

Business and Personal.

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Spy Glasses and Telescopes of all kinds and prices. Lenses for making the same, with full directions for mounting. Illustrated priced circular free. McAlister, Manufacturing Optician, 49 Nassau St., New York.

Reliable Oak Leather and Rubber Belting. A specialty of Belting for high speed and hard work. Charles W. Army, Manufacturer, Phila., Pa. Send for price lists.

How to make Violins—Write J. Ranger, Syracuse, N. Y.

Shaw's Noise-Quitting Nozzles, for Escape Pipes of Locomotives, Steamboats, etc. Quiets all the noise of high pressure escaping steam without any detriment whatever. T. Shaw, 915 Ridge Ave., Philadelphia, Pa.

Reliable information given on all subjects relating to Mechanics, Hydraulics, Pneumatics, Steam Engines, and Boilers, by A. F. Nagle, M. E., Providence, R. I.

For 13, 15, 16, and 18 in. Swing Screw-Cutting Engine Lathes, address Star Tool Company, Providence, R. I.

For Sale.—Second-hand 4 Sided-Moulder, with about 300 knives; good as new; price \$500. T. R. Bailey, Agt., Lockport, N. Y.

Will A. T. S., who advertised June 9 for a Manufacturing business, address Box 1021, Providence, R. I.

Wanted—A partner with about \$7,500 in a Manufacturing concern; no competition; will pay 25 to 30 per cent. on investment. Address E. Y. M., Pittsburgh, Pa.

Combined Miller and Gear-Cutter; capacity large; almost new; a bargain. C. A. Conde & Co., Phila., Pa.

For Boulton's Paneling, Moulding, and Dovetailing Machine, and other wood working machinery, address B. C. Machinery Co., Battle Creek, Mich.

John T. Noye & Son, Buffalo, N. Y., are Manufacturers of Burr Mill Stones and Flour Mill Machinery of all kinds, and dealers in Dufont & Co.'s Batting Cloth. Send for large illustrated catalogue.

Steel and Iron Set Screws, manufactured by L. F. Standish & Son, New Haven, Conn.

Electric Gas Lighting Apparatus, applied to public and private buildings. The latest improvements. A. L. Bogart's patent. Address 702 Broadway, N. Y.

Patent Taper Sleeve Fastening and Wooden Pulley Works are now in full operation. Orders solicited. Satisfaction guaranteed. A. H. Gray, Erie, Pa.

Painters, etc., get circular, prices, etc., of New Metallic "Wiping out" Graining Tools; 75,000 now in use. J. J. Callow, Cleveland, O.

Removal.—Fitch & Meserole, Manufacturers of Electrical Apparatus, and Bradley's Patent Naked Wire Helices, have removed to 40 Cortlandt St., N. Y. Experimental work.

Power & Foot Presses, Ferracute Co., Bridgeton, N. J.

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

Lead Pipe, Sheet Lead, Bar Lead, and Gas Pipe. Send for prices. Bailey, Farrell & Co., Pittsburgh, Pa.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing metals. E. Lyon & Co., 470 Grand St., N. Y.

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, N. Y.

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

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

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

Small Fine Gray Iron Castings a specialty. Warranted soft and true to patterns. A. Winterburn, 16 and 18 De Witt St., Albany, N. Y.

Articles in Light Metal Work, Fine Castings in Brass, Malleable Iron, &c., Japanning, Tinning, Galvanizing, Welles' Specialty Works, Chicago, Ill.

Book Binders' Case Binding Machine. Send for illustrated circular. Frank Thomas & Co., Cincinnati, Ohio.

Skinner Portable Engine Improved, 2 1/2 to 10 H. P. Skinner & Wood, Erie, Pa.

Yacht and Stationary Engines, 2 to 20 H. P. The best for the price. N. W. Twiss, New Haven, Conn.

All nervous, exhausting, and painful diseases speedily yield to the curative influences of Pulvermacher's Electric Belts and Bands. They are safe and effective. Book, with full particulars, mailed free. Address Pulvermacher Galvanic Co., 292 Vine st., Cincinnati, Ohio.

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

Territory, on a Useful Household Article, given away free. Address Ezra F. Landis, Lancaster, Pa.

