

Business and Personal.

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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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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.

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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 206.

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.

Notes & Queries

(1) T. M. S. asks how "tube white" in artist colors, is made? A. Precipitate a solution (in water) of barium chloride by addition of dilute sulphuric acid in excess. Decant the liquid after the precipitate has subsided, wash the precipitate well with water, dry it, and finally grind it with a small quantity of fine oil.

Please give me a recipe for waterproofing a blanket? A. Boil 4 1/2 ozs. of white soap in 2 1/2 gallons of water, and separately dissolve 5 1/2 ozs. of alum in 2 1/2 gallons of water. Heat these two solutions to 190° Fah. and pass the goods once through the soap bath, and afterwards through the alum solution. Lastly, dry it in the open air. The alum causes the precipitation of an insoluble alum soap within the fiber.

(2) R. J. says: Will powdered coke cemented together do for the carbon rod in a Leclanché cell? What kind of cement shall I use? A. The carbon is ground fine, mixed with gas tar, pressed into form, and baked at a strong heat. The pores are filled by dipping in the tar (sometimes molasses is used in place of the tar) and rebaking. This is often repeated 4 or 5 times.

(3) L. J. asks: What will take out the stain left by common gunpowder, where it has been blown into the skin? A. It can often be removed by blistering the parts, but this is painful, and does not always succeed.

(4) G. S. says: 1. The conductivity of copper is said to be 100, that of iron about 16 per cent. Does that mean that a wire of iron, six times as large as copper wire, offers the same resistance (to electricity) as the copper wire? A. Yes. 2. Would dipping common fence wire into hot coal tar protect the wire from rust? A. Yes, for a time; depending on the conditions of exposure, etc. 3. Would the tar impair the conducting qualities of the wire? A. No. 4. I wish to prepare two miles of wire for telegraphing. What is best to protect it from rust? A. Coat with boiled oil or good asphaltum dissolved in naphtha or turpentine.

(5) T. A. J. asks for a recipe to clean ivory knife handles that have become colored by use? A. Try bisulphide of carbon and whiting or pipe clay.

Also a recipe to make solder for a Britannia teapot? A. Tin, 8 parts; lead, 4 parts; bismuth, 1 part. Melt at a moderate heat and run into bars.

(6) T. J. P. asks if rubber hose burned in a firebox is injurious to the steel or iron of which it is made, as in a fire engine for generating steam quick? A. Yes, the sulphur it contains will corrode the metal. Unvulcanized rubber would not prove injurious.

(7) W. E. asks: 1. What is the Jablockhoff electric candle? A. See No. 22, p. 339, vol. 36, of the SCIENTIFIC AMERICAN. 2. Does it require a battery? A. The candle is supplied with electricity from a powerful galvanic battery or magneto-electric machine.

What is kaolin? A. Kaolin is a pure white clay—such as is used in the manufacture of porcelain ware.

(8) W. B. K. asks: 1. Does the solution of 1 lb. of tungstate of soda in 3 gallons of warm water prevent wood from decaying as well as render it fireproof? A. Yes, to a certain extent, if properly applied. 2. If not, what will prevent the decay of beams, joists, etc., in buildings? A. Solutions of zinc chloride, sodium sulphate, water glass, pyroligneous acid, carbolic acid, and corrosive sublimate have been used. The latter is poisonous. 3. Is the tungstate of soda solution simply to be applied with a brush? A. It is better to saturate the wood as far as may be with it—it should be used hot. 4. If so, will you inform me how to estimate the cost both of material and labor in rendering all the wood fireproof that would be required in building a large wooden house? A. You can best determine this by experiment—it will probably require not less than a pound for every hundred square feet of surface. 5. If the solution applied as a wash is not sufficient for the purpose, how long should the wood lie in a bath of the same? A. If the wood were dry and the solution hot, ordinarily half an hour would suffice. 6. Is there any firm in the country, to your knowledge, from whom fireproof wood can be purchased? A. We do not know of such a firm. 7. Which is the better way of making black mortar for brickwork, to use anthracite coal dust instead of sand, or to mix a sufficient quantity of ivory black with the sand? A. The latter. 8. Which stone trims the walls of a large country house built of pressed brick, to better effect, the brown stone so common here, New York, or the light yellow stone? A. This is a matter of taste. The brown stone is, we believe, generally preferred.

