

## Business and Personal,

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For Sale—State Rights of Patent Safety Horse Hopples; sells on sight. Address, for terms, circulars, etc., J. F. Riesgraf, care of Box 773, New York City.

Agricultural Implements and Industrial Machinery for Export and Domestic Use. R. H. Allen & Co., N. Y. 500 Machines, new and 2nd hand, at low prices. See page 333, for particulars. S. C. Forsyth & Co., Manchester, N. H.

For Sale—An 18 ton Engine Lathe, 7½ ft. swing 20 ft. bed, triple geared. S. L. Holt Machine Co., 33 Haverhill St., Boston, Mass.

Book on Making and Working Batteries, Electrotyping, Plating, &c., 25 cts. T. Ray, Box 356, Ipswich, Mass.

Lansdell's Pat. Steam Syphons—Lansdell & Leng's Lever and Cam Valve. Leng & Ogden, 212 Pearl St., N. Y.

For Sale—Patent Right (17 years)—A Machine for trimming Cigarettes. Address or apply to Montes Bro's, 38 Beekman Street, New York.

To Clean Boiler Tubes—Use National Steel Tube Cleaner, tempered and strong. Chalmers Spence Co., N. Y.

For Sale—Two first class Household Articles, by State or Counties. Address Duke & James, Lancaster, Pa.

Valves for Pipe Wells and Foot Valves. Always hold charge in hand. Never out of order. One inch, \$2. T. Maguire, Port Jervis, N. Y.

Baxter's Adjustable Wrenches, price greatly reduced. Greene, Tweed & Co., 18 Park Place, N. Y.

Machine Shop to Let—the whole or part—Tools first class—capacity, 40 men—near Boston. Address M. S., 13 Milk St., Boston, Mass.

The Cabinet Machine—A Complete Wood Worker. M. R. Conway, 222 W. 2d St., Cincinnati, Ohio.

Wanted—Reliable man, with small capital, to take one half interest in a good, practical, valuable patent. Investment will be safe and profitable. Address A. E. Blake, Mendota, Illinois.

For Sale—Geared Boiler Plate Rollers, rollers wrought iron 6 ft. 2 in. long, 8½ in. diam., has rolled ½ in. plates 4½ ft. wide. G. Hardie, 62 Church St., Albany, N. Y.

The Gatling Gun received the only medal and award given for machine guns at the Centennial Exhibition. For information regarding this gun, address Gatling Gun Co., Hartford, Conn., U. S. A.

500 Machines, new and 2nd hand, at low prices. See page 333, for particulars. S. C. Forsyth & Co., Manchester, N. H.

Latest and Best Books on Steam Engineering. Send stamp for catalogue. F. Keppy, Bridgeport, Conn.

D. Frisbie & Co. manufacture the Friction Pulley—Captain—best in the World. New Haven, Conn.

Patent Scroll and Band Saws, best and cheapest in use. Cordesman, Egan & Co., Cincinnati, Ohio.

Chester Steel Castings Co. make castings twice as strong as malleable iron castings at about the same price. See their advertisement, page 333.

The best Sewing Machine in the world—Makes the Lock Stitch, the Chain Stitch, and Embroidery Stitch from two whole Spools. Agents wanted everywhere. G. L. Du Laney & Co., 744 Broadway, New York City.

Town and Village Hand Fire Engines, with hose carriage and fittings, only \$350. Send for cuts and full information. S. C. Forsyth & Co., Manchester, N. H.

Journal of Microscopy—For Amateurs. Plain, practical, reliable. 50 cents per year. Specimens free. Address Box 4875, New York.

For Sale—Shop Rights to every Tool Builder and manufacturer for Bean's Patent Friction Pulley Countershaft. D. Frisbie & Co., New Haven, Conn.

For Sale, Cheap—Centennial Shafting—In Machinery Hall: 3 complete lines, each 624 ft. long; 1 line 162 ft. In Pump Annex, 1 line 191 ft. In Machine Shop, 1 line 112 ft. In Agricultural Hall, 4 lines, each 182 ft.; 2 Driving Counter Lines. All Cold Rolled. For full specifications and price, apply to Jones & Laughlins, Pittsburgh, Pa.

