

Business and Personal.

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Glass Cylinders Tempered in Oil. T. Degnan, 129 Milk St., Boston, Mass.

Wanted—The address of the proprietor and manufacturer of the Counts Fruit Gatherer. Reply to J. C. Stribling, Pendleton, S. C.

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

Practical Plumbers wanted as Agents for Improved Hydraulic Engine (highest Centennial award) for Blowing Organs. Address H. L. Roosevelt, Church Organs, New York.

Steam Yachts for sale, new, 14 feet long, 4 feet beam, 1/2 h. p., \$250; 18 feet long, 4 1/2 feet beam, 1 h. p., \$355; 21 feet long, 5 1/2 feet beam, 2 h. p., \$425. Shipping weights 450, 800, and 1,200 lbs. Will carry comfortably 4, 8, and 12 persons. Send for particulars. S. C. Forsaith & Co., Manchester, N. H.

Manufacturers can buy or lease Hydraulic Power in any quantity, at very low rates, at Rock Falls, Ill. A. P. Smith.

One hundred Salesmen are employed in the Retail Warerooms of Baldwin the Clothier. The branch house in Brooklyn holds there the same relative place that the Broadway and Canal street headquarters hold in New York. The sales are three times larger than any other house can show, and the stock displayed four times greater. The leader of the retail clothing trade is Baldwin the Clothier.

Easy Flowing Silver on Hard Solder and small Metal Tubing. John Holland, Cincinnati, O.

Capital wanted by A. Daul, 363 Morris Ave., Newark, N. J., for Postage Stamp Cancellation and Horse Car and Omnibus Control.

Wanted—Proposals to make about 10 Tons Engine Castings, large and small. Address Box 2132, N. Y. city.

600 New and Second-hand Portable and Stationary Engines and Boilers, Saw Mills, Wood Working Machines, Grist Mills, Lathes, Planers, Machine Tools, Yachts and Yacht Engines, Water Wheels, Steam Pumps, etc., etc., fully described in our No. 11 list, with prices annexed. Send stamp for copy, stating fully just what is wanted. Forsaith & Co., Machine dealers, Manchester, N. H.

New Lathe Attachments, such as Gear Cutting, Tap and Spline Slotting. W. P. Hopkins, Lawrence, Mass.

Amateur Photographic Apparatus, Chemicals, etc. Complete outfits, \$5 to \$25. E. Sackmann & Co., manufs., Brooklyn, N. Y.

Painters.—Send for new prices of Metallic Graining Tools, for "wiping out." J. J. Callow, Cleveland, O.

For Sale.—Combined Punch and Shears, and Engine Lathes, new and second-hand. Address Lambertville Iron Works, Lambertville, N. J.

Gas lighting by Electricity, applied to public and private buildings. For the best system, address A. L. Bogart, 702 Broadway, N. Y.

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

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.

F. C. Beach & Co., makers of the Tom Thumb Telegraph and other electrical machines, have removed to 530 Water St., N. Y.

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.

Consumption Cured.—An old physician retired from active practice, having had placed in his hands by an East Indian missionary the formula of a simple vegetable remedy for the speedy and permanent cure for Consumption, Bronchitis, Catarrh, Asthma, and all Throat and Lung affections, also a positive and radical cure for Nervous Debility and all nervous complaints, after having thoroughly tested its wonderful curative powers in thousands of cases, feels it his duty to make it known to his suffering fellows. Actuated by this motive, and a conscientious desire to relieve human suffering, he will send, free of charge to all who desire it, this recipe, with full directions for preparing and successfully using. Sent by return mail by addressing with stamp, naming this paper, Dr. J. C. Stone, 32 North Fifth Street, Philadelphia, Pa.

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.

Wanted.—A first-class Wood Engraver. Address Engraver, P. O. Box 271, Cincinnati, O.

Wanted.—A first-class Mould Maker on Undertakers' Hardware. Address Mould Maker, P. O. Box 337, Cincinnati, O.

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

See Boults' Paneling, Moulding, and Dovetailing Machine at Centennial, B. 8-55. Send for pamphlet and sample of work. B. C. Machy Co., Battle Creek, Mich.

Patent Scroll and Band Saws. Best and cheapest in use. Cordesman, Egan & Co., Cincinnati, O.

