

## ENGINEERING INVENTIONS.

A car coupling has been patented by Mr. John G. Ogden, of No. 46 Jackson Street, Chicago, Ill. The invention relates to means for automatically coupling and uncoupling railway cars without going between them, and to this end covers novel details of construction and arrangement of parts.

A car truck has been patented by Mr. Charles E. Candee, of New York city. The principal feature of the invention lies in the equalizing bars, which are fitted to swing so as to allow lateral motion of the truck frame independently of the wheels and axles, together with boxes of novel construction, and holders for the supporting springs, by which the springs are held upright in any position of the truck.

A car coupling has been patented by Mr. Frank D. Root, of Cortland, Ill. A drawhead is held in hangers, and has at its rear end a neck passed through the rear hanger, a large nut being screwed on the end of the neck; a spring is held in the transverse cavity in the free end of the drawhead, the spring acting on a tongue on the inner end of a coupling hook, pivoted in the outer end of the drawhead, the coupling hook being connected by a chain with a plate having a quadrant edge, and the plate secured on the lower end of a vertical shaft on the platform.

## AGRICULTURAL INVENTIONS.

A side hill sulky plow has been patented by Mr. Addison D. Sewell, of Colton, Washington Ter. It is made with two plows rigidly connected in reversed positions, and pivoted to a plow beam having a locking mechanism, there being a spiral spring on the beam, and a foot lever connected with the beam and the locking sleeve, whereby the plows will be locked automatically and can be readily released, with other novel features.

## MISCELLANEOUS INVENTIONS.

A machine for threading screws, bolts, and nuts, has been patented by Mr. Edmond P. Bavielle, of Brussels, Belgium. It is for threading screws in general, and especially screw bolts, and has for its object to impart to the manufacture greater rapidity, considerable economy, and greater accuracy. The universal adjustable cutting tool consists of a mere piece of flat steel bar, in one side of which are triangular or rectangular grooves, that may be cut on a planing machine, according to the thread to be made, this cutting tool allowing the pitch of the screw being varied at will; by means of its peculiar adjustment in the screw stock, this tool also cuts the thread on the cylindrical surface of the rod or stem without compressing the latter or squeezing it between the tools, the tool cutting as well at the heel as at the top of the thread. With the machine as preferably constructed, with four die stocks and four taps, it is said that eight to nine thousand bolts can be made in a day of ten hours.

A neck yoke clamp has been patented by Mr. Elihu Wolf, of North Vernon, Ind. This invention covers a novel construction and arrangement of parts constituting a clamp for holding a neck yoke on the end of a pole in such a manner that it can easily swing vertically and laterally on the end of the pole.

A fence wire strainer has been patented by Mr. Sydney W. Fulton, of West Taieri, near Dunedin, New Zealand. The invention consists of a ring or frame carrying two pairs of clamping jaws, and a wire straining shaft or roll disposed on side of the line of the jaws, with certain novel details of construction.

A tricycle has been patented by Mr. Carl G. E. Hennig, of Paterson, N. J. Combined with four pairs of treadles are two rocking arms, connected to the cranks of the axle by rods, two pairs of said treadles being connected to the axle, and the two other pairs of said treadles being connected to a tube arranged upon the axle, with other novel features.

An improvement in the construction of buildings has been patented by Mr. Richard S. Pearsall, of Sea Cliff, N. Y. This invention covers a special manner of construction, especially in the joining and mortising of the stuff, whereby a house may be made very strong and tight, and so that it can be easily, quickly, and cheaply built.

An automatic weighing scale has been patented by Mr. Henry C. Keeler, of Ogden, Utah Ter. This invention relates to scales having a revolving dial and a stationary pointer, so the record of the weight may always be seen at one place through a small glazed opening, instead of having to follow the pointer around its range, and covers several novel features of construction and arrangement.

A lifting device has been patented by Mr. Eugene Paul, of Norwich, N. Y. It may be made of wood or metal, and is for lifting heavy articles, such as logs, for sawing or loading, and combines, with legs and a center piece, a lifting lever held by links on the center piece and carrying a shackle, through which a toothed lifting bar passes, which latter also passes through a shackle on the top of the center piece.

