

Business and Personal.

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Wanted—To purchase a second-hand Disintegrating Mill. Please address, stating size and price, J. O. & E. Smith, So. Canterbury, Conn.

600 New and Second-hand Portable and Stationary Engines and Boilers, Saw Mills, Woodworking Machines, Grist Mills, Lathes, Planers, Machine Tools, Yachts and Yacht Engines, Water Wheels, Steam Pumps, etc., etc., fully described in our No. 12 list, with prices annexed. Send stamp for copy, stating fully just what is wanted. Forsaith & Co., Machine dealers, Manchester, N. H.

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

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.

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

"Abbe" Bolt, Forging Machines, and "Palmer" Power Hammers; best produced. Prices greatly reduced. Also sole builders Village and Town Combined Hand Fire Engines and Hose Carriages, \$350. Send for circulars. Forsaith & Co., Manchester, N. H.

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

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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.

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.

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

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

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 110.

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.

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

Notes & Queries

It has been our custom for thirty years past to devote a considerable space to the answering of questions by correspondents; so useful have these labors proved that the SCIENTIFIC AMERICAN office has become the factotum, or headquarters, to which everybody sends, who wants special information upon any particular subject. So large is the number of our correspondents, so wide the range of their inquiries, so desirous are we to meet their wants and supply correct information, that we are obliged to employ the constant assistance of a considerable staff of experienced writers, who have the requisite knowledge or access to the latest and best sources of information. For example, questions relating to steam engines, boilers, boats, locomotives, railways, etc., are considered and answered by a professional engineer of distinguished ability and extensive practical experience. Inquiries relating to electricity are answered by one of the most able and prominent practical electricians in this country. Astronomical queries by a practical astronomer. Chemical inquiries by one of our most eminent and experienced professors of chemistry; and so on through all the various departments. In this way we are enabled to answer the thousands of questions and furnish the large mass of information which these correspondence columns present. The large number of questions sent—they pour in upon us from all parts of the world—renders it impossible for us to publish all. The editor selects from the mass those that he thinks most likely to be of general interest to the readers of the SCIENTIFIC AMERICAN. These, with the replies, are printed; the remainder go into the waste basket. Many of the rejected questions are of a primitive or personal nature, which

should be answered by mail; in fact, hundreds of correspondents desire a special reply by post, but very few of them are thoughtful enough to inclose so much as a postage stamp. We could in many cases send a brief reply by mail if the writer were to inclose a small fee, a dollar or more, according to the nature or importance of the case. When we cannot furnish the information, the money is promptly returned to the sender.

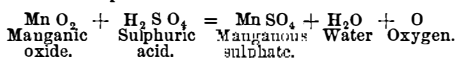
M. M. F. is informed that we could not recommend any steam engine or boiler as the most economical.—J. G. McC. is informed he can only ascertain the carrying capacity of his balloon by experiment. No rule for dimensions can be given. We know no manufacturer of the kind of balloon you refer to. See reply to C. E. L.

(1) C. L. asks: 1. Can salt or sea water be so filtered through a sand beach that a well dug from one to two hundred feet from the seashore will contain fresh water from the filtration of the sea? A. The salt cannot be removed from sea water by filtration. Land springs are sometimes struck close to the seashore, which leads to the delusion. 2. Can water containing coloring matter in solution be purified by filtration through sand or other material? A. The organic coloring matters in water are usually destroyed or removed, completely or in great part, by filtration through sandy soils, and contact with various rocks and minerals, but the complete purification of the water by these means depends much on the nature of the coloring matter and the degree of colorization. Granular animal charcoal readily deprives most liquids of organic coloring matters when they are allowed to filter slowly through it.

(2) W. H. C. asks if beef will keep fresh and sweet treated with acetate of soda? A. The process is an excellent one. See answer to W. E. S., on p. 43 present volume of the SCIENTIFIC AMERICAN.

(3) D. W. R. asks: What kind of potash is used in melting brass? A. Potash is not used to melt brass, but the carbonates of potash and soda are sometimes used as a flux.