More than twelve thousand crank shafts made by Chester Steel Castings Co. now running; 8 years' constant use prove them stronger and more durable than wrought iron. See advertisement, page 398.

Diamond Planers. J. Dickinson, 64 Nassau St., N. Y.

Emery Grinders, Emery Wheels, Best and Cheapest, Hardened surfaces planed or turned to order. Awarded Medal and Diploma by Centennial Commission. Address American Twist Drill Co., Woonsocket, R. I.

C. N. will find a table of the prices of metals on p. 169, vol. 33. As to powerful explosives, see p. 2, vol. 34. As to the most deadly poison, see p. 155, vol. 31.—A. K. will find something on the properties of selenium on p. 241, vol. 30.—C. C. is informed that the Textile Manufacturer is published in Manchester, England.—G. H. W.'s query was answered under the initials G. H. M., p. 268, vol. 36.—A. A. can calculate the

horse power of his engine by the formula given on p. 33, vol. 33.—F. E. M. will find something on removing moles or freckles from the face on p. 374, vol. 32.—J. A. McN. will find an explanation of the apparent variation in the size of the moon's disk on p. 305, vol. 34.—B. L. D. should use crude or pure rubber in the preparation of marine glue.—C. W. I. will find directions for removing mildew from cloth on p. 250, vol. 34.—R. should consult his family physician.—D. S. R. will find on p. 20, vol. 30, directions for deodorizing cod liver oil.—W. C. R.'s query as to gas cylinders for calcium light is answered on p. 380, vol. 36.—S. A. M. will find that the claims of the Keely motor people are fully exposed on p. 400, vol. 32.—P. W.'s query as to weight near the surface of and in the depths of the ocean is answered on p. 363, vol. 36.—J. C. B. will find good tables of logarithms in Culley's "Handbook of Telegraphy."—J. L. C. will find directions for building an aquarium on p. 90, vol. 30.—G. C. will find directions for tempering small drills on p. 85, vol. 33.—T. J. S. S. will find a formula for the width of belts on p. 58, vol. 27.—J. G. K. will find the address of the inventor of the calculating machine in the article describing it.—E. L. L. F. will find an article on watermelon sugar on p. 191, vol. 25.—C. P. will find full particulars as to the Great Eastern steamship on p. 346, vol. 31.—S. A. E. will find something on utilizing mica on p. 241, vol. 34.

(1) J. says: You recently informed a correspondent that you knew of no better way of pouring a Babbitt metal box, where the box is solid instead of being in halves, than by wrapping paper around the shaft to allow for shrinkage of the Babbitt metal. This slovenly plan has two objections. The paper is too thick to make the proper fit, and the metal shrinks on the paper and makes the box difficult to remove after pouring. Neat workmen warm the shaft and coat it with soap. But I have seen workmen make use of a plan so simple, so perfect, and so novel that I think it worthy the name of a wrinkle. It is simply to place the box horizontally, pour it half full, and let it cool. Then pour the other half. The result is a solid box in halves. The metal will be found to fill the casting solidly and not to have shrunk on the shaft.

(2) J. O. C. says: I have a wood lathe, bed made of 4 1/2 x 14 inches oak timber, head and tail stock of wood, with a cast steel head spindle with 1 1/4 inches bearing, 4 inches long. In turning wagon hubs, the lathe runs smoothly and without jar. Please let me know if I can turn iron on the lathe by using a hand slide rest? A. Yes.

(3) G. H. asks: What particular bones of the whale supplies us with the article of commerce known as whalebone? A. Whalebone is not, as its name might seem to signify, obtained from the bones of the whale, but from a substance which forms a substitute for teeth in the Greenland and other whales. This substance consists of flat plates or blades, hanging from the sides of the upper jaw (occupying the position of teeth in other animals). They are usually about 300 in number on each side, and are arranged parallel with each other, at right angles to the jaw. They are usually, at the middle of the jaw, about 9 feet in length. A full sized Greenland whale yields about 1 ton of these.

(4) W. E. G. asks: At what part of the crank stroke of an engine should the slide valve open the ports? A. The port should be about 1/4 inch open when the crank is on the dead center.