A combined desk pad, portfolio, and calendar has been patented by Mr. William R. Cole, of Pottsville, Pa. The calendar is fixed to the head or top of the pad, and has a roller indicating the months and days of the month, and another indicating the days of the week, the days showing through slots in the calendar case, and the portfolio being fixed to the back of the pad.

Improved suspenders form the subject of a patent issued to Mr. Frank E. Flagg, of New York city. The end of the shoulder strap has a cap with a tubular socket to receive a rubber rod, upon which is a regulator to which the suspender ends are attached, and which is made with a tubular aperture smaller than the rod, whereby the rod is securely connected with the shoulder strap, and the regulator can be readily adjusted and held in place.

A measuring, sacking, and registering attachment for grain separators has been patented by Mr. James Forrest, of Grand Forks, Dakota Ter. This invention consists in a peculiar construction and combination of parts to facilitate the work for which it is designed, and so the grain will all the time be covered during its passage from the discharge spout of the separator to the sacks, and thus kept clean from chaff, dust, straw, etc.

A shirt and necktie fastener has been patented by Mr. Sigmund Fechtmeier, of New York city. By this improved device the shirt, scarf, or necktie, and fastener, are all combined and connected to make of the whole one article, dispensing with studs or buttons for closing the shirt in front, and the device at the same time serving to form an ornamental clasp for the ends of the tie or scarf at the neck, or other points down the bosom of the shirt.

A handle for pot and other covers has been patented by Mr. George E. Palmer, of Horseheads, N. Y. This invention relates to ring or loop-shaped handles, and covers a novel construction and means of attaching it to the cover; it may be held in its place without solder, and when attached and in use will always occupy an upright position, thereby keeping comparatively cool when applied as a handle to a stove or other pot cover.

A street lamp has been patented by Mr. George Schuette, of Manitowoc, Wis. The invention covers an elevator contrivance within a hollow lamp post for suspending an oil lamp, and arrangement for lowering the lamp to an opening in the side of the post for filling and trimming the lamp without climbing, all contrived for great convenience in the care taking, for protection from snow and ice, and from wanton abuse.

A two wheeled vehicle has been patented by Messrs. Ruben F. Taliaferro and Edward P. Mitchell, of Hueneme, Cal. Spring holders, clipped or otherwise, are secured upon the axle, and to these holders, at their rear ends, are pivoted the inner ends of bars secured to the under side of the shafts and extending backward beneath the axle, with other novel features, for so attaching the shafts that they can be raised or lowered, and the axle with the springs kept plumb.

A fire escape has been patented by Mr. Lewis B. McDonald, of Little Rock, Ark. This invention combines, with a bifurcated L-shaped rod pivoted to the floor and window sill, a rope pulley or drum pivoted between and in the prongs of the rod, with other special features, to enable the safe descent of a person escaping from a burning building, and to cause the automatic recoiling of the rope to permit the descent of another person.

A damper has been patented by Messrs. David Manuel, of Hyde Park, and George H. Burrows, of Boston, Mass. This invention covers two disks, flat at their central portion and concavo-convex at their outer portions, with openings through the outer portions, so an annular chamber can be formed between them, and the openings will alternate with each other, so that the ascending air and products of combustion may be sufficiently retarded to insure perfect combustion.

A water closet valve has been patented by Mr. Hermann C. Apel, of Milwaukee, Wis. Combined with a piston working in a cylinder and forming a valve is a lever for pressing down the piston, and an inlet for admitting water into the bottom of the cylinder to raise the piston valve, which is fitted in an inner cylinder with its seat depending in an outer cylinder, the seat being slightly elevated above the upper end of the inner cylinder, with other novel features.

An axle box and skein has been patented by Messrs. Lawrence Bimel and William Bimel, of St. Mary's, O. This invention relates to thimble skeins employed in connection with wooden axles of wagons and other vehicles, insuring the continuous oiling of the axle for a long time, and permitting of the ready application of a fresh supply of oil without removing the wheel from the axle, the bearing of the axle being protected at both ends from sand and mud, so that it will run with the minimum of wear.

A boot or shoe ventilator has been patented by Mr. Adoniram J. Trask, of Nobleborough, Me. A flexible bulb in a cavity at the heel is combined with an insole which has an aperture above and in line with the bulb, whereby the latter communicates by a tube with the inside of the boot or shoe, and by a second tube with the external air, the tubes having valves, so the bulb is alternately compressed and expanded, and air is forced into the shoe by the action of walking.