The Zero Refrigerator was awarded a grand Centennial medal. Send for book. Lesley, 226 W. 23d St., N. Y.

Etterich's Screw Cutting Tools are in great demand. Catalogue free. Frasse & Co., 62 Chatham St., N. Y.

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

Best Glass Oilers. Cody & Ruthven, Cincinnati, O.

Notes & Queries

W. Z.'s query as to the stick of timber is a schoolboy's problem.—W. A. M. will find directions for making liquid glass on p. 225, vol. 23.—A. D. should advertise his query as to the high speed engine at the Centennial.—C. A. H. will find directions for making battery carbons on p. 187, vol. 32. We cannot recommend particular machine makers in these columns.—J. T. K. will find a description of an incubator on p. 273, vol. 33.—J. F. will find directions for making yeast on p. 185, vol. 30.—L. A. K. will find directions for bluing gun barrels on p. 123, vol. 31. For giving a fine brown color to gun barrels, see p. 11, vol. 32.—F. D. will find a good recipe for tooth powder on p. 72, vol. 34.—F. H. B. W. H. C. will find on p. 154, vol. 34, directions for tinning iron castings. As to polishing metals, see p. 57, vol. 34.—J. L. K. will find directions for making mirrors on p. 267, vol. 31.—R. F. W. is informed that the art of graining is too complicated for description in these columns.—A. L. B.'s query as to postage stamps was answered on p. 203, vol. 36.—A. R. D.'s queries are business questions, and should appear in our advertising columns.

(1) W. E. W. asks: Can sheets of spring steel be rolled out to $\frac{3}{16}$ of an inch thick, 4 feet wide, and 21 feet long, without flaws? A. Yes.

(2) D. D. asks: How much clearance should a 12 x 20 inch steam engine of good design, running 120 revolutions per minute, have between the piston head and cylinder head? A. About $\frac{1}{4}$ to $\frac{1}{2}$ inch.

(3) M. G. says: I have an apparatus for calcium light, with which I have some trouble. My reflector is 18 inches in diameter and about 11 inches deep, and set the lamp how I please, I never get a plain, brightly illuminated surface. The whole surface is covered with black and white rings, in the center of which is a large black spot. As soon as I set the lamp in a different way, the black spot disappears and in its place comes an intense bright one, surrounded by darkness. A. Clean, dry, and polish the reflector, and adjust the jet, with its lime cylinder, facing directly into the reflector so as to concentrate all the light upon its surface. For ordinary purposes the ignited surface of the lime should be within about 2 inches of the back of the reflector. Turn on first a good supply of hydrogen (or coal gas) so as to give a flame of about 6 inches length; then immediately turn on the oxygen, and adjust the supply of gases so that neither will be in excess. If too much hydrogen is on, the flame will flare out around the sides of the lime; if too much oxygen, it will either make a singing noise or extinguish the light. A little practice will soon teach you when the adjustment is perfect. The lime cylinder should be within about the 16th of an inch of the tip of the jet, and should be turned occasionally so as to present fresh surfaces to the flame. 2. Which is better for the light, common lime or the prepared lime cylinders, and what do the latter contain, that make them preferable? A. Almost any kind of good fresh lime will answer; but the best results are of course obtained with lime that is pure—free from sand and earthy materials—well burnt, perfectly dry, and caustic. The prepared cylinders of lime are usually made of the finest and hardest quality of lime, and therefore generally give the best results. The cylinders are best small. 3. Which are better, gas bags, or the copper tanks into which the gas must be pumped? A. The greater the pressure of gas, the better the light within certain limits. Wrought iron cylinders, containing the gases under a pressure of about 15 or 16 atmospheres (225 or 240 lbs. to the inch), are safest and best. Gas bags, when used as reservoirs, should have a total weight put on them of about 500 or 600 lbs. 4. Which is preferable for tinting effects, gelatin plates or colored glass panes? A. Use plates of colored glass.