(5) G. W. S. says: I am about completing an invention that requires the use of a small cord, not to exceed 1 1/2 inches in circumference. I would prefer that it should be 1 1/2 inches in circumference, and desire it to sustain strains of at least 400 lbs. I do not think wire can be made to answer, and wish to know what is the best material in a rope or cord of the two dimensions? What are the breaking and safe strains of such cords? A. Good hemp rope, of either size mentioned, can be made of the requisite strength. Silk cord can be made much smaller. You should apply to manufacturers for prices.

(6) H. B. says: I am engaged in file cutting and have considerable trouble from the files cracking in tempering. In 170 gallons of water used for tempering, I use the following ingredients: 1/2 pint oil of vitriol, 1/2 lb. alum, 1/4 lb. borax, 1/4 lb. prussiate of potash, and have the water salted so that a potato will float on it. What additional ingredients must be used, or what can be done to prevent the files cracking? A. Your files are probably heated too high. Try heating lower, and dip vertically.

(7) F. S. says: We have a four horse power caloric engine, which we would like to run with oil. We now run it with anthracite coal, which costs us \$10 per ton, and the air passing through the fire deposits so much grit in the cylinder as to cut out the packing ring and the cylinder in a short time. Which would be the cheapest, coal or oil? And if the latter, which would be the best kind of oil? A. We advise you to confer with the manufacturers.

We have a cistern built in clay ground; after having finished it, we found that water had made its way in. Thinking that it was not cemented enough, we put on 6 or 7 coats; but water still comes through. What can be done with it? A. We could not tell without knowing more particulars. If there is a spring in the neighborhood, it may be necessary to give it another outlet.

We have an iron roof on our factory which sweats in frosty weather, the sweat dripping down on the machinery. What can we put on to prevent it? A. You should either ventilate and heat the building more effectually, or cover the iron with some non-conducting material.

(8) C. H. M. says: I have a 12x14 inches engine. The steam follows the valve 10 inches. I am about putting in new valves, and am thinking of using more lap so as to make the valve cut-off earlier. Of course the exhaust will open the same, but will close earlier, unless I make it open very early. I want to know whether there will be any gain in so doing? A. You will gain by giving your valve sufficient lap to cut off the steam at about 3/4 stroke.

(9) T. R. W. asks: What is the best disinfectant for kitchen drains, cesspools, etc.? A. Use

chloride of lime (hypochlorite of calcium), or carbolic acid.

(10) E. M. L. asks: How can I utilize small scraps of tortoiseshell? A. Small pieces of good tortoiseshell may be joined so as to form one large apparently seamless piece in the following manner: Slope off the margins of the shells for a distance of about a quarter of an inch from the edge. Then place them so that the margins overlap one another; and thus arranged put them in an iron press and immerse in boiling water for some time. The pieces by this means become so perfectly united that the joint cannot be seen. The filings and very small scraps may be softened in hot water and consolidated by hydraulic pressure in metal moulds. Protracted heating of tortoiseshell darkens it, and greatly lessens its beauty.

(11) J. H. B., of Leeds, England, says: I require a peculiar kind of cement. I have used plaster of Paris and white lead, which, when moulded and hot pressed, forms into a very hard substance: but it rubs off on to fabrics when being pressed on to them in a chamber containing steam. Can you suggest anything that will keep the white from rubbing off? A. You might try a wash of strong alum solution. Perhaps a better cement for the purpose would be that made with lime and albumen. Slake freshly burnt lime with boiling water; this occasions it to fall to a very fine dry powder, if excess of water has not been added. White of egg or blood albumen should be intimately mixed by beating with an equal quantity of water; and enough of the lime powder should be added to form a thin paste, which should be used speedily, as it soon sets. This is a valuable cement, possessed of great strength, and capable of withstanding steam or boiling water.

(12) M. A. says: We have a lot of plated spoons that are discolored with a bluish purple cast resembling that on tempered steel. We fear to injure the polish. Can you tell us how to clean or remove the color without injuring the polish? A. The discoloration is very probably due to the formation of a film of sulphide of silver. This may be removed by dipping for a moment in strong nitric acid, and then washing immediately in running water. If the silver is permitted to remain in contact with the acid for more than a moment or two, the polished surface will be injured, so that it is preferable to rub off the film with a little finest tripoli powder and a piece of chamois skin or a soft brush.

