

Business and Personal.

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

Wanted—A Rotary Machine, with impression roller attached, for cutting veneer stuff for Berry Baskets. Address H. Humphreys, Salisbury, Md.

Wanted to Manufacture light hardware patents. Address I. H. Baldwin, Meriden, Conn.

Wanted—Patent Office Reports for 1869, 1870, 1871. P. O. 4769, New York.

Wanted—Proposals for supplying from three to five tons per week of first class castings, for Steam Engines. For particulars, address Lidgerwood Manufacturing Company, 165 Pearl Street, New York.

For Sale, cheap—A No. 3 "Sturtevant Blower." Also, a good Bolt Cutter. J. Laverty & Co., Rochester, N. Y.

Situation Wanted—By a first class Glass Mould and Die Maker; also Letterer—country preferred. Address J. Koppen, 109 Greene St., New York city.

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.

Patent on a powerful popular Microscope for Sale. Address James H. Logan, 12 Cedar Avenue, Allegheny, Pa.

Chicago Exposition—See Abbe's Bolt Forging Machine and Palmer's Power Spring Hammer, there on exhibition. S. C. Forsyth & Co., Manchester, N. H.

Engines, Boilers, &c., bought, sold and exchanged. All kinds constantly on hand. Send for circular. E. E. Roberts 52 Broadway, New York.

Brown's Coal Yard Quarry & Contractors' Apparatus for hoisting and conveying material by iron cable. W. D. Andrews & Bro. 41 Water St. N. Y.

Cabinet Makers' Machinery. T. R. Bailey & Vail. Wanted—A Cylinder, 6 or 8 ft. in dia. and 50 to 80 ft. long, suitable for treating wood. Address Baugh & Sons, Philadelphia, Pa.

Sewing Machine Needle Machinery—Groovers, Reducers, Wire Cutters, Eye Punches, &c. Hendey Brothers, Wolcottville, Conn.

Machine Shop & Foundry for sale—For particulars, address Wagoner & Matthews, Westminster, Md.

Key Seat Cutting Machine. T. R. Bailey & Vail.

English Roof Paint, all mixed in oil ready for use, 50c. a gallon, 116 Maiden Lane, New York.

Patent Petroleum Linseed Oil works in all paints as Boiled Linseed Oil. Price only 50cts. a gallon, 116 Maiden Lane, New York.

Buy Wood and Iron Working Machinery of Gear, Boston, Mass.

Patent Chemical Metallic Paint—All shades ground in oil, and all mixed ready for use. Put up in cans, barrels, and half barrels. Price, 50c., \$1, and \$1.50 per gal. Send for card of colors. New York City Oil Company, Sole Agents, 116 Maiden Lane, New York.

We sell all Chemicals, Metallic, Oxides, and Imported Drugs; also, "Nickel Salts" and Anodes for Plating, with full printed directions on Nickel, in pamphlet form, which we mail, on receipt of fifty cents, free. A Treatise on "Soluble Glass" we mail for \$1 also. Orders will receive prompt attention by addressing L. & J. W. Feuchtwanger, 55 Cedar Street, New York.

The Leclanché Battery Co. supply the best battery for Burglar Alarms, Bells, &c., No. 40 West 18th Street, New York.

Belting—Best Philadelphia Oak Tanned. C. W. Army, 301 and 303 Cherry Street, Philadelphia, Pa.

Mercurial Steam Blast & Hydraulic Gauges of all pressures, very accurate. T. Shaw, 913 Ridge av., Phil.

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Catalogue on Transmission of Power by Wire Rope. T. R. Bailey & Vail.

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

Portable Hoisting and Pumping Engines—Ames Portable Engines—Saw Mills, Edgers, Burr Mills, Climax Turbine, Vertical and Horizontal Engines and Boilers; all with valuable improvements. Hampson, Whitehill & Co., Newburgh Steam Engine Works, Depot 98 Cortlandt Street, New York.

Buy Engine Lathes and Bolt Cutters of Gear, Boston, Mass.

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

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

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

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

Five different sizes of Gatling Guns are now manufactured at Colt's Armory, Hartford, Conn. The larger sizes have a range of over two miles. These arms are indispensable in modern warfare.

Gauge Lathe for Cabinet and all kinds of handles. Shaping Machine for Woodworking. T. R. Bailey & Vail, Lockport, N. Y.