Superior Lace Leather, all Sizes, Cheap. Hooks and Couplings for flat and round Belts. Send for catalogue. C. W. Army, 148 North 3d St., Philadelphia, Pa.

Magic Lanterns, Stereopticons, for Parlor Entertainments and Public Exhibitions. Pays well on small capital. 74 Page Catalogue free. Centennial Medal and Diploma awarded. McAllister, 49 Nassau St., N. Y.

Noiseless Exhaust Nozzles for Exhaust Pipe and Pop Valves. T. Shaw, 915 Ridge Av., Phila., Pa.

Fire Hose, Rubber Lined Linen, also Cotton, finest quality. Eureka Fire Hose Co., 13 Barclay St., New York.

Walrus Leather, Emery, Crocus and Composition for polishing Metals. Greene, Tweed & Co., 18 Park Place, New York.

Shingle, Heading and Stave Machine. See advertisement of Trevor & Co., Lockport, N. Y.

The Scientific American Supplement—Any desired back number can be had for 10 cents, at this office, or almost any news store.

500 new and second hand machines at low prices, fully described in printed lists. Send stamp, stating just what you want. S. C. Forsyth & Co., Manchester, N. H.

To stop leaks in boiler tubes, use Quinn's Patent Ferrules. Address S. M. Co., So. Newmarket, N. H.

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

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

Solid Emery Vulcanite Wheels—The Solid Original 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.

M. Shaw, Manufacturer of Insulated Wire for galvanic and telegraph purposes, &c., 259 W. 27th St., N. Y.

F. C. Beach & Co., makers of the Tom Thumb Telegraph and other electrical machines, have removed to 530 Water Street, New York.

Hyatt & Co.'s Varnishes and Japans, as to price, color, purity, and durability, are cheaper by comparison than any others extant. 246 Grand St., N. Y. Factory, Newark, N. J. Send for circular and descriptive price list.

Power & Foot Presses & all Fruit-can Tools. Ferracute Wks., Bridgeton, N. J. & C. 27, Mch. Hall, Cent. 1.

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 and Jay, Brooklyn, N. Y.

The "Abbe" Bolt Forging Machines and the "Palmer" Power Hammers a specialty. Send for reduced price lists. S. C. Forsyth & Co., Manchester, N. H.

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

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

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

Slide Rest for \$8 to fit any lathe. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

"Dead Stroke" Power Hammers—recently greatly improved, increasing cost over 10 per cent. Prices reduced over 20 per cent. Hull & Belden Co., Danbury, Ct.

G. E. P. will find a description of a cheap galvanic battery on p. 234, vol. 34.—J. M. will find a good recipe for shoe blacking on p. 27, vol. 34.

—H. L. G. will find directions for coloring gold on p. 43, vol. 30.—C. H. will find a recipe for a depilatory on p. 186, vol. 34.—J. R. C. will find something on moles in the skin on p. 347, vol. 32.—W. S. will find directions for straightening wire on p. 299, vol. 34.—L. R. P. will find a good recipe for mucilage for labels on p. 202, vol. 31.—H. R. E. will find directions for making printing inks on p. 238, vol. 31. A cheap battery is described on p. 234, vol. 34.—A. A. will find a recipe for a cement for fastening glass to brass on p. 117, vol. 32.—H. N. H. should varnish his brass with the preparation described on p. 310, vol. 35, for silver.

—H. E. N. will find directions for making an incubator on p. 273, vol. 33.—F. W. M. will find directions for galvanizing iron on p. 346, vol. 31.—P. will find an answer to his query as to speed of navy cutters on p. 251, vol. 35.—R. T. M. will find an explanation of his wagon wheel difficulty on p. 298, vol. 31.—E. H. will find a formula for the width of belting on p. 244, vol. 34.—A. B. C. will find an explanation of the transmission of vocal sounds by electric wires on p. 327, vol. 33.—E. B. will find an article on taking the kinks out of sawson p. 11, vol. 33.—J. H. will find directions for lacquer or bronze on cast iron on p. 11, vol. 33.