(4) B. K. D. asks: 1. When sulphuric acid is used with manganese, to obtain its oxygen, what is the appearance or condition of the remainder? A. When separated from the undecomposed manganese dioxide in the flask, manganese sulphate is of a light pink or rose color. 2. Is there any other method of obtaining the oxygen from manganese than by mixing with sulphuric acid? If so, will you please inform me of the least expensive method? A. Oxygen may also be obtained from the oxide by strongly heating it in an iron retort in a good furnace. 3. Can you inform me how much sulphuric acid is required to free the oxygen from 10 lbs. manganese? A. For the complete decomposition of 10 lbs. of the pure dioxide, about 11.35 lbs. of sulphuric acid (specific gravity=1.8) will be requisite, but it will be better to use an excess of the acid. These amounts will give you, if the action is completed, about 18 cubic feet of gas. 4. What are the other ingredients, or component parts of manganese, and what is the proportion? A. Manganese proper (Mn) is a metal, manganese dioxide, commonly called manganese, being a combination of that element with oxygen—(Mn O₂). The proportions are: Manganese, 54.8; oxygen 32.0. With hot sulphuric acid the reaction is:



(5) F. A. L. asks: Can you tell me how to remove ink stains from white marble? The ink is black French ink, and has been spilled on a white marble mantle. A. Try a strong aqueous solution of pyrophosphate of soda. If this fails, try a solution of a few drops of spirits of niter in a spoonful of water; apply with a feather, and wash well afterwards with water.

(6) I. H. E. says: Will you inform me how to melt and mould rubber? A. Rubber cannot be melted by heat without partial decomposition. The gum rubber (caoutchouc) may be softened by boiling water so as to admit of being worked or moulded as desired. After working, the rubber is caused to combine with a small per cent of sulphur, which vulcanizes it.

(7) A. K. S. says: Can you give me a recipe for making cement, one that will hold machine belts together? A. See SCIENTIFIC AMERICAN, p. 171, vol. 35. This composition is soluble in naphtha or benzole, and the addition of a little naphtha solution of caoutchouc is said to improve it.

(8) R. L. asks how red mottled soap is made? A. The mottled appearance is produced by the addition of a small quantity of an iron salt—usually copperas.

(9) J. H. C. asks: How can a strong solution of laundry starch and water be clarified, and the starchy taste removed, without destroying its gelatinous properties? A. If we understand you, this may be accomplished by boiling the starch for half an hour with a slight excess of water, and straining the paste while hot. If starch is boiled for some time with dilute sulphuric acid, it is converted first into gum (dextrin) and then into grape sugar, which may be separated from the acid by precipitating the latter with chalk.

(10) W. M. asks for a cement that will unite parchment paper, and will stand hot and cold water and not lose any of its adhesive properties? A. Mix ordinary glue with about 3 per cent of potassium or ammonium dichromate in the dark. This may be used on the paper, and after exposure to light becomes perfectly insoluble in boiling water. This glue has been very largely used in Germany for joining the parchment paper envelopes of pea sausages. The strips of paper joined by this glue are dried quickly and exposed to light till the glue changes to a brownish color; they are then boiled with water containing about 3 per cent of alum till all the excess of alkaline dichromate is extracted, and then washed in water and dried.

(11) J. B. & Co. ask: Is there any way that the aniline colors red and blue can be mixed with varnish for japanning metal, or with oil to be used as paint? A. Many of the clear varnishes and oils may be colored directly with some of the aniline dyes by mixing the coloring material with the solvent used. These dyes do not hold their colors very well at high temperatures.

(12) F. W. H. A. says: I cut down some trees in my garden last year, and wishing to get rid of the stumps without digging up the ground, I followed your recommendation, by boring holes 12 inches deep in them, pouring in about a pint of sulphuric acid, and plugging. This was done both in fall and spring, but, notwithstanding, shoots are coming up from the roots (and stems a little below the surface) of all the trees. Can you suggest a cause and a remedy? The trees are (or were) fig, lilac and elder, and they seem to care as little for the sulphuric acid as "Dan'l" did for "them ere lions." A. The sulphuric acid treatment referred to was recommended by one of our agricultural contemporaries presumably well informed in the matter. We had not tried the experiment, but it would seem reasonable to suppose that if a sufficient quantity of the acid were used in the proper manner, it might effectually destroy the vitality of the roots. To our knowledge the surest method of getting rid of stumps is by mechanical means, for which purpose there are a number of excellent devices in the market. It has been stated that the following method has been used with good success. In the top of the stump a number of holes, each capable of holding a pound or two of saltpeter (potassic nitrate) are bored, filled with the salt, and during the latter part of the fall kept full of water, which will dissolve the salt, and the solution formed gradually passes into the roots. In the early spring the same holes are to be filled for a week or two with kerosene oil, and finally the oil-soaked stump set fire to, when the combustion will proceed, aided by the oxygen of the niter, until the greater part of the roots are consumed, after the manner of a slow match. How far this may be matter of fact we are unable to say, but the experiment is perhaps worth trying.

(13) J. P. T. asks for a recipe for white metal that will melt at a low heat? A. An alloy of bismuth 8 parts, lead 5 parts, tin 3 parts, will melt below 212° Fahr. Bismuth 2 parts, lead 5 parts, tin 3 parts, is said to melt in boiling water. Lead 3 parts, tin 2 parts, bismuth 5 parts, melts at 197°.