A steam radiator forms the subject of two patents issued to Messrs. Juan B. Arci and John Chapman, of Brooklyn, N. Y. These inventions relate to radiators where circulating pipes are used, communicating at their ends with upper and lower chambers, and embrace such construction of the chambers and tubes that the latter are adapted to reach through the chambers, to receive nuts or caps at their outer ends, and so the tubes and chambers may be joined together, forming the radiator complete without any extra fitting of the parts.

## NEW BOOKS AND PUBLICATIONS.

PICTURESQUE CALIFORNIA HOMES. S. & J. O. Hewson, architects, San Francisco, Cal.

This is a series of some forty folio plates representing both the elevation and plans of dwelling houses erected on the Pacific coast, costing from \$700 to \$15,000. Not only the dimensions of the different houses are given, but the size of each room, hall, and closet, and also detail drawings of the ornamental woodwork specified in the agreement. Forms of builder's contract, with full specifications, covering all work from the foundation walls to the speaking tubes, electric bells, and gas fittings, accompany the plates. To persons about to build in the country, this series of plates will be found useful.

## Business and Personal.

The charge for insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Pocket Implement—Auguste Stoner patentee, 1875. His present address desired. Address Screw-driver, Box 773, N. Y. city.

Lane's Patent Self-measuring Faucets for molasses, oil, varnish, etc. Lane Bros., Box 276, Poughkeepsie, N. Y. Seaming and Looping Machines, Patent Burr Wheels, Brushing Machines. Tubbs & Humphreys, Drawer 1637, Cohoes, N. Y.

The Providence Steam Engine Co., of Providence, R. I., are the sole builders of "The Improved Greene Engine."

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Stephens' Pat. Bench Vises and Planer Chucks. See adv., p. 76.

For sale.—Large Air Compressor, 24" x 24" air cylinder; steam cylinder, 18" x 24"; coupled to one shaft, with cranks at right angles; also has 10" band, wheel 16" face. Good as new. Will be sold very low. Address Henry I. Snell, 135 N. 3d St., Philadelphia, Pa.

Clark's Rubber Wheels. See adv., page 78.

Wanted.—Address of parties furnishing supplies and machinery for umbrella manufacturers, M. Nial, 883 River Street, Troy, N. Y.

Nickel Plated Steel Pocket Tool by mail for five 2 cent stamps. R. S. Co., Trenton, Mich.

Steam Engine, Corliss system, 10 inch cylinder, 24 stroke, used only a short time, for sale. Keuffel & Esser, New York.

Experimental Machinery Perfected, Machinery Patterns, Light Forgings, etc. Tolhurst Machine Works, Troy, N. Y.

Bermuda Scientific Collections. Naturalist, Box 3359, N. Y.

Snyder Engine Company, 12 Cortlandt St., N. Y. "Little Giant" Engines, 1 to 6 H. P. Also Boat Engines, Propeller Wheels, etc. Send stamp for 23 page list.

Wanted.—A first-class man to superintend a Sash, Blind, and Door Factory; outfitted with all late and improved machinery; working about one hundred hands. Must be sober, a good manager, and estimator on job work. To the right man a good salary and permanent employment will be given. Or I will sell a half interest in the above well established business. Address, with full particulars as to age, habits, qualifications, and recommendation, R. F. Learned, Natchez, Miss.

Walrus and Sea Lion Leather for Gun Rolls and Metal Polishing. Greene, Tweed & Co., N. Y.

Whistles, Injectors, Damper Regulators; guaranteed. Special C. O. D. prices. A. G. Brooks, 261 N. 3d St., Phila.

Brush Electric Arc Lights and Storage Batteries. Twenty thousand Arc Lights already sold. Our largest machine gives 65 Arc Lights with 45 horse power. Our Storage Battery is the only practical one in the market. Brush Electric Co., Cleveland, O.

The Cyclone Steam Flue Cleaner on 30 days' trial to reliable parties. Crescent Mfg. Co. Cleveland, O.

For Steam and Power Pumping Machinery of Single and Duplex Pattern, embracing boiler feed, fire and low pressure pumps, independent condensing outfits, vacuum, hydraulic, artesian, and deep well pumps, air compressors, address Geo. F. Blake Mfg. Co., 44 Washington St., Boston; 97 Liberty St., N. Y. Send for catalogue.

