A. It will be better to use a piece of paper. 2. Please give directions for making a hard, heavy, black paint for the unfinished cast iron parts. A. There is a black varnish made from petroleum that answers very well. 3. How much should the back gears diminish the speed so as to turn wrought iron 3 inches in diameter? A. You should arrange the gears to give the iron a surface velocity of about 30 feet a minute. In regard to your other questions, they are rather indefinite, as the dimensions you ask for are dependent upon many circumstances. It would be well for you to inspect some good lathes, and take measurements.

A. R. G. asks: 1. Should I gain any power in a small turbine water wheel by continuing two of the buckets spirally up the shaft to the top of the penstock, or would the wheel run too fast for the water at the top of penstock? Would a close fitting or a wide penstock be best if the wheel is used under heads from 16 feet upwards? If this is an improvement, would it be patentable? A. These matters could best be determined by experiment. An examination of previous patents (see prospectus in our advertising pages) would be necessary to enable us to answer your last question.

R. C. M. asks: Could a steel saw be used with economy in sawing stone, using adjustable teeth? "I have been experimenting with black carbons, but find it impossible to make them stay in their places." A. We believe the diamond tooth saw is found to be more economical.

S. A. C. says: We have a 30 horse engine, with a cut-off, and we find that the cylinder has worn more at each end than at the center. We have been told that this is a common occurrence with cut-off engines; is it so? As we have a good deal of trouble with the cut-off, we thought of doing away with it, and using a governor to regulate at throttle. Will this cause the cylinder to wear in the center so as eventually to make it more uniform? A. We think the best way to remedy the trouble will be to re-bore the cylinder.

H. R. says: We are engaged in a manufacture requiring iron of great tensile strength. What kinds would you recommend? A. Pure gray cast iron, and Uster wrought iron.

P. J. D. asks: 1. How do you calculate the thickness of a horizontal stationary engine frame? A. It is treated as a beam. 2. In your answer to J. O. R. about the length of lever for a roll valve, what does the decimal 0.672 represent, and how do you get it? A. There is a slight mistake in this example, which occurred through an oversight. Referring to the figure, the chord R C is equal to twice A B, multiplied by the sine of half the angle B A C. B A C = 97° 31'. A B = 3 inches. Hence, B C = 2x3x sine 47° 45' = 6x.674 = 4.044 inches and lever A E = 3x11+4.44 = 7.66 inches, nearly.

A. C. F. asks: What is tinsel? How could I make the red kind? A. Tinsel is thin metallic foil coated or plated with silver or gold. The red kind of which you speak is probably copper. You could not make it without expensive machinery and skill. The makers and dealers in fancy boxes could probably supply you.

R. A. McL. asks: 1. What pressure of steam will a tin boiler of the following dimensions stand: Height one foot, diameter of top and bottom respectively four and eight inches? A. Treat it as a cylindrical boiler having the diameter of the largest part. 2. Has a rotary steam engine ever been constructed on the principle of the turbine water wheel? If so, did it work? 2. Such engines have been made and have worked, how economically we are not able to state.

M. H. P. asks: Is coal tar good to put on an old tin roof to keep it from rusting? How shall I apply it? A. Coal tar is often used for roofing purposes. For particulars as to its preparation, correspond with some manufacturer of roofing materials.

C. asks: 1. Can you give me a description of the circular slide valves for steam engines? A. There are several patent valves of this description in the market, and, by addressing their manufacturers, you can obtain the necessary information. 2. Why is it that they have not succeeded in navigating submarine boats with men in them? Is it because there is no motor suitable to propel them, or because they roll over and become unmanageable, and are likely to turn upside down? A. We believe this has been accomplished on several occasions.

Z. E. H. asks: 1. What is the simplest way of drawing a meridian line? A. We gave a method on page 409, vol. 29, which is quite simple and tolerably accurate. 2. How is mean time calculated? A. Mean time is calculated by supposing that an imaginary sun, called the mean sun, moves uniformly with the mean velocity of the true sun. 3. What is meant by "sun fast" and "sun slow" and "true midday"? A. The difference of time, as given by the true and mean suns, shows a correction of "sun fast" or "sun slow." True midday is the time of the passage of the sun over the meridian. 4. What is equinoctial time? A. Equinoctial time is reckoned from the moment when the point of Aries passes the vernal equinox. 5. What is the simplest method of finding the variation or error of a watch or clock? A. By observing the meridian transit of the sun. 6. Have we a national standard of time? A. The calculations in the Nautical Almanac are generally made for Washington time.

J. C. S. asks: When the strain is between the head of a bolt and the nuts, which of the nuts bears the strain, the first or the last? A. A great deal depends upon the adjustment. With the threads accurately cut, the strain might be equally divided. 2. I have a little girl who often amuses herself by looking in my eyes. We sit facing a lighted lamp. She places her right eye as close as possible to my left, and we turn our eyes toward each other. They are then partially shaded, and we see all the interior fluid and optic nerves. Do I see her eyes or the reflection of my own? A. We suppose you see into her eyes.

A. R. P. asks: How far is it possible for the naked eye to see any object at sea, above the curvature of the earth? How far is it possible for the naked eye to see on land within a radius of 200 miles of Pittsburgh, at an elevation of 1,000 feet. A. In general it may be stated that a white object illuminated by the light of the sun can be seen at a distance of 17,250 times its own diameter. A red object, under the same circumstances, would be seen only half as far, and a blue object a still less distance. An object can be seen in ordinary daylight only about half as far as it could be if directly illuminated by the rays of the sun. These figures will of course vary somewhat with different eyes.

W. H. G. asks: 1. How does the duplex telegraph work? A. Consult some good work on the electric telegraph for particulars. 2. Must I wind the wire around the core of an electromagnet in one direction? A. The wire must be wound in one direction.