Sure cure for Slipping Belts—Sutton's patent Pulley Cover is warranted to do double the work before the belt will slip. See Sci. Am. June 21st, 1873, Page 389. Circulars free. J. W. Sutton, 95 Liberty St., N. Y.

Machinists—Price List of small Tools free; Gear Wheels for Models, Price List free; Chucks and Drills, Price List free. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

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

Bookkeepers should try the Olmsted Patent Bill File and Letter Clip. They are admirable for all papers. Save their cost in one day's business. Sold by all Stationers. J. H. White, Newark, N. J., Sole Manufacturer.

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

Damper Regulators and Gage Cocks—For the best, address Murrill & Ketcher, Baltimore, Md.

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

The Olmsted Oiler is the best; it is self-righting, strong and cheap. All Hardware and Tin Houses have it.

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

A Partner Wanted—In the manufacture of Linseed Oil; also, Oil Machinery. Address Box 159 East Des Moines, Iowa.

For Sale—Machine Shop & Foundry. Only shop in county; nearest shop 18 miles. \$7,000. Address Ladd & Parker, Elmore, Ottawa County, Ohio.

At American Institute and Chicago Exposition—Boulton's Unriveted Paneling, Variety Molding and Dovetailing Machine. Manufactured by Battle Creek Machinery Company, Mich.

Estimates Wanted—For furnishing complete, a Steam Laundry, capable of working for one thousand persons. Address, with full descriptions, "Laundry," Key Box 186, Charleston, S. C.

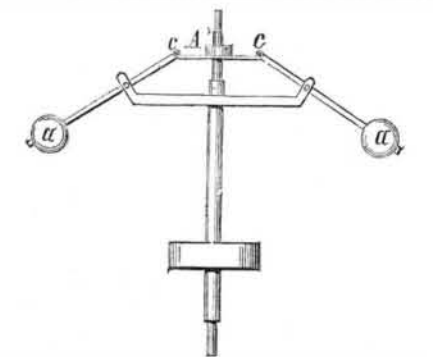
Notes & Queries

A. D. asks: Is there a remedy for snails other than salt?

V. E. asks: How many minutes, and what degree of heat is required to vulcanize a sheet of India rubber, 3.32 of an inch thick, to the greatest possible elasticity?

D. E. R. asks for a remedy for a strange disease among fowls, prevailing all over Northern Texas "Up to a few days before they die, I do not notice any change in their appearance, except that the comb and wattles become pale, with a slight puffiness around the eyes. They have a great increase of heat, are very thirsty, and still continue to eat heartily up to 12 hours before they die. I have opened a number and find in all an enlarged liver and distended gall bladder. My largest rooster died a few days since, and I opened him, and his liver and gall bladder weighed nearly 6 ozs. I have tried every remedy I could think of to act on the liver. Calomel prolongs their lives a few days; cayenne pepper braces them up for a while, but soon ceases to have any effect. Other remedies do only temporary good, as they all die that become afflicted."

E. A. P. asks: Suppose I have a governor rotating upon a horizontal shaft at a speed of 30 revolutions per minute, and that the balls weigh 10 lbs. each, also that, when diverged to their fullest extent, they describe a circle of 6 feet diameter, and that the longer arm of the lever is 3/4 of its entire length, which, measuring from



center of ball, a, to c, is 39 inches: How much pressure will be exerted upon the sliding sleeve (A) by both balls? [This is a simple and interesting problem, requiring the application of the principles of centrifugal force and of the lever for its solution. We believe that some of our readers take an interest in such matters, and we prefer to leave to them the resolution of the question.—Eds.]

Answers to Correspondents

C. S. D. will find a recipe for ink on p. 106, vol. 27.—A. D. can try powdered borax as a remedy for roaches.—A. S. will find full information on silkworm culture on pp. 207, 331, vol. 26.—A. S. will find the recipe for cement for leather on p. 119, vol. 23.—J. W. E. will find that a cement for mending rubber boots is described on p. 155, vol. 26.—W. E. L. will find the wheel question answered on p. 362, vol. 23.—D. S. W.'s solution of the train and siding query is correct.

F. S. D. asks: Is gas formed by passing a current of air through naphtha or benzine lighter or heavier than air, and what is the chemical reaction? Answer: When air is passed through or over naphtha or benzine, it carries off, mechanically suspended in it, a portion of the vapor of the hydrocarbon. There is no chemical compound formed; and as the vapor of naphtha or benzine is heavier than the air, the air charged with their vapors is of course of greater specific gravity than air not so charged.