(9) G. A. P. asks: 1. How can I make a good electric light by means of a galvanic battery? A. Connect fifty or sixty quart cells (of a Bunsen or Grove description) in series—that is, the carbon or platinum pole of one to the zinc of the next, and so on. Bring the conducting wires—one from the free pole at each end of the series of elements—to the lamp. This may be of the kind known as "Jablockhoff's candle" (described on p. 339, SCIENTIFIC AMERICAN, vol. 36). When the wires are properly connected to the lower ends of the carbons in the candle, and a small pea of carbon or lead is thrown between the upper ends of the same so as to establish communication, the current passes, and the electric arc appears—the lead or carbon being burned. 2. How many batteries would I need, and what would be the cost? A. About sixty large-sized carbon cells, costing about 75 dollars. 3. In making an electric light, would I have to have an induction coil? A. No. 4. Also how calcium lights are made? A. Oxygen and hydrogen—or coal gas—are caused to mingle in a very small, stout chamber, situated near the tip of a suitably curved jet. The mixed gases, as they issue from the jet, are ignited, and the flame caused to impinge upon a small cylinder of hard lime, which thereby becomes heated to incandescence. The gases are kept under pressure in large rubber bags or iron cylinders, and are conducted thence separately by rubber tubing to the jet. 5. How much would one cost? A. The cost of apparatus for the light is about fifty or sixty dollars.

(10) S. L. C. asks how to make parchment paper? A. Strong unsized paper is immersed for a few seconds in oil of vitriol diluted with half its volume of water. It is then washed in pure water or weak ammonia water. The acid solution must not be warmer than the surrounding atmosphere.

(11) J. C. G. asks: Is the accumulation of carbonic oxide gas, in wells, sudden or gradual? A. Gradual.

(12) P. McG.—The scale insect infesting the orange trees of Florida seems to be *Aspidiotus citri-*

cola. For information on orange blight in Florida see Packard's "Guide to the Study of Insects."

(13) E. G. asks for a recipe for preparing wax for modeling? A. Mix lard with white wax to make it malleable. It may be colored any desirable tint with dry color. In working, the tools and board or stone should be moistened with water to prevent its adhering.

(14) W. T. R. asks: 1. Whether the offensive odor, in the spring of the year, arising from the ailanthus tree is detrimental to health? A. Such has not proved to be the case. 2. What is the best season of the year to destroy the tree? A. It is a difficult matter to destroy them completely at any time; perhaps the latter part of October would prove most favorable.

(15) P. M. B. asks: What is the cheapest application or process to retain the polish on steel plates in a damp room? A. Oil or a thin transparent varnish is often used. The polished surfaces on machinery, stored or in disuse, are often protected by coating them with a mixture of tallow and white lead.

(16) J. J. asks: 1. Which is the most improved magneto-electrical machine? A. Probably the Gramme machine. 2. Where can I get a full description and illustration of the same? A. See pp. 181, 195, vol. 34, SCIENTIFIC AMERICAN, and No. 17 of SCIENTIFIC AMERICAN SUPPLEMENT. 3. When was it patented? A. We believe the first patents were secured in the year 1873. 4. How large a machine would it require to completely decompose one gallon of water in five hours? A. One using about thirty horse power would probably do this, the water being acidulated. 5. How does acidulated water compare with pure water for this purpose? A. Acidulated water is generally used; its electrical conductivity is very much greater than that of pure water. 6. How many revolutions per minute does it require to obtain the best possible results and the most powerful current? A. This depends on the size of the machine. Usually with as great a velocity as compatible with the safety of its parts. With the two or three horse power machines about 250 revolutions per minute give good results. 7. Upon what conditions does the efficiency of a magneto-electrical machine depend? A. When properly constructed, mainly upon the rapidity with which the bobbin wires pass through the magnetic field, the number, size, and arrangement of the bobbin wires, and the power of the magnet.