Stationary, Marine, Portable, and Locomotive Boilers a specialty. Lake Erie Boiler Works, Buffalo, N. Y.

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For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

Steam Boilers, Rotary Bleachers, Wrought Iron Turn Tables, Plate Iron Work. Tippet & Wood, Easton, Pa.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn. Send for Monthly Machinery List.

to the George Place Machinery Company, 121 Chambers and 103 Reade Streets, New York.

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN patent agency, 361 Broadway, New York.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Steam Pumping Machinery of every description. Send for catalogue.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. Complete outfit for plating, etc. Hanson & Van Winkle, Newark, N. J., and 32 and 34 Liberty St., New York.

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Supplement Catalogue.—Persons in pursuit of information of any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

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Catalogue of Books, 128 pages, for Engineers and Electricians, sent free. E. & F. N. Spon, 35 Murray Street, N. Y.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 62.

Agency wanted by M. E. to represent at Exposition, or on cotton, sugar, or rice plantations. Wm. N. Simmons, No. 817 Magazine St., N. O.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Emerson's *Book of Staves* free. Reduced prices for 1885. 50,000 Sawyers and Lumbermen. Address Emerson, Smith & Co., Limited, Beaver Falls, Pa.

Hoisting Engines, Friction Clutch Pulleys, Cut-off Couplings. D. Frisbie & Co., Philadelphia, Pa.

Wrought Iron Bridges, Roofs, Girders, and Structural Iron Work. Hudson Bridge Works, Box 411, Hudson, N. Y.

Barrel, Keg, Hoghead, Stave Mach'y. See adv. p. 78.

U. S. Standard Thread Cutting Lathe Tool. Pratt & Whitney Co., Hartford, Conn.

Catechism of the Locomotive, 625 pages, 250 engravings. Most accurate, complete, and easily understood book on the Locomotive. Price \$2.50. Send for catalogue of railroad books. The Railroad Gazette, 73 B'way, N. Y.

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All kinds of Steam and Water Packing. Greene, Tweed & Co., 118 Chambers St., N. Y.

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The Porter-Allen High Speed Steam Engine. Southwark Foundry & Mach. Co., 430 Washington Ave., Phil. Pa.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

## Notes &amp; Queries

## HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and though we endeavor to reply to all, either by letter or in this department, each must take his turn.

Special Information requests on matters of personal rather than general interest, and requests for Prompt Answers by Letter, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Minerals sent for examination should be distinctly marked or labeled.

(1) L. C. L.—Turtles are shipped from Cuba and Florida to New York by steamers. Will stand a voyage of a week or ten days. Require no attendance. Tie the flippers together, and lay on their backs. They are sent by rail in the same manner. Oysters are shipped from New York to Europe, and to all the neighboring States, by rail and boat. If for a short trip, say of less than two days, can be shoveled into perforated barrels and closed with bagging or in boxes with bagging for cover. If for distant places, pack them belly down and cover as above, which insures proper handling.

(2) R. K. T. writes: I would like to put reading matter on one side of a knife blade so it will not rub off. Could it be done with a rubber stamp, using an acid for ink? I am now making the blades of hot rolled steel, but would use cold rolled with a bright finish if the letters could be put on that finish to stay. A. Mark the blade with a rubber stamp and ink made by rubbing into a paste with a muller and stone, flower sulphur with linseed oil and a little vermilion for color. Make it as thick as printer's ink. Stamp the blades, and lay aside to dry. When the stamp wears off, the blade will be found marked by the sulphur.

(3) S. B. G.—Small toy balloons for use without gas are usually made of tissue paper with paste. The cutting of the shapes is an easy matter, which you should be able to study out yourself. Fire is the usual means for inflating with hot air. A hoop of fine wire at the mouth of the balloon to keep it from collapsing, with a small piece of sponge tied within the hoop with fine wire, is all that is required until ready for use; then saturate the sponge with a little alcohol or a mixture of alcohol and resin, and set it on fire; at the same time the balloon must be held up and spread out, so as not to take fire. A little practice will enable you to accomplish this.