C. H. K. asks: How can I remove fly spots from a picture? Answer: Try a strong solution of fine soap in warm water, applied gently with a soft woolen cloth.

C. W. asks: What is the cause of the easterly current by which Professor Wise proposed to cross the Atlantic? Answer: The existence of this current is not an established fact, and the object of the transatlantic voyage was to investigate the matter. Of late, many arguments have been advanced pro and con; and it seems to us that, as the matter stands at the present, it is an open question.

W. G. P. asks: 1. How can I make silicate of potassa, or silicate of soda, or what is known as liquid glass? 2. Will you describe a simple process of nickel plating? Answers: 1. Fuse together 1 part of silica and 2 parts of either carbonate of soda or carbonate of potash. 2. To plate with nickel, observe the following directions: In a eubical glass or earthenware vessel, suspend by means of a brass rod, the articles to be plated, and on another brass or metal rod, about an inch from the other, as many plates of pure nickel as there are articles to be plated, each plate of nickel opposite one article. Fill the vessel containing these with a solution of the double sulphate of nickel and ammonia. Now connect the rod on which the articles to be plated are hung with the zinc pole of a galvanic battery and the rod holding the nickel plates with the other pole.

W. F. W. asks: When an engine with a 1 1/2 inch inlet for steam is set 400 feet from the boiler, with 60 lbs. pressure, will the engine get hotter steam by a steam pipe of 1 1/2 inches diameter than by one of 2 inches diameter? 2. Is it economy to lay a steam line 400 feet long in a box underground? Answers: 1. A pipe just large enough to supply the engine will probably be the best, as there will be less radiation. 2. Yes, if you mean to compare this method with that of having the pipe exposed.

P. B. H. asks for an expression of our views on the subject of slow or quick motion in the speed of stationary engines. "I quote the following assertion: 'Probably one half the engines in the country would do their work with one third less fuel if their speed were reduced one third or one half.' On the other hand, most of the premiums that are awarded for the best steam engines go to the class that have a very short stroke with a quick motion, in some cases the piston traveling at a speed of 1,000 feet per minute." Answer: We incline to the opinion that great economy results from a quick piston speed, provided the engine is properly constructed.

T. W. asks: 1. Why is it that a person in the water, by throwing himself on his back and extending his limbs, can maintain his position on the surface, while in any other attitude the body sinks? Is not the displacement the same whatever attitude is assumed? 2. What is the scientific explanation of the motion of a snake's tail after apparent death? Answers: 1. When a person is in the position described, he displaces the most water possible without being fully submerged, as only a slight portion of his face is out of water. 2. It is supposed to be due to unconscious nerve action, which appears to increase in animals with the decrease of intelligence.

J. H. W. asks: What is the alcoholic strength of 4th proof brandy, and what is the origin of that term? Answer: The term "proof spirit," used to denote the amount of alcohol in liquors, is of English origin. Proof spirit contains about 50 per cent of pure alcohol, and any mixture above or under this amount is said to be over proof or under proof. Formerly spirit was said to be 1 to 3, 1 to 4, etc., over proof, by which it was meant that 1 gallon of water added to 3 or 4 gallons of such spirit would reduce it to "proof." This is as near as we can come to the elucidation of your question, the expressions in which may have been due to some local peculiarities of speech.

C. E. C. asks: What is French polish composed of, and how is it applied to furniture and to turned work? Answer: Several varnishes are used under the name of French polish. One is pale shellac 5 1/2 ozs., finest wood naphtha, 1 pint; dissolve. The varnish may be colored to modify the character of the wood. A reddish tinge is given with dragon's blood, alkanet root, or red sanders wood; yellow, by turmeric root or gamboge. The process of French polishing is as follows: The surface of the wood is made as smooth as possible with glass paper and placed opposite the light. A rubber is made by rolling up a strip of thick woolen cloth (list) which has been torn off, so as to form a soft elastic edge. This should form a coil from 1 to 3 inches in diameter. The workman moistens the middle of the flat face of the rubber with the polish by laying the rubber on the mouth of the narrow necked bottle containing the varnish and shaking up the varnish against it once. The rubber is next enclosed in a soft linen cloth doubled, the rest of the cloth being gathered up at the back of the rubber to form a handle. The face of the linen is now moistened with a little raw linseed oil applied with the finger to the middle of it, and the operation of polishing commenced. For this purpose the workman passes his rubber quickly and lightly over the surface uniformly in one direction, until the varnish becomes dry, or nearly so, when he again charges his rubber as before, omitting the oil, and repeats the rubbing until three coats are laid on. He now applies a little oil to the rubber and two coats more are commonly given. As soon as the coating of varnish has acquired some thickness, he wets the inside of the linen cloth, before applying the varnish, with alcohol or wood naphtha and gives a quick, light and uniform touch over the whole surface. The work is lastly carefully gone over with the linen cloth, moistened with a little oil and rectified spirit or naphtha without varnish, and rubbed as before until dry.