(14) H. E. asks for a recipe for manufacturing a good article of paste shoe-blackening at a moderate cost? A. Consult "Cooley's Cyclopaedia of Practical Recipes," published by Lindsay and Blackiston, Philadelphia. You can judge of cost by consulting dealers in the articles you require.

(15) F. N. B. asks: 1. How can I black the inside of a tin telescope tube so that it will not rub off or retain dust? A. Thin shellac varnish and lampblack will do. It must be a dull, dead black surface. 2. How tight should a 2 3/4 inch achromatic object glass fit in a tin cell? A. Not so tight as to bend or break the lens.

(16) W. B. asks for a cheap method of galvanizing iron? A. The iron is first cleaned bright by being kept for a time in sulphuric acid, then dipped in muriate of zinc, and then plunged in a bath of molten zinc.

(17) E. K. says: Can you give me the name of parties publishing a directory that gives the address of all the foundrymen in the United States and Canada? A. We know of no such directory.

(18) E. A. and others, who ask about carbolic soap: Take freshly prepared cocoanut oil soap 150 parts, and fuse; then add a solution of alcohol 10 parts, carbolic acid 6 parts, caustic potassa 2 parts, oil of lemon 1 part. Mix with stirring, and pour into moulds.

(19) W. E. asks: Will you please give me the mode of preparing the peroxide of hydrogen? A. It is prepared by decomposing the peroxide of barium with as much very cold solution of hydrofluoric or phosphoric acid as will exactly saturate the base. The baryta salt then precipitates, leaving the hydrogen peroxide dissolved in the water. The filtered solution is then concentrated in vacuo by the aid of the absorbing power of strong sulphuric acid in an adjoining connected vessel.

(20) F. S. T. asks: What is the best method for cleansing kid gloves? A. Put them together with a sufficient quantity of pure benzene in a large stoppered vessel, and shake the whole occasionally with alternate rest. If on removing the gloves there remain any spots, rub them out with a soft cloth moistened with ether or benzole. Dry the gloves by exposure to the air, and then place smoothly between glass plates at the temperature of boiling water until the last traces of benzene are expelled. They may then be folded and pressed between paper with a warm iron. Another way is to use a strong solution of pure soap in hot milk beaten up with the yolk of one egg to a pint of the solution. Put the glove on the hand and rub it gently with the paste, to which a little ether may be added, then carefully lay by to dry. White gloves are not discolored by this treatment, and the leather will be made thereby clean and soft as when new.

(21) P. J. K. asks: Is there any way of drilling a small hole in glass? I wish to suspend a pane of glass by means of a thread or fine string. I have broken a large amount of glass in trying to bore a small hole in it, but have not succeeded. A. Use turpentine, and take care when the drill is about to break its way through the glass as the hole is finished.

(22) E. C. H. says: You answer that my difficulty in pouring Babbitt metal boxes is in the vent; this is not the case, as I have left one side of the box entirely open, and then I failed to get the box solid, the metal seeming to chill too quickly. A. Try heating the shaft and boxes, and give good ventilation. Are the wrinkles or ridges that are rolled in tinware intended to beautify or make more firm the vessel, or are both these objects intended? A. The principal use is to strengthen the vessels; although sometimes ornamentation is only desired.

Is an oscillating engine properly constructed as good as one with guides, connecting rod, etc., for all purposes? A. One great defect is that there is more wear in the parts of the oscillating as usually made, than in the reciprocating. Where flat surfaces work upon each other with circular strokes, trouble is experienced in keeping them to wear equally, and consequently to keep them packed steamtight.

Can the edge of a razor, whetted to the keenest edge, be magnified? A. We presume it could be magnified.

(23) J. M. says: I have several small pieces of walnut 1/4 inch in thickness, which have become warped. How can I make them recover and retain their proper shape? A. Steam them so as to soften them, then fasten them in the position which you wish them to retain.

(24) H. B. P. asks: Can you inform me whether you published during the Centennial any account of the Vienna model bakery and their processes? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 60, p. 953.

(25) E. L. M. says: A friend claims it will take no stronger dam to hold a pond of 100 acres, 10 feet deep, than one of 1 acre, 10 feet deep. I claim that the larger the pond the greater the pressure, but it presses in all directions and the dam has a pressure on it, more or less, according to its length, supposing it to be the same depth in every place in both cases. A. Your friend is right, you are wrong.

He claims that gold sinks in quicksilver because the silver adheres to it. I say it is because the gold is heaviest. A. You are right.