(4) W. H. R. says, as to snakes catching fish: During the summer of 1872 or 1873, I was residing in Marriottsville, Md. One day we took a small net about 10 feet long and went to the stream that divides Howard and Carroll counties, for the purpose of catching fish. On one of the hauls, we succeeded in catching about a dozen minnows, about 3 inches long, and a water snake, about 2 feet long. Immediately after raising the net out of the water, the snake glided over the netting to one of the fish and swallowed it down without any apparent difficulty. As we did not appreciate his efforts in that line, we threw him on the land and stopped his fishing career with a stick. My brother told me that he once saw a snake swimming in a deep pool just below Marriottsville with a trout in his mouth about 10 inches long.

(5) S. says, as to patterns for fret sawwork: I have been using a sheet of thin zinc between my pieces of wood; and by sawing out the patterns pasted on one piece of wood, I obtain a stencil with which any number of patterns can be rapidly made. The stencil will not wear out.

(6) B. G. S. asks: If two boilers having connection only by a feed pipe have different pressures, what would happen if I open the feed pipe? I think that the water will run from the higher pressure boiler till the pressure is equal, and then the water will come to the same level in both boilers. Am I right? I had four boilers, and two others set about 6 feet above the four, 45 feet long with two 15 inch flues, connected with the coal boilers at the middle and at the end, the connections being set on two steam drums across the boilers. The coal boilers were under 75 lbs. pressure; and having too much steam, I went to open the connecting valve, I felt a strong push ahead by the boilers, enough to crack the walls in two or three places. Can you explain this? A. The steam as it escaped from the boiler, having the higher pressure, acted precisely as it does in the reaction engine, and moved the boiler slightly.

(7) F. H. B. asks: Please tell me how to find the area of a circle in square inches? A. Square the diameter in inches, and multiply by 0.7854.

(8) D. H. M. asks: What is sisal? A. Sisal is the prepared fiber of the *agave Americana*, or American aloe; so called from Sisal, a port in Yucatan. The fiber is white, and of nearly the same thickness through-

out its great length of 7 to 20 inches. The fibers are used, in the rough state, for cordage.

(9) G. W. H. says: The specific gravity of wrought and cast iron, as given by various authorities, varies considerably. Why is this? A. It is scarcely possible to obtain pure iron. The metal ordinarily known as iron is virtually a combination of the elements iron and carbon. According to the amount of carbon present, the metal is called wrought iron, steel, malleable iron, and cast or pig iron. The specific gravity of electro-deposited iron is 8.139; that of steel bars and plates averages 7.823; that of tilted or hammered iron bars and forgings ranges from 7.76 to 7.798; that of rolled iron plates or bars varies between 7.76 and 7.54. The specific gravity of cast iron ranges between 6.85 and 7.35; that used in construction averaging 7.1. Wrought iron is very bad in quality when its specific gravity is less than 7.5.

(10) W. H. W. K. asks: Is there any work that will instruct me how to erect a building that will answer as a kind of refrigerator without the use of ice, that will lower the temperature inside to one half of what it is outside? A. We do not know of any. 2. Have you any drawings of the Alden process of drying? A. No.

(11) E. W. H. asks: Can you give me directions for stamping cashmere, broadcloth, etc., in patterns, that will stay on long enough to have the pattern worked in embroidery? A. Try the following: Prepared chalk, 5 parts; dextrin, 1 part. Rub into a paste of the proper consistence with a strong, hot solution of soap and a few drops of glycerin.

(12) C. R. asks: What is a reliable test for pure gold? A. One of the most reliable tests for the purity of gold is its specific gravity (19.34). It should retain its luster at all temperatures and resist the action of hot nitric acid. Take a clean piece of slate, make a mark or streak on it with the piece of metal to be examined, note the appearance of this with a strong magnifying glass; heat the slate over a gas burner and note if any change has occurred. If not, moisten it with a drop of strong nitric acid free from chlorine. If this does not affect it, and its specific gravity equals 19.34 or 19.4, it may be considered pure gold.

(13) R. T. L. asks: How can I remove varnish and paint from window glass? A. Remove as much as you can with a suitable scraper, and rub off the remainder with a cloth saturated with strong ammonia water.

(14) B. asks: What is the least amount of mercury that will unite with 1 oz. of pure gold, forming an amalgam, so that no free gold will remain? A. The proportion should be about 33 parts mercury to 57 gold.