For japanning cast iron, see p. 122, vol. 27.—D. & D. will find directions for enameling leather on p. 122, vol. 27.—M. S., F. G., J. A. T., C. A., J. C. C., G. A. C., and others 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) A. E. H. says: I send you by this mail a piece of copper tube taken from a coil used for cooling brine. You will notice that there has been a chemical action which destroys the copper, but this only occurs when it is threaded, or close to the threads. What is it that produces this action? The coil was put together with plumbago and oil as a lubricant. A. It seems very probable that the corrosion was caused by the galvanic action set up between the copper and carbon (graphite) in contact with moisture and the fatty acids in the lubricant. The salt water is in no way accountable for the corrosion.

(2) W. H. A. says: Please give me the theory, causes, and circumstances attending the undertow on thesea coast. A. The following statement, from Maury's "Physical Geography of the Sea," may be of interest in this connection: "Suppose the case of a long trough, opening into a vat of oil, with a partition to keep the oil from running into the trough. Now suppose the trough to be filled up with wine on one side of the partition to the level of the oil on the other. The oil is introduced to represent the lighter water as it enters either of these seas from the ocean, and the wine the same water after it has lost some of its freshness by evaporation, and therefore has become saltier and heavier. Now suppose the partition to be raised, what would take place? Why, the oil would run in as an upper current, overflowing the wine, and the wine would run out as an under current."

(3) J. O. G. says: You state under the heading of "English Fire Engines" that the engine lifted the water 32 feet in a perpendicular line. Is it possible for a fire engine, with its many joints and imperfections, to raise a column of water 32 feet without the intervention of a foot valve in the suction? A. From all that appears in the statement, we should say that the engine just lifted the water slowly, which would be quite possible, with a very accurately constructed pump.

(4) G. A. A. says: I am building a steam chimney 90 feet high with 6 feet base, with a round flue 2 feet across inside; should this flue run to the top of chimney or not, to get better draft? A. To the top, as we understand you.

1. For a lightning rod, will common gas pipes do? A. It will be better to make the rod of a single piece of metal, with a copper tip added.

2. Is it necessary in connecting lightning rods with city water pipes to connect underground, or can I connect it with a right and left coupling above the ground, say inside the shop? A. It is better to connect it underground.

I intend to reset my boiler, which is a 50 horse power tubular, horizontal. My principal fuel is wet tan. How shall I set the boiler to get best results? A. See p. 339, vol. 33.

(5) O. T. B. asks: How many cubic feet of water per minute will a cast iron pipe 150 feet long of 6 inches bore discharge, if laid horizontally, receiving its supply under 12 inches head and discharging into open air? A. About seventeen, if the interior of the pipe is smooth.

(6) V. asks: Can the water in a newly cemented cistern of 4,000 gallons, which is strongly impregnated with lime, be made fit for drinking, cooking, and washing with by the use of alum? If so, what quantity should be used? The cistern has been filled and emptied; and having again been filled with rain water, it is not convenient to empty it again. A. The cement lining of the cistern has evidently been allowed a sufficient length of time in which to set and dry perfectly; the result is that the water has dissolved out a considerable quantity of the lime. The greater part of the lime may be removed as sulphate by the addition of a calculated quantity of alum (sulphate of alumina and potash). Take a gallon of the water in question and add to it a strong aqueous solution of alum, of a known strength, in varying quantities, until the precise quantity of the reagent necessary has been determined. This quantity, multiplied by the number of gallons contained in the cistern, will be the total amount required. This is one of the best methods that can be employed in such cases; but it is somewhat objectionable where the water is to be employed for cooking and drinking purposes, as it leaves in solution in the water a notable quantity of the soluble sulphate of potash. There are many other methods by which the lime might be removed from the water; but owing to the poisonous character of the reagents or the impracticability of their application in your case, they are out of the question. Where the water is to be used only for washing purposes, perhaps the cheapest plan would be to precipitate the lime by the addition of a solution of common soap. This answers the queries of several other correspondents.

(7) J. P. M. asks: Will mercury evaporate when heat is applied? How long will it last under a constant heat of 104°? A. Mercury is volatile under the temperature mentioned, and will evaporate, but not very rapidly.