(26) H. W. asks: 1. What kind of wheel and stone does the scissor and razor grinder use? A. Any free cutting grindstone will answer. The diameter from 4 to 12 inches is generally used, and from 2 to 4 inches thick. 2. What kind of an oilstone to finish the razors? A. You can obtain suitable oilstones from dealers. 3. The name of a good book for the amateur machinist and jobber? A. Address H. C. Baird & Co., 810 Walnut street, Philadelphia, Pa.

(27) B. A. W. asks how to make shellac varnish? A. Take shellac, any quantity, put it in a glass jar or tin vessel, and add alcohol to just cover the shellac. Set in a warm place, beside a stove or even in the sunshine, and in two or three days it is fit for use. If too thick add alcohol. It is not necessary to strain, as impurities will settle to the bottom of the vessel. Keep covered to keep out dust. If closely corked, evaporation of the alcohol will be very small. It can be used for wood, brass, iron, paper, etc. Experience will determine the proper thickness of the varnish.

(28) I. F. B. asks how to make straw board impervious to water? A. Try soaking in linseed oil and then cover with repeated coats of varnish.

(29) W. E. B. A. Co. says: Can you tell us how to cut off iron rods in a more economical way than by means of a cold chisel and filing to length? A. If you have an engine lathe in your factory, run a circular saw, at a proper speed, between centers, arrange some method to hold the rods in the tool post, and cut them to gauge the proper length.

(30) H. C. McG. asks: Which way is the torpedo most destructive? Does it blow the vessel out of the water, burst it in pieces, or blow holes in the bottom? A. The torpedo, upon being exploded in contact with the side of the vessel, is intended to burst a hole in the hull and thus sink her.

(31) G. E. S. asks: How are glass water gauges cut off to proper lengths without breaking? A. One method employed by mechanics is to break off the end of a round file, say 1/4 inch, so as to obtain a sharp edge, then with it scratch a circle on the inside of the gauge, at the proper length, and it will readily snap off where the scratch is made.

(32) V. A. S. asks for a recipe for making tooth paste? A. Take sugar of milk 100 parts, pure tannin 15 parts, lake 10 parts, oils of mint, aniseed, and orange flowers, sufficient quantity. Rub together the lake and tannin, gradually add the sugar of milk, and then the oils.

(33) H. G. H. asks for a recipe for making boot blacking. A. Ivory black 1 part, molasses 3/4 part, sweet oil 1/2 part. Mix and stir in hydrochloric acid 1/2 part, and oil of vitriol 1/4 part. Dilute the acid with twice its weight of water before mixing. Another recipe is to take ivory black 4 lbs., molasses 2 lbs., sweet oil 1 lb., oil of vitriol 8 lbs. Mix and put in boxes.

(34) E. R.—The material of which you ask information is chloride of silver, and when found native is called horn silver. It is procured as a dense white flocculent precipitate on adding hydrochloric acid or the solution of any chloride to a soluble salt of silver.

(35) G. W.—The disease and remedy may depend much on the physiological condition of the individual. Apply to your family physician.

(36) F. W. F. says: Send me instructions for the building of a cheap single scull shell to be made of canvas. Length about 18 feet. A. See Nos. 25, 26, 29, 30, 32, 36, 37, 39, and 42 of the SCIENTIFIC AMERICAN SUPPLEMENT, which give illustrations, descriptions, and proportions of boats. As your query is very indefinite, we can give no exact rules for your guidance. We presume a perusal of the papers referred to will give suitable instruction.

(37) D. H. asks: How is citric acid manufactured? What machinery is required to operate a factory on a small scale? A. Citric acid is generally manufactured from lemon juice, which is imported in a concentrated state, produced by evaporation by a gentle heat. It consists of citric acid 6 to 7 per cent, alcohol 5 to 6, and the remainder water, inorganic salts, etc. By some manufacturers it is allowed to partially ferment for the purpose of evaporating the clear liquor from the mucilage, or it may be clarified in the usual method by the use of albumen in the form of the white of an egg. Carbonate of lime in fine powder is then gradually added, and stirred in so long as effervescence continues. Citrate of lime forms, and after being separated by drawing off the watery liquor is well washed with warm water. It is then intimately mixed with strong sulphuric acid diluted with 6 parts of water. After some hours the citrate is decomposed, the sulphuric acid having taken up the lime and formed an insoluble sulphate, settling the citric acid free. This, separated by decanting and filtering, is evaporated in leaden pans till it attains the specific gravity 1.13. The evaporation is afterward continued by a water or steam bath till the liquor begins to be syrupy, or to be covered with a thin pellicle. It is then removed from the fire, and put aside to crystallize, the mother liquor after a few days be-