(15) J. M. asks: Please give a recipe for softening muskrat skins. I have dried a dozen of them by putting alum and salt on them, but they are too hard. A. The skins should be thoroughly washed in clean water and treated with the alum bath and albumen mentioned in answer to C. C. F., p. 251, vol. 36.

(16) J. R. M., Jr., asks: What is the simplest way to obtain irridated glass? Is it 100 parts of water to 15 of acid, and how can I obtain the required pressure of from 2 to 3 atmospheres? A. Make a solution consisting of 15 parts of strong hydrochloric acid and 85 of pure water. Place this in a glass vessel in a strong metallic receiver capable of standing a pressure of 100 lbs. to the inch. Close all the openings airtight, and pump in air until the pressure gauge with which the receiver must be provided indicates about 50 lbs. Then allow to stand for several days. You will succeed best with soft glass.

(17) W. G. asks: Can kerosene oil be adulterated with water? During the winter I bought a lot of kerosene oil and put it into my oil safe; and in a few days I was unable to draw any oil, and upon examination I found that the pipe was frozen full of ice. I cleared it, but in a few days it was again stopped with ice, which made me suspicious that the oil was adulterated with water, as I never knew oil to freeze solid. A. No. Kerosene oil and water are not miscible. The water must have got into the tank in some other way.

(18) J. R. McC. says: A brass moulder told me that he had a lot of old brass given him to re-melt. It was a very hard composition, and he was asked if he could make it softer without adding any more copper; he said he could not; one of his men said he could, and he did. He was watched, but no one saw how he did it. Can you explain? A. He probably melted the brass and kept it at a very high heat, so that part of the tin and zinc evaporated.

(19) J. J. W. says: 1. In a recent issue of the SCIENTIFIC AMERICAN I noticed an article which stated that coal oil reproduced a full growth of hair on the head of an old servant who had become bald. Is it true? A. We think it is very doubtful. 2. Is there any injurious ingredient in coal oil? A. Yes. Can you tell me of a simple preparation that will prevent the hair from falling out, or one that will make hair grow on a bald head? A. See answer to N. R. on p. 251, vol. 26. As a general rule, hair cannot be made to grow again on a bald head, especially if the baldness is due to the natural infirmity of advanced age.

(20) A. C. asks: How are indelible pencils made? A. Reduce nitrate of silver to an impalpable powder, add just enough lampblack to give it a black color, and enough of a thick solution of gum arabic in hot water to make the powder coherent. Rub these ingredients well together, form into thin sticks, and dry.

What is moulders' wax composed of? A. Stearin or paraffin.

(21) R. P. P. says: This morning I send a small bottle of grapevine, which soured on my hands. It is well sugared, and on exposure to the air will evaporate to a thick syrup. How can I redeem it, so that it will be fit to use as a beverage? A. Treat it with enough bicarbonate of soda to neutralize the acetic acid. The proper quantity of the carbonate may be ascertained by first experimenting with a small sample of the wine. Judging from the sample of wine you send us, however, we think it doubtful that you will succeed in rendering it again palatable by this or any other

means, as the second fermentation has been permitted to go so far that a great part of the alcohol has been acetified. If the wine be treated with enough slaked lime to neutralize the free acid, and then distilled, the spirituous constituents may be recovered and utilized.

(22) Mrs. P. R. V. S. asks: How is glycerin made? A. The greater part of the pure glycerin is obtained by distilling with superheated steam the dilute solution remaining after the saponification of the oil with lime, in the manufacture of stearin candles. Crude glycerin is obtained in a similar manner from residues of soap-making. 2. What is the difference between glycerin and nitro-glycerin? A. Glycerin is converted into nitro-glycerin by treating it with a mixture of fuming nitric and sulphuric acids. This treatment causes a substitution of nitric acid for the hydrogen in the glycerin. They are entirely different in their properties.