(8) J. W. B. says: Please give the chemical analysis of quinine. A. The sulphate of quinine [(C<sub>20</sub>H<sub>21</sub>N<sub>3</sub>O<sub>8</sub>SO<sub>4</sub> + 14 (H<sub>2</sub>O)] is the medicinal preparation commonly called quinine. The vegetable alkaloid quinine is obtained from the yellow bark (cinchona cordifolia), in which it occurs mixed with cinchona, and combined with quinic and quinotannic acids.

(9) T. M. asks: 1. How many cubic feet of carbonic acid gas can be obtained from 1 lb. of marble dust? A. About five. 2. What amount of acid per lb. is needed? A. About ½ lb. This is the calculated amount; it will require something more than this in practice.

(10) J. D. says: Please give me a recipe for filling the grain of sole or other heavy leather, and making it firm and stiff so that it will resist pressure and dampness, which will not rot or destroy the durability of the leather? A. We understand that very good results have been obtained in similar cases by the use of carbolic acid, but cannot furnish you with the details of the process. It is necessary to have the leather very dry, and to force the acid into the pores by hydraulic pressure.

(11) J. H. N. asks: Does everything that exists on the face of the earth contain poison? A. Every known substance, if taken in excessive quantity, will prove destructive to human life.

(12) W. S. D. says: 1. I have a keel boat, 11 feet 2 inches long, 3 feet 2 inches wide. She draws 16 inches when loaded. I have an engine, inverted cylinder style, with link motion. Cylinder is 2½ inches in diameter with 4 inches stroke; the engine weighs 100 lbs. without wheel. Is the engine (with boiler in proportion) too large for the boat? Would it do to build a boiler a little too small, say 16 x 30 inches, and run the engine with 2½ or 3 cut off? What should be the diameter and height of fire box, and the size and number of tubes for upright boiler of that size? A. Build a boiler large enough to supply the engine. You can use tubes 1½ or 2 inches in diameter.

2. What should be the diameter and pitch of propeller? A. It may be 15 inches in diameter, and have 2 to 2½ feet pitch.

(13) T. J. G. says: In a book of instruction on shooting the following rule is laid down: "When the sun shines from the left, it will illuminate the right side of the back sight and the left side of the fore sight; and when these two points are aligned on the target, it will cause the ball to go to the right of the mark, and vice versa." Now I maintain the very opposite, that is, that the ball will go to the right in this case. Who is right? A. As the sights on a rifle are usually arranged, we do not see how the statement in the book will hold good.

(14) J. H. D. asks: What substance, suitable for a traveller's pocket, will, by burning, best disinfect the air of a room? A. The vapor of burning sulphur (sulphurous acid) is one of the best of disinfectants, but has the disadvantage of a very pungent odor, and in any considerable quantity is irrespirable. Chlorine or bromine water, chloride of lime (hypochlorite of lime), carbolic acid, etc., are very powerful disinfectants, so that a small quantity only will be requisite. Such a quantity may be carried in the pocket. These will not burn, but an ethereal solution of bromine probably will.

(15) E. H. asks: 1. In speaking of cement to be used in making concrete buildings, do you mean ordinary water lime, or some of the imported cements, such as Portland, etc.? A. Rosendale and like cements of this country make a very good concrete. Portland cement makes a very superior concrete. 2. There are concrete buildings in this vicinity, the mortar of which is composed of sand and gravel mixed with quicklime only; would such buildings be durable? A. Walls of concrete in which common lime is the only binding ingredient cannot be depended upon for a permanent career in this climate. 3. Would concrete make a good building for a shop in which to run woodworking machinery, or would the jar have a tendency to crumble the walls? A. When properly constructed and time given them to harden, there is no reason why

they should not answer well. 4. How thick ought the walls to be for a building 30 x 40 feet, 16 or 18 feet high? A. Such a building would require a girder through the center if two stories in height, and the walls would do at 14 inches thick; if one story in height, the walls should be 18 inches thick. 5. Would concrete do for the foundation on ground overflowed by water during part of the year, or would it be preferable to lay up a stone wall with hydraulic mortar? A. Concrete would do.