(17) R. E. R. asks for a cement for aquariums? A. Take 10 parts, by measure, of litharge, 10 parts of plaster of Paris, 10 parts dry white sand, 1 part finely powdered rosin, and mix them when wanted for use into a stiff putty with boiled linseed oil. This will stick to wood, stone, metal, or glass, and hardens under water. Do not use the tank until three or four days after it has been cemented.

(18) C. A. R. says: In a discussion on optics the question was asked why we could not see through fog. A. said it was on account of polarization of light. B. said it was because the top part of the fog up in the air acted like a mirror and reflected the rays of the sun. C. said it was refraction, that is, the fog was a prism, and bent the ray so we could not see, being able to see only in straight line. A. A. has the correct idea.

(19) J. B. F. asks for a recipe for making koumiss? A. As made by the Calmuck Tartars, mare's milk is distilled as it is undergoing fermentation.

(20) C. P. W. asks: Is there anything cheaper than alcohol that could be successfully used in a common blowpipe lamp? A. No.

(21) J. H. asks what greenheart wood is, such as fishing poles are made of? A. Greenheart is a tree belonging to the laurel family. It is found in the West India Islands and in parts of South America. The value of the wood is in great strength and hardness.

(22) A. I. asks how to anneal old saw blades? A. Heat carefully in a forge, fire to a dull red heat, and while hot immerse in wood ashes or air-slacked lime until cold.

(23) J. B. S. asks for a preparation for polishing turned work in the lathe; says he has used bleached shellac and sweet oil, but it takes too many applications and time to produce the desired finish. A. Dissolve gum sandarach in alcohol in proportion of 1 oz. of the gum to 1/2 pint of alcohol. Shave fine in 1 oz. of beeswax and dissolve in turpentine sufficient to make a paste. Add to the dissolved sandarach. To use, apply with a woolen cloth to the work while running in the lathe, and polish with a soft linen rag.

(24) H. C. B. asks what to use to stop the smokestack of a portable engine that is exposed to the weather, to prevent its rusting? A. Dissolve asphaltum in turpentine with the application of a gentle heat. Use when cold. Apply with a brush.

(25) I. W. D. asks how to thin printing ink so as to distribute even on pads? A. Mix with boiled linseed oil or common kerosene and grind with a muller or a pallet knife on a painter's slab.

(26) W. T. B. asks: Will it hurt a steam boiler to use corn cobs for fuel? A. No.

(27) E. O. K. asks for a method of coloring wall plastering before it is put on the wall? A. Wet the coloring material, if in powder, with alcohol, then mix with the water with which the mortar is made.

(28) J. D. B. asks: Shall I use nitric or sulphuric ether to dissolve rubber? A. Ethylic—commonly called sulphuric—ether is the kind. To be of use as a solvent for gum rubber (it does not dissolve vulcanized rubber) it must be quite free from alcohol and water. Ether of requisite purity is often difficult to procure. Pure ether boils readily at the temperature of the hand.

(29) L. A. B. asks: What time of the year is best to cut branches to make rustic work? A. Late in the autumn.

(30) E. B. asks: How is it that opticians will give eyepieces with telescopes warranted to magnify 100 or 150 diameters, when the magnifying power of

a telescope varies with every object whose distance varies? A. Opticians do not usually focus their telescopes on objects to determine their focal length. Whenever they do, it is on a small star; this is the nearest to parallel light and may be considered as such. The focal length of a telescopic objective is computed for light entering parallel; it is in this condition that the eyepiece is said to have a certain magnifying power, but it is the combined magnifying power of both objective and eyepiece. Some use the dynamometer, which gives the magnifying power at once without being obliged to know the focal length of any of the lenses.

(31) W. J. R. asks: Is a circular saw, made for sawing logs into lumber, made concave on one side? A. No.

(32) R. I. T. asks for a process for refining beeswax, and how to tell pure wax from the adulterated? A. Melt the wax with a little water in a vessel heated in a water bath or by steam, and after boiling a few minutes withdraw the heat and sprinkle over its surface 3 or 4 fluid ozs. of oil of vitriol to every 100 lbs. of wax. Care must be exercised in applying the acid, as the wax is liable to froth up and run over the sides of the vessel. Cover over and leave for two or three hours to settle. Carefully skim and decant the clear portion. Pure beeswax burns without smoke or smell. Its complete solution in bisulphide of carbon and benzine demonstrates its freedom from sulphur, sawdust, or bone dust. Spermaceti may be detected by the wax bending before it breaks, and by its flavor when chewed. Rosin may also be detected by the taste. When greasy matter is present in any considerable quantity it may be detected by an unctuous feel and by a disagreeable taste. Chalk, plaster, etc., will subside to the bottom of the vessel when the wax is melted, owing to their superior gravity.