R. H. G. asks: 1. Is there any method of keeping powdered alum and bicarbonate of soda together, without destroying the properties of either? A. You can mix dry powdered alum and dry bicarbonate of soda together without any fear of decomposition taking place. 2. How can alum be dried, as in its commercial condition it contains about 50 per cent water? A. By exposing ordinary alum to heat, as by throwing a piece upon a hot iron plate, it melts, loses its water of crystallization, and becomes reduced to what is termed burnt alum. At a white heat, alum decomposes.

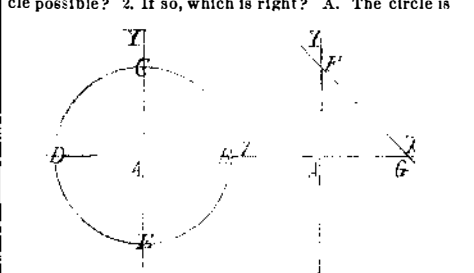
G. B. asks: Which is the most injurious to drink, Japan tea or Java coffee? What effect has tea upon the nervous system when drunk at night just before retiring? Does coffee of moderate strength produce thickness of the blood and cause dizziness and headache? A. Very strong coffee and tea are considered injurious when drunk to excess, and the effect of either when taken by a person not accustomed to their use before retiring is to stimulate the nervous system and cause sleeplessness. They may cause dizziness and headache in some constitutions, but we have doubts about their thickening the blood.

G. W. C. says: I wish to make a sand paper with considerable grit. What can I use better than sand or emery? I want something that will last, to rub down a hard substance. A. Perhaps an emery wheel will answer your purpose.

O. M. C. asks: What is the process of making potato flour? A. The tubers, after being washed and peeled, are rasped by a revolving grater, and the pulp washed on a hair sieve to free it from feculous matter. When a sufficient quantity has passed through the sieves, the starch particles are allowed to subside, and the water is drawn out. Fresh water is let in, and the whole stirred up and again allowed to subside; this process is repeated till the starch is pure. It can be dried in perforated boxes, or placed on porous bricks to absorb the moisture, or dried by heat or the air.

J. S. H. asks: Where was the first locomotive built and run in the United States? A. Mr. Cady Staley mentions, as the first locomotive in the United States, one constructed by Oliver Evans, in Philadelphia in 1801.

W. L. C. says: The teacher of our geometry class asserts that "an infinite circle is coincident with an infinite straight line." He argues that, as long as a line is in the least curved, if produced, it will form a circle; and that the curve may be made less, and therefore the circle is not infinite, and from this conclusion argues that an infinite circle is a straight line. I hold that if it is possible to come to this, the circle ceases, and the line is neither an infinite or any other kind of a circle. 1. According to his definition, is an infinite circle possible? 2. If so, which is right? A. The circle is



a line of the second order, and the straight line is of the first order; hence they can never coincide. This may be shown from their equations: $x^2+y^2=r^2$ is the equation of a circle, B C D E, referred to rectangular axes with origin at the center. $y=ax+b$ is the equation of a straight line, F G, referred to rectangular axes. Make $x=\infty$, then $x^2+y^2=\infty$. Make $x=0$, then $y=\pm \infty$. Make $y=0$, then $x=\pm \infty$. This shows that the circle cuts the axis of Y in two points, on different sides of the origin, and at an infinite distance from it; also the axis of X, in two similar points. Now, in the equation of the straight line, make $b=\infty$, then $y=ax+\infty$. Make $x=0$, then $y=\infty$. Make $y=0$, then $x=-\infty$. Hence the straight line cuts the axis Y in one point, and the axis of X in one point, at an infinite distance from the origin.

J. C. K. says: A press with movable type suitable for desk use, not larger than an ordinary sea-press, would meet with a ready sale. A. Such presses are commonly sold in our large cities.

A. W. C. asks: 1. How can I tan bear skins with the hair on, so that the hair will not fall out? A. Pulverize and mix one part alum and two salt-peter; sprinkle on the flesh of the skins, and lay two flesh sides together; fold up tight and hang in a dry place. Rub over the edge of a board to make them supple. 2. How can I paste labels on tin or iron, so that they will not fall off? A. Add 1 tablespoonful of brown sugar to every quart of flour paste, and mix thoroughly.

D. R. S. asks: How can I ventilate show windows, so as to prevent sweating and freezing in cold weather? A. Make some small holes at the bottom and top, so that the exterior air will circulate through your show window.

M. W. J. asks: 1. Is there any machine for breaking stone for railroad beds, macadamized roads, etc.? A. Yes. 2. Can I raise fish, such as bass, trout etc., in a large artificial pool, by running a small stream of spring water through it? A. Yes.

H. N. asks: 1. If any one invents an article which is partly made of rubber, has he to pay royalty to a rubber company? A. There are several patents in force which protect the use of certain processes of treating rubber. 2. Can anything be done with old scraps of tin? A. The tin may be melted off the iron by heat, or dissolved in hydrochloric acid, making muriate of tin. 3. Is broken window glass valuable? A. Glass makers buy it to melt up.

L. M. C. asks: What is the weight of an ordinary passenger engine of 4 feet 8 1/2 inch gauge? A. From 25 to 40 tons. How long a circuit will the Tom Thumb telegraph operate? A. 15 or more miles.

W. T. R. asks: Will the Tom Thumb battery answer for silver plating on a small scale? A. Yes.

M. M. asks: If I hang a rope over a loose pulley and put my feet in a loop in one end and take the other in my hands to elevate myself, what proportion of my weight do I pull down with my hands? My friend says I have no advantage over a single rope. I say I gain nearly half. Which is right? A. We think that your friend is right.