What is the rule for finding the size of shafts for transmitting a given horse power, speed being given? I wish to know how large a line shaft 30 feet long, to run at 300 revolutions per minute, would be needed to transmit the power of a 12 horse engine. A. About 1½ inches in diameter.

(16) C. asks: What is the weight of a 13 inch cast iron ball? A. About 300-37 lbs.

(17) J. H. L. says: 1. I am about to erect an outside cellar of brick; it is to be entirely separate from any other building, and I want to have it frost-proof. It is to be 18 x 22 outside; the outer wall will be 9 inches and the inner wall 4 inches thick, with a space of 12 inches between the two walls. Should this 12 inch space be filled in with something, or left open, to secure a perfectly frost-proof building? A. If your cellar is to be sunk into the ground its whole depth, or the greater part thereof, it would be better to make its outside wall 13 inches, the space 6 inches, and the inside wall 4 inches, the floor joists being extended to rest upon the exterior wall. The intermediate space will answer without filling, if made tight. 2. What is the best means of ventilation? A. A slight ventilation may be provided for the cellar itself without materially reducing the temperature.

(18) J. R. B. asks: Does the ostrich, after laying her eggs in the sand, brood them like other birds, or does she leave them to be hatched by the sun? A. She incubates at night, and leaves them in the sun in the day.

(19) X. says: We are digging a reservoir to supply a trough for horses and cattle on the street; the reservoir is ¼ mile away, fall about 30 feet. Wood pipe, about 2 inches internal diameter, is used. The reservoir is 17 feet deep. Is it economical to dig the trench for laying the pipe as deep as the reservoir, that is, 17 feet? They are doing this for 25 or 30 rods, in order, as they say, to take all the water from the reservoir (or in other words, from the bottom) in a dry season. A. A regularly graded pipe from the bottom of the reservoir will make the surest job, as in many cases siphon pipes have failed to act, mainly, it is thought, from the common cause—the collection of air at the highest point of the pipe. In this case the use of wooden pipes would be likely to add to the difficulty.

(20) A. B. C. says: 1. I have a cast iron frame for a lamp, that has become soiled by smoke and flies. How can I cleanse it for re-bronzing? A. Use sulphuric acid diluted in water. 2. How can I put on the bronze so that kerosene smoke will not remove it? A. Try the recipe given on p. 231, vol. 32.

(21) J. M. B. asks: Which is the best way to make a telescope speculum, 5 or 6 inches in diameter? A. We would advise you to make your reflector of glass, and silver it. Unless you have had some experience in working specula, you will find it not easy to make and not very good when made. Take a thick piece of glass and grind and polish it to the curve you wish. If you wish it to have 5 feet focus, you must grind it on a curve of 10 feet radius.

(22) W. L. W. asks: What substance could I put on the sights of my rifle to make them visible in the dark? A. Put a little phosphorus on the foresight.

(23) W. H. E. says: I am copying photographs on glass, in oil paints. Can you give me a recipe for a mixture to make the photograph stick to the glass, so that it will not peel off or leave a shiny appearance between the picture and the glass? A. Use a paste made by mixing starch with a little cold water; then add boiling water, and stir until it is of a uniform creamy consistency. Press out the air bubbles and excess of paste from between the picture and glass, and let dry slowly.

(24) P. H. C. asks: How can I obtain the meridian altitude of the sun for any place at any given date? A. From 90°, subtract the latitude of the place, which gives the co-latitude or its equal, which is the distance from the horizon to the equator; then, if the sun is north, add his declination, and if south, subtract it.

(25) E. C. says: In building a new house, second hand brick were used for partition walls, some of which were from an old chimney. Plastering is laid directly upon the bricks, then hard finish and paint. Several coats of the latter fail to cover a stain which comes through from the bricks. What is the remedy? A. The most effectual remedy is to cut out the smoky bricks and replace them with new ones.

(26) E. S. W. asks: 1. How can I construct a portable retort, to make gas of coal, wood, or grease, to fill a 30 x 40 inch gas bag? How large a retort will be required? A. A retort about 18 inches long, having a diameter of about 10 inches and a movable cap at one end, will answer. The retort may be of iron. 2. What degree of heat is needed to bring the gas over? A. The heat of a good coal or charcoal fire will be requisite. You will find descriptions of gas apparatus in any good work on chemistry or chemical technology.