(33) W. F. T. asks how to prepare glue to use cold, also what can be added to make glue pliable when dry? A. Prepare the glue with alcohol and acetic acid instead of water. To make glue pliable and glycerin or molasses.

(34) J. N. S. W. asks (1) for a method of straightening a rifle barrel? A. Gun barrels before they are rifled are straightened by observing peculiar shadow lines in the interior of the barrel, which are a guide to the workman. After the barrel is rifled, these lines cannot be seen. Some gunsmiths draw a fine black silk thread through the barrel and observe if it touches the barrel alike through the interior. 2. How to blue parts of a gun, such as the lockplate, etc.? A. To blue the parts of a gun, first polish the parts and then burnish them with a steel burnisher. Put them in an iron box containing powdered charcoal or wood ashes and heat over a forge fire until by observation the parts are of the desired color, then remove and let them cool.

(35) J. B. I. asks how to cut a lamp chimney lengthwise? A. If the shape of the chimney precludes the use of a diamond, a small thin copper wheel, such as used by glass engravers, charged with sharp gritted sand and water, will accomplish it.

(36) H. G. asks how to bronze gun barrels, also the best protection of guns from rust near the seashore? A. Mix 1 oz. each of nitric acid and sweet spirits of niter, 4 ozs. powdered blue vitriol, 2 ozs. tincture of iron, and water 1/2 pint. Agitate until dissolved. Polish the barrel and rub with powdered lime or whiting to remove all grease. Stop up breech and muzzle of the barrel with wooden plugs made long enough to handle the barrel by. Rub the solution on evenly and put in a warm place to dry until the next day, when rub off the coating produced by the solution with a wire brush. Repeat the process of wetting, drying, and rubbing off until the desired color is produced. When this is the case, wash in pearl ash water and then in clear water. The best protection for guns when exposed to the influence of a sea atmosphere is to rub them over with mercurial ointment.

(37) H. F. C. asks: Does it produce a physical or chemical change in a knife blade to magnetize it? A. No.

(38) E. P. L. asks: What is the method employed to detect bad eggs? A. Hold the eggs to the light, encircling them with the thumb and fingers. Good eggs show transparent, but the bad ones are opaque.

(39) W. & S. say: 1. We are engaged in the manufacture of cast steel mould boards for plows. In hardening them they often crack. What is the remedy? A. Over heating in forging will often cause steel to crack in hardening. Another trouble is hardening them in water that is too cold and having the steel at a high heat when so hardened. Careful forging in working use water that is a little warm in hardening are the remedies. 2. Can they be casehardened, and if so, how? A. Pack the work in an iron box, filling all the space around the work with fine bone dust, or burnt leather reduced to a powder. Be careful to press the bone dust or leather tightly around the work, and see that the surfaces of the work do not lie in contact. Cover the box and lute with clay so as to be tight. Heat in a brisk fire until the box and contents are heated to a red heat, and keep so for one quarter or one half hour, then remove the cover of the box and empty the contents into water. If too hard, the temper may be drawn in same manner as hardened steel.

(40) M. A. J. says: If a nut on an old bolt cannot be started with a wrench, cut into each side of the nut with a dull cold chisel, holding a sledge on the opposite side, and the cutting will stretch the nut enough so that it can be readily turned off.

(41) J. M. asks if there is any such thing as a mineral plumb, used by men prospecting for gold or silver? A. No.

(42) J. Q. R. asks for a rule for the standard horse power of steam boilers? A. There is no standard for the horse power of a boiler that is generally recognized by engineers.

(43) S. E. S. asks: 1. What mixture is used for making blackboards? A. Incorporate flour of emery or powdered pumicestone with shellac varnish, adding sufficient lampblack to give the required color. Ap-