(13) C. W. G. asks: How do you account for the fact that some of the genuine fifty and twenty-five cent pieces have not the ring of true metal? I sometimes see coins that, when thrown upon a counter, sound like lead; and yet they stand all the other tests, and are to all appearances genuine silver coin. A. It may be attributed to some flaw, crack, or strain due to distortion. Most of the non-sonorous coins in circulation are not genuine.

(14) P. M. B. asks: How can I remove an oil stain from granite, caused by having left some fresh oiled putty on the same? A. Moisten the spot with bisulphide of carbon, and immediately cover it with dry pipeclay or kaolin.

(15) E. P. H. says: I have a bronze mirror, and it has become dull and a little defaced by handling. I cannot find anything that will restore the polish. Can you tell me what to do with it? A. Rub it over with a cloth moistened with dilute sulphuric acid; wash with water, dry, and polish, first with finest tripoli, and then with putty powder on a piece of chamois skin.

(16) A. C. A. asks: How can flowers be wrapped up so that they can be sent by mail without wilting? What is the best way to send roots and plants by mail? A. Dip them for a moment in dilute glycerin and pack loosely in cotton (moist) in small pasteboard boxes. Roots or bulbs should be wrapped as tightly as possible in a strip of cloth moistened with a mixture of about 1 part glycerin to 3 parts water, and packed in small pasteboard boxes.

(17) C. H. says: Can you give full particulars of the preparation of powder paper? Would it explode under pressure, without ignition? A. It is very probable that it would. We have not tried the experiment.

(18) T. H. L. asks: Do all animals above fishes perspire through the entire surface of their bodies? A. To a greater or less extent, this is, we believe, the case with all of the higher animals.

(19) R. S. H. asks: What will take the stain of apple juice out of white cambric muslin? A. Rub the spots well with strong alcohol, and then moisten with a little very dilute sulphuric acid (1 part acid to 20 parts water), and cover with moist bleaching powder (chloride of lime) until the spots disappear. Finally, wash well with soap and water.

(20) W. H. J. says: I have a parchment diploma that has hung against a brick wall till it has become wrinkled from gathering moisture. How can I make it smooth again? A. Cover it on both sides with bibulous tin blotting paper, and pass a warm iron over the reverse side until it is properly smoothed.

(21) M. B. H. says: I am sprinkling the streets with a 300 barrel tank, from which I fill my wagon, which holds 19 barrels water. Can you tell me how much chloride of calcium would be necessary to keep the dust down, going over the ground two or three times a day? Would it be better to put the chloride into the large tank or the small one? A. We think the smallest quantity to be used is about 1 lb. to the barrel (= 1/2 oz. to 1 gallon). If you can make sure of its complete solution, you had better add it in the small tank.

(22) C. T. L. says: In making fly paper, I wish to put a preparation of sticky materials on calendered writing paper. On one side, I put an extra sizing of glue; but I cannot spread it evenly, and it stains through the paper. A. Use a sizing of a thin solution of shellac in borax, or dip the paper for a moment into a solution of beeswax in methyl alcohol, and then pass

it between hot rollers. The sheets may then be glued by laying each sheet, face downward, on the surface of the bath.

(23) H. M. H. asks: What are the chemical changes produced on the photographic plate from the time the collodion is flowed on to the time the fixing solution is washed off? And what are the lights and shades composed of before and after the plate is fixed? A. Upon putting the collodionized plate into the silver bath, the iodides or bromides contained in the collodion cause a precipitation of insoluble iodide or bromide of silver on the collodion. On exposing this to light, a partial reduction of these salts ensues wherever the light strikes it—the stronger the light the greater the reduction—and this reduction is in so far completed by the action of the developer that the parts exposed to light become insoluble in the fixing solution (hyposulphite of soda or cyanide of potassium). Before fixing, the shades are composed of basic salts and oxide of silver, the lights of unreduced salts. In the fixing bath all of the unreduced salts are dissolved out, while the rest remains unchanged. The lights in the finished negative are therefore the transparent portions.

(24) F. P. asks: How can an aqueous solution of Liebig's extract of beef be prepared? A. Dissolve 1 part extract in about 30 parts warm water.