(27) B. S. C. B. says: I have an astronomical glass of 60 inches focus. How can I fix it so that I can look at the sun with impunity, overcoming the extreme brightness? A. Put a diaphragm over the object glass with ½ inch aperture; then use a neutral tint shade glass between the eye and eyepiece.

## Notes &amp; Queries



(28) J. E. M. asks: Is there a non-conductor of magnetism? A. Yes. An interval of space.

(29) C. E. T. says: An "Engineers' Pocket Book" states: "Water may be reduced to 5° Fah. if confined in tubes of from 0.003 to 0.005 inch in diameter; this is in consequence of the adhesion of the water to the surface of the tube, interfering with a change in its state. Is this true, and if so, how do you know it? A. We do not know whether it is true or not. It might be tested by observing whether the water would flow in the tube at this temperature. Probably the author has some authority for his statement, although he does not give it.

(30) T. M. says: 1. I. F. states that, in building a grist mill, to use 48 cubic feet of water per second, with a 48 inch pipe to convey water, the flow must be 4 feet per second, or 240 feet per minute. Would not a larger pipe or penstock give better results with less velocity, say 100 feet per minute? A. There might be some gain, but possibly not enough to pay for the increased price of pipe. 2. What would be the difference in the velocity of water under any head, say 15 feet, with a draft tube (and vacuum pipe) or without one? What is the formula for velocity in a vacuum? A. Without the draft tube, the total head is that of the water. With the draft tube, the head is increased by the weight of the atmosphere, equivalent, for a perfect vacuum in the tube, to a column of water 34 feet high.

(31) M. B. L. says: I am making a magneto-electric machine, in which I have two 9 inch permanent horseshoe magnets. I tried a pair of electro-magnets 1 1/4 inches long, with a diameter of 1 1/4 inches and 1/2 inch core; the resistance of the magnets is 300 ohms (each spool 150 ohms). The current from these could not be felt. Please let me know what the resistance of a pair of spools for such a machine should be. A. The resistance of your spools is correct, and you ought to get a powerful shock from your machine. If you do not get it, the fault will probably be found in your connections.

(32) C. E. A. says: The following is a cheap device for oiling loose pulleys: Cut a shallow screw thread, of 1 inch pitch, right and left hand, nearly the whole length of the eye of pulley hub (the threads can be cut after the pulley is bored and while it is in the lathe). Then it will readily be seen that, while the pulley is in motion, the oil will follow in the grooves from right to left and left to right, nearly the whole length of pulley hub, without any chance to escape, as the groove ends within 1/4 inch from the end of hub. It will be necessary to fit a plug in the oil hole, as the centrifugal force will have a tendency to throw the oil out. A. This is a very good idea where the bearing surface is ample.

(33) J. M. L. asks: How can I make a fluid that, when a stick or paper are dipped into it, and exposed to the air, will take fire? A. Phosphorus is slightly soluble in ether, more so in benzole or turpentine. If a solution of phosphorus be made in either of the above solvents, and a drop of the solution be allowed to evaporate in the air, the phosphorus, which is left behind in a very finely divided condition—thus exposing a very extended surface for oxidation—takes fire spontaneously. If paper or other similar combustible material be moistened with one of the above solutions and subsequently allowed to dry in a warm air, it will become inflamed at the moment of the ignition of the phosphorus; this flame, however, will speedily be extinguished by the coating formed on its surface by the deposition of the white anhydrous phosphoric acid. The best solvent for phosphorus is bisulphide of carbon.

(34) H. B. asks: How can I make hyposulphite of lead? A. Add a slight excess of an aqueous solution of acetate of lead (sugar of lead) to a strong solution of hyposulphite of soda; the white precipitate which forms is hyposulphite of lead. It is very sparingly soluble in water, but dissolves in alkaline hyposulphites with the formation of double salts. It may be dried at 212° Fah. without decomposition; but at a higher temperature it blackens and gives off sulphurous oxide, and leaves a residue of sulphate and sulphite of lead. When heated in the air it glows like tinler.