(23) E. H. asks: Why does nitrous oxide gas deteriorate by time? Does the water kill its anesthetic properties by degrees, giving it up to the atmosphere through the space between the water tank and the gasometer? A. Pure nitrous oxide is a permanent gas at ordinary temperatures, and, when isolated, will retain its characteristic properties for an indefinite length of time. The gas is quite soluble in cold water, and if inclosed in a tight vessel, in contact with a quantity of water, it will displace much of the air held in solution therein, which, mixing with the unabsorbed gas, will of course dilute it. Again, if the water or the gas reservoir contains any quantity of organic matters, they will become oxidized at the expense of a portion of the oxygen of the nitrous oxide, liberating at the same time the equivalent of inactive nitrogen. But ordinarily the chief cause of the dilution may be attributed to the gradual diffusion of air and gas through the water, joints, rubbering, valves, etc. As the density of nitrous oxide is something more than that of air, the diffusion is in favor of the entrance of the air over the exit of the gas in the reservoir.

(24) A. E. D. says: How are moulds for cakes of toilet soap made? I made some of plaster of Paris, and ran the soap in them, but the soap did not form smoothly, little holes forming on the surface. A. Use moulds made of tinned iron.

(25) E. W. asks: Are the glasses which make an achromatic lens ground separately? A. Yes. 2. Will a single lens $1\frac{1}{2}$ inches in diameter do for a small camera? A. A single achromatic lens will make a picture whose diameter equals $\frac{1}{2}$ the focal length of the lens. The smaller the aperture, the sharper and better the picture.

What size of engine would it require to run a lathe of 6 inches swing? A. Such a lathe will require $\frac{1}{4}$ horse power to work it.

(26) A. S. B.—Red, brown, green, and other colored crayons are made with fine pipeclay, worked into a paste with water and intimately mixed by grinding with earthy or metallic pigments, or in general with a body of surface colors; then moulded and dried.

(27) C. B. P. asks: 1. How can I find out whether a telescope is achromatic or not? A. Look at some bright white object, say the moon; and if the edge is not fringed with color, but is clear and white, then the telescope is very nearly achromatic. 2. How can I find out the magnifying power of a telescope? A. Set up two sticks one foot apart at a distance of about two hundred feet from you; look at the sticks through the telescope with one eye and outside with the other. See how many feet on the ground outside the one foot in the telescope appears to cover. This will give the approximate magnifying power.

(28) G. W. M. asks: Is the article on astronomical observations, published in your issue of March 24, which says that the precession of the equinoxes is 50 1/2 minutes of arc, correct? A. It should have been seconds of arc, instead of minutes.

(29) J. S. asks: 1. How long does an elephant live? A. Elephants attain maturity in 30 years, and live to 150, perhaps to 200. 2. How long does it take elephants to breed? A. The period of gestation is about 20 1/2 months.

(30) J. E. L. asks: How many square miles of territory has England on this side of the ocean? A. About 3,194,690.

(31) R. H. R. asks: How can I color red and polish the edges of books? A. When the edges are trimmed, keep the book in the press, and brush on a coating of dilute gum tragacanth (about 1/2 lb. gum to 1 1/2 gallons), colored to the desired hue with a mixture of 3 parts rose pink with 1 vermilion. Let dry in the press, and burnish with an agate burnisher.

(32) B. J. asks: What can I use as driers for coal tar, when applied as paint? A. We do not know of any such substance; but the addition of a little black oxide of manganese will aid in the drying.

(33) J. McN. asks: What is the best method of whitening the grease obtained from pork scraps, which, on coming from the press, is quite dark in color? I have tried several things, such as carbonate of soda, alum, etc., but have not obtained satisfactory results. A. Agitate the grease with hot water containing 10 per cent of oil of vitriol, allow the impurities to settle, and draw off the fused grease with a siphon.

(34) C. I. K. says: I have a lot of cast and wrought iron pipes used for steam heating, running through a battery room. The fumes from the batteries cause the pipes to corrode. Is there any paint which will protect this? A. Coat the pipes with good asphalt, thinned down with turpentine or naphtha.

(35) E. G. S. says: I find that soluble glass, in the state in which it is in when bought, cannot be used or applied as a paint, by reason of its setting too quickly. I desire to apply it to pine boards, that will be subjected to dampness. I wish to prevent the boards from damp, warping, and smelling, by reason of decay, and thereby prevent the tainting of any matter or eatables that the box may contain. Can soluble glass be mixed with paint in any manner without destroying its properties, so that a painter could apply it to the outside of a dwelling house without leaving brush marks? A. Waterglass may be mixed with dry zinc white (ox