(25) H. L. C. says: I wish to make some permanent U magnets of cast steel, of 3/4 x 1 inch bar. They are to be 7 inches long, and capable of supporting 8 or 10 lbs. Can I charge them by using an 18 by 1 inch round iron formed into a U shape, and wound with 75 feet of No. 14 cotton-covered wire, with battery power consisting of two Hill cells? A. Yes, but one Grove or carbon cell would answer better.

(26) B. says: I have a cistern which is made in clay ground; and it lets in water through the cement, and makes the rain water hard. It has 6 or 7 coats of cement, and still the water comes through. What is the reason, and how can I prevent it? A. No kind of cement that is mixed with water can be depended upon absolutely to make a lining impervious to water. You require an asphaltic cement put on in several coats, and fortified and loaded down with a brick or concrete bottom and sides, to keep it in place, so as to resist the pressure of the exterior water when the cistern is not filled.

(27) F. D. H. asks: In connecting the coils of an electromagnet, which are the proper ends of the wire to join, those nearest the cores or the outside ones? A. It is usual to join those nearest the core.

(28) J. C. W. asks: How can I build a hot-house of lumber, for flowers in the winter? A. Locate it so as to harmonize with surrounding buildings, but place it so as to front either south, southeast, or east. Let the front wall be 2 feet above the ground, and the rear wall sufficiently high to give the glass roof a slant of 45°—the height depending upon the width of the building. If the soil is dry, the floor may be sunk 2 feet below the surface of the ground by excavating to that depth. If you have stone, build foundation walls 18 inches thick up to 6 inches above surface of ground, lay sills around and set your posts about 4 feet apart, their size being 4 by 4 inches. Cover the front and rear, both on the exterior and interior, with tongued and grooved boards, and pack the 4 inch space between the boarding with dry sawdust or wood shavings rammed close. If you have no stone, use locust or chestnut posts, driven well into the ground and sawed off level for the sill. Make your rafters of sufficient size to suit the width of the building, and placed so as to properly receive your glass frames, and provide in the 2 feet wall at bottom, and in the upper row of sashes, a ventilating shutter to every other opening between the rafters. Put the door in the warmest end, and construct the ends of glass. To provide against severe weather, procure a hot water greenhouse stove and pipes, and set the same according to the directions given.

(29) J. W. S. says: A house that cost \$15,000 caught fire from a chimney; the gas had eaten the mortar away from the bricks. Is there anything that can be put in mortar that will counteract the effects of the gas? A. Make your mortar of lime and clean sharp sand (no clay or loam); make the walls of the flues fully 4 inches thick, and fill the joints of the brick-work with the mortar properly, and there will be no danger of the gas eating through the mortar to set the house on fire.

(30) J. J. says: A large reservoir 20 feet deep, 2 miles from town and 200 feet above town, has two pipes equal in size and length. One is inserted at bottom of lake or reservoir, the other near the top; and both are led to the same point in town. Which would supply water first to run the most? What would be the difference if the top pipe were connected to a small box three feet square which is kept supplied with water at the same height as the reservoir? A. The head of water, or the pressure at the bottom of the pipe in town, is the same in both cases, the only difference being in the length of time that the supply would continue—the pipe which connects near the top of the tank ceasing to flow when the water subsides to that point, but the other continuing until the tank is fully discharged.

(31) B. & C. F. say: 1. We propose building a storehouse. We desire to know which is best, brick or stone, stone being white sandstone of good quality and the brick medium? A. The brick wall could be laid up in less time than stone and would answer of less thickness—it would therefore most likely be more economical; it would also stand fire better. 2. Which is best for roofs, tin or sheet iron? Should it be painted? A. A roof of bright I C plate charcoal tin is the best; and it should be painted 2 coats of best yellow ochre paint.

(32) A. G. says: I got some small articles for silver plating, and tried your recipe given on p. 299, vol. 31, but without success. The articles are of a composition of tin, zinc, and lead or antimony, 1 to 2 inches long and 1/2 inch wide. How can I succeed? A. Probably you were not careful enough in cleaning the objects. Try boiling and rubbing them in a solution of caustic soda, made by boiling about 2 lbs. of common