J. C. P. asks: In your article on page 133 of your current volume, you speak of the albumen of eggs being converted into fibrin. Do you mean the yolk as well as the white? Will any vegetable albumen answer? Is the quantity increased in weight or bulk, as in the Creole plan of converting milk into butter by addition of a little butter to begin? (I have seen two pounds of butter made from a quart of milk by this process.) Does it all become fibrin, eggs, water and all? If so, it would give us cheap living. Answer: The article referred to seems to have given rise to some misapprehensions, which its statements do not seem to justify. It is not claimed that the albumen of the eggs converted into fibrin, as this is not the case. Albumen and fibrin are chemically different, though both contain many of the same constituents, and are probably mutually convertible by the organic forces in the animal body. The white of the egg is pure albumen (dissolved in certain quantity of water) while the yolk is not, but still may be used in the preparation of the artificial fibrin. The eggs probably increase both in weight and bulk by the long digestion in cold water, by absorbing a certain quantity; but no chemical change takes place in the egg material, but only a molecular one, shown by the snowy whiteness of the albuminous parts. Vegetable and animal albumen are identical in composition, and our correspondent can try the process with the vegetable substance.

W. H. J. asks: What is the proper diameter and length of bearing of the crank pin of a steam engine, in proportion to the diameter of the cylinder? Answer: Let D=diameter of cylinder in inches. d=diameter of crank pin in inches. l=length of crank pin in inches. P=maximum steam pressure in cylinder, in pounds per square inch. n=number of revolutions of engine shaft per minute. Then, according to Mr. Van Buren's formulas: 1=(P x D^2 x 0.7354) + 850,000, or the least allowable length of the crank pin in inches is equal to the total steam pressure divided by 350,000. Having settled upon the length of the pin, the diameter may be found by the following rule: D= sqrt(D^2 x P x l) + 1690, or the diameter of the crank pin is found by multiplying the square of the diameter of the cylinder by the maximum steam pressure per square inch and by the length of the pin, dividing the product by 1690, and taking the cube root of the quotient.

E. W. asks: What makes water and some other liquids run crooked and others straight? Answer: All liquids descend a slope by the force of gravity; and any divergence from a straight line is caused by the configuration of the surface.

H. M. P. asks: Can a small skiff be propelled by a cylinder, 18 inches long 8 inches in diameter, attached to the stern of the boat beneath the water, and having this cylinder arranged so you can pack it full of water and, with a force pump, put on a pressure of 200 lbs. to the square inch? "I propose to have a valve in the end of cylinder half as large as the cylinder itself; and when the pressure is at its height, to let go the valve. Would the amount of pressure escaping instantaneously exert any power to move, the boat in the oppo-

site direction? If so, how much? Answer: The plan is practicable. You will find much valuable information on jet propulsion in standard works on the steam engine and steam navigation.

J. L. C. asks: What advantage is an air pump to an engine, or rather what increase of power does it give to the engine in proportion to the power it takes to drive it? Answer: We will give you an example of an actual case. A pair of high pressure engines, of 200 horse power, were fitted with a condenser and air pump. The mean pressure per square inch was 31 pounds, or 31 + 200 = 0.0155 pounds per square inch of pressure on the pistons for one horse power. The air pump had to do the work required to lift 2792.19 pounds of water 14 feet high per minute = 2792.19 x 14 = 39,090.6 = 1.18 horse power, and in doing this, exerted an efficiency of 44.98 per cent, so that the actual power required for the air pump was 1.18 x 100 = 44.98 = 2.68 horse power. equivalent to a pressure of 2.68 x 0.0155 = .042 pounds per square inch. Before the condenser was attached, there was a back pressure of 2.29 pounds per square inch; and with the condenser, the mean pressure due to a vacuum was 5.14 pounds per square inch; so that the gain from the use of the condenser and air pump was 5.14 + 2.29 = .042 = 7.388 pounds per square inch, or 7.387 x 100 = 31 = 23.88 per cent.