(35) J. D. B. asks: 1. What will make gelatin insoluble in water, without losing its adhesive property? A. If treated with a strong solution of bichromate of potassa in water, and then exposed to strong sunlight, any form of gelatin is rendered superficially insoluble. Tannic acid renders gelatin insoluble by forming with it an insoluble tannate. Gelatin is also rendered insoluble by solutions of corrosive sublimate. 2. Is glue or gelatin soluble in ether, and how rapidly does it dissolve therein in comparison with water? A. It is insoluble in ether, but dissolves to some extent in a mixture of strong vinegar or acetic acid and alcohol (vinegar 4 parts, alcohol 1 part; heat.) 3. What acid is best for etching type metal? A. Use nitric acid. 4. Is kerosene injurious to leather? A. Kerosene is liable to render the leather brittle and reduce its tenacity by removing a part of its natural oil. 5. Inking rollers can be kept soft in kerosene, but will the kerosene have an injurious effect? A. If the rollers are of the same composition as those usually employed by printers, the oil will not injure them.

(36) W. S. V. says: O. W. J. can preserve citron by boiling the sliced fruit, in enough water to cover it well, until tender; then to 2 lbs. fruit add 1 lb. sugar (A) and 1 lemon, sliced, and cook until the sirup is thick. The first water should be poured off, and as much more added before adding the sugar, etc. The better the sugar, the better the sauce.

(37) Professor C. W. MacCord says: You give place to the statement that the curve de-

scribed by a point in the connecting rod, between the centers of the crank pin and the crosshead journals, is a perfect ellipse: This statement is correct if the length of the connecting rod be equal to that of the crank, and the stroke of the crosshead four times as great, that is, twice the throw of the crank, but not otherwise.

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

J. H. P.—No. 1 is sulphuret of iron. No. 2 is graphite in quartz rock.—J. B. P.—The markings are a thin coat of oxide of manganese, formed by deposition between surfaces nearly in contact.—E. A. C. D.—It is carbonate of soda mixed with some sulphate of soda.—A box, with no name or address on it, contains one of the *epetra*—large garden spiders.—O. S.—The gelatin sent is prepared from the finest material, tinted with one of the aniline colors, by passing it, while in a viscid condition, between rollers.

T. H. B. asks: How can rice imitations of alabaster ornaments be made?—A. R. asks: How can I brighten bronze castings?—J. K. asks: What paint is the most durable for coating mirrors over the silvering?—W. D. asks: Why, in English coaches, are the hind wheels turned in at the base instead of being at right angles with the axle?

#### COMMUNICATIONS RECEIVED.

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

On the Trisection of an Angle. By A. B., J. B., and H. A. H.  
On the Russian Frost Plant. By J. S.  
On the Sun's Retrograde Motion. By J. H.  
On Measuring the Width of a Stream. By W. A. D.  
On the Canadian Patent Office. By F. L. J.  
On the Sun's Heat. By H. S. W.  
On the Ball Puzzle. By J. D.  
On Hats and Bald Heads. By J. H.  
On Professor Huxley's Lectures. By W. M.  
On Land Waterspouts. By S. McD.

Also inquiries and answers from the following:  
W. W. P.—C. F. G.—J. W. H.—R. J. L.—J. K. F.—C. M.—W. K.—N. J.—C. D.—G. L. P.

#### 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 sells the best utensil for steaming cattle fodder, etc.? Who makes machines for making square biscuit tins? Who sells phosphor bronze? Who is the best apparatus for extracting lead from ores?" 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 any desired information can in this way be expeditiously obtained.

## VALUE OF PATENTS,

AND

### How to Obtain Them.

#### Practical Hints to Inventors.



PROBABLY no investment of a small sum of money brings a greater return than the expense incurred in obtaining a patent, even when the invention is but a small one. Large inventions are found to pay correspondingly well. The names of Blanchard, Morse, Bigelow, Colt, Ericson, Howe, McCormick, Hoe, and others, who have amassed immense fortunes from their inventions, are well known. And there are thousands of others who have realized large sums from their patents.