J. T. S. asks: If I sell a horse for \$40 and gain thereby as much per cent as the horse cost in dollars, what would be the price of the horse? Answer: Let x = the cost. Then x + x per cent of x = 40. x + x/100 = 40. 100x + x^2 = 4000. 100x + x^2 + 2500 = 6500. x + 50 = sqrt(6500) = 80.65 = 50 = \$30.65, nearly.

G. W. S. says: Should make his lemon sirup as follows: Take pulverized citric acid 2 1/2 drams oil of lemon, 5 drops; simple sirup 1 quart. Cut the oil with a little alcohol, then stir the whole together; and after heating, strain through muslin.

J. L. says, in answer to the queries of R. C. G. and C. F. C. regarding steam yachts: R. C. G.'s engine is far too large for his boat, and moreover condensing engines are not adapted for use in small screw steamers. If he will put his 20 square feet of heating surface into a vertical tubular boiler 3 1/2 feet high and 20 inches in diameter, capable of withstanding safely a pressure of 80 or 100 lbs. to the inch, and use a direct acting engine 3 x 6 inches, running at 300 revolutions per minute, with a suitable screw, his boat, if of moderately good shape, will probably make about 7 miles per hour. C. F. C.'s engine is also larger than is necessary. A cylinder 4 x 6 inches would be large enough; for which he will need a boiler about 4 feet high and 22 inches in diameter, with 35 square feet of heating surface. With this he may obtain a speed of 8 miles an hour, more or less, according to the shape of his boat. It will most likely be difficult to get a much greater speed in either of these cases. "I think your allowance of 18 to 20 square feet heating surface per horse power is unnecessarily large, and would be inconvenient for this purpose. For successful steam yachting is required a well proportioned boat, small strong boiler with large fire box and many tubes, by which rapid combustion and a high degree of heat are maintained; a well constructed engine with small cylinder and very large steam passages, working somewhat expansively at a high rate of speed with considerable steam pressure; engine and boiler protected from radiation."

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

R. R. R.—This material is a silicate of alumina, containing silica, alumina, traces of oxide of iron, and fossil leaves. It is a blue clay, not the kind usually employed for fire brick.

A. D.—Your tripod seems to be of good quality, but the best plan is for you to send large samples to different dealers and have it well tested.

F. M. S.—This is lignite or brown coal. It might prove serviceable as a fuel if found in sufficient quantities, and if coal be expensive. Its presence is no certain indication of the presence of true coal, as lignite belongs to the recent formations of sedimentary rocks, while coal occurs in the older formations.

COMMUNICATIONS RECEIVED.

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

- On a Lightning Freak. By L. G. F.
- On Decimal Weights and Measures. By C. A. G.
- On Transmission of Power by Belts. By W. A.
- On the Bisulphide Engine. By J. T. H.
- On the Variable Star Algol. By J. M. B.
- On Crude Oil for Fuel. By A. L. S.
- On Water Pipes. By M. S.
- On Gold Pens. By W. V. R.
- On the Divisibility of Matter. By W. S.
- On the Devil Fish. By T. L. P.
- On the Hair Worm. By J. S.
- On Crude Petroleum as Fuel. By H. L. A.
- On Paper Making Statistics. By A. S. G.
- On Water Coolers and Filters. By S. E. G.

Also enquiries from the following: W. E. W.—J. C. E.—A. G. G.—A. Y. H.—W. R.—P. W.—E. F. L.—B. C. E. C.—A. B. C.

Correspondents in different parts of the country ask Where can I obtain machinery for spinning cotton, adapted for small powers? Who makes brick machines? Who makes wool carding machines? Who sells rice mills, to work by hand? Where can the oak-feeding and allanthus-feedingsilk worms be obtained? Where can I obtain a folding clothes rack, to fasten against the wall? Who makes peat-compressing machinery? Makers of the above articles will probably promote their interests by advertising, in reply, in the SCIENTIFIC AMERICAN.

Correspondents who write to ask the address of certain manufacturers, or where specified articles are to be had, also those having goods for sale, or who want to find partners, should send with their communications an amount sufficient to cover the cost of publication under the head of "Business and Personal," which is specially devoted to such enquiries.