More than FIFTY THOUSAND inventors have availed themselves of the services of MUNN & CO. during the THIRTY years they have acted as solicitors and publishers of the SCIENTIFIC AMERICAN. They stand at the head in this class of business; and their large corps of assistants, mostly selected from the ranks of the Patent Office: men capable of rendering the best service to the inventor, from the experience practically obtained while examiners in the Patent Office: enables MUNN & CO. to do everything appertaining to patents CHEAPER than any other reliable agency.

#### HOW TO OBTAIN PATENTS.

This is the closing inquiry in nearly every letter, describing some invention, which comes to this office. A positive answer can only be had by presenting a complete application for a patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After great perplexity and de-

lay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning. If the parties consulted are honorable men, the inventor may safely confide his ideas to them; they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his right.

#### How Can I Best Secure My Invention?

This is an inquiry which one inventor naturally asks another, who has had some experience in obtaining patents. His answer generally is as follows, and correct:

Construct a neat model, not over a foot in any dimension—smaller if possible—and send by express, prepaid, addressed to MUNN & CO., 37 Park Row, together with a description of its operation and merits. On receipt thereof, they will examine the invention carefully, and advise you as to its patentability, free of charge. Or, if you have not time, or the means at hand, to construct a model, make as good a pen and ink sketch of the improvement as possible and send by mail. An answer as to the prospect of a patent will be received, usually by return of mail. It is sometimes best to have a search made at the Patent Office; such a measure often saves the cost of an application for a patent.

#### Preliminary Examination.

In order to have such a search, make out a written description of the invention, in your own words, and a pencil, or pen and ink sketch. Send these, with the fee of \$5, by mail, addressed to MUNN & CO., 37 Park Row, and in due time you will receive an acknowledgment thereof, followed by a written report in regard to the patentability of your improvement. This special search is made with great care, among the models and patents at Washington, to ascertain whether the improvement presented is patentable.

#### To Make an Application for a Patent.

The applicant for a patent must furnish a model of his invention, if susceptible of one; or if the invention be a chemical production, he must furnish samples of the ingredients of which his composition consists. These should be securely packed, the inventor's name marked on them, and sent by express, prepaid. Small models, from a distance, can often be sent cheaper by mail. The safest way to remit money is by a draft or postal order, on New York, to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents.

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The population of Great Britain is 31,000,000; of France, 37,000,000; Belgium, 5,000,000; Austria, 38,000,000; Prussia, 40,000,000; Russia, 70,000,000. Patents may be secured by American citizens in all these countries. Now is the time, when business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. A large share of all the patents secured in foreign countries by Americans are obtained through our Agency. Patents obtained in Canada, England, France, Belgium, Germany, Russia, Prussia, Spain, Portugal, the British Colonies, and all other countries where patents are granted, at prices greatly reduced from former rates. Send for pamphlet pertaining specially to foreign patents, which states the cost, time granted, and the requirements of each country. Address MUNN & CO., 37 Park Row, New York. Circulars, with full information on foreign patents, furnished free.

#### Canadian Patents.

In order to apply for a patent in Canada, the applicant must furnish a working model, showing the operation of the improved parts; the model need not exceed eighteen inches on the longest side. Send the model, with a description of its merits, by express or otherwise, to MUNN & CO., 37 Park Row. Also remit to their order by draft, check, or postal order, the money to pay expenses, which are as follows: For a five years' patent, \$50; for a ten years' patent, \$75; for a fifteen years' patent, \$100. The five and ten years' patents are granted with privilege of extension to fifteen years.

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#### THE VALIDITY OF PATENTS.

We recommend to every person who is about to purchase a patent, or about to commence the manufacture of any article under a license, to have the patent carefully examined by a competent party, and to have a research made in the Patent Office to see what the condition of the art was when the patent was issued. He should also see that the claims are so worded as to cover all the inventor was entitled to when his patent was issued; and it is still more essential that he be informed whether it is an infringement on some other existing patent. Parties desiring to have such searches made can have them done through the Scientific American Patent Agency, by giving the date of the patent and stating the nature of the information desired. For further information, address **MUNN & CO.,** 37 PARK ROW, New York.

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