(4) P. J. C. writes: A floor for a skating rink was deadened by a mixture of lime, earth, and saw dust, in the proportion of 1, 1, and 6, respectively. About one-sixth of it was covered by the first layer of the floor, and the mixture under this had lain over night before being put in place. The remainder was put in as fast as it was mixed. The night after it was put in, the building burned down. Granting that one-quarter of the lime was not slaked, could it have set fire to the building? A. You fail to tell us whether the lime, earth, and saw dust was mixed with water. If the lime was slaked by wetting with water, and then mixed with the other materials, there is no reason to believe that the fire was caused by the slaking of the lime. If, on the contrary, the lime was mixed with the other materials dry, and any of the mass left in a heap or even spread between flooring, spontaneous combustion might result from the air-slaking of the lime in contact with saw dust. Damp saw dust alone in a mass of no more than a cubic foot is liable to spontaneous combustion. We have experienced this phenomenon in a drawer of saw dust used for drying jewelry after washing.

(5) S. E. S.—Your description will answer for a boiler to carry 60 pounds steam. Should be tested with 125 pounds pressure. Steam has been used at 500 pounds pressure in an engine, and 1,000 pounds pressure in a steam gun. Such high pressures are generally impracticable. The steam is too hot for packings and lubrication.

(6) N. L. S.—Do you know of a wet process for the development of solar prints? A. The print is exposed in the solar camera until it assumes a lilac hue, which will be a few minutes at most. The image at this time will be just visible. The paper is now taken out and immersed in the following developing bath devised by Carey Lea:

Gallic acid.....6 grs.  
Acetate of lead.....3 grs.  
Rain water.....40 oz.

which is prepared as follows: Dissolve a drachm of gallic acid in four drachms of alcohol, and a drachm of acetate of lead in  $1\frac{3}{4}$  ounces of water. Take a drachm of the alcohol solution and  $1\frac{3}{4}$  drachms of the solution of acetate; add these to 100 ounces of water, and then drop in just enough glacial acetic acid to redissolve the slight precipitate of acetate of lead that falls. Several prints may be immersed in the bath at a time. Five or six minutes is required for development, which occurs in the dark room, and it must be stopped when prints appear perfect. Overprinting is not necessary, as the fixing bath improves the detail. After washing, the prints are immersed in a hypo bath.

Water.....20 oz.  
Hypo sulphite soda.....6 oz.  
Four minutes is sufficient for fixing; the prints are then thoroughly washed in running water; their color is reddish, but on drying changes to a beautiful deep brown.

(7) L. W. S. & S.—The liquid in hand grenades for extinguishing fires consists of sodium chloride, ammonium chloride, and hydrochloric acid dissolved in water, with the addition of potassium carbonate and subsequently sodium bicarbonate, and last of all a little free crystallized tartaric acid is added. The object of such a mixture is the generation of carbonic acid at the time of the fire, so that if you can arrange to have a solution of some carbonates, sodium or potassium, so placed that in the event of fire a free acid of some character can be brought in contact with the liquid, thereby generating the carbonic acid gas, your purpose will be accomplished.

(8) C. H. writes: I wish to know the proportions and manner of mixing lard and creamery butter to make "butterine" (not oleo). I wish to make some for experiment. A. We understand the manufacture of butterine to be similar to that of oleomargarine, and therefore refer you to illustrated articles on this subject in Nos. 48 and 49 of the SCIENTIFIC AMERICAN SUPPLEMENT. 2. Can the iron parts of furnace registers be jappanned and dried enough in a common stove oven so as not to smell a long time after putting in their place in the house floor? A. The heat required for jappanning is not very great. A common black japan may be made by painting a piece of work with drying oil and putting the work into a stove not too hot, but of such a degree as will change the oil black without burning it, gradually raising the heat to about 350° Fah., and keeping it up for a long time. This process requires no polishing.

(9) M. E. and H. G.—The best practice for laying up a boiler for winter is to thoroughly clean it outside and inside, by taking out all mud and scale; then fill up the boiler, and put from one-half to 1 gallon kerosene oil inside. Get up 10 or 15 pounds steam, draw the fires, and, if a locomotive or upright, blow out the entire contents. If set in brick, wait until the brick work cools enough to do no damage. Clean the flues and scrape all soot and ashes from the shell and smoke box, close every opening to boiler, and shut damper. To keep an engine that is idle, thoroughly oil with mixture of oil and tallow.

(10) G. K. G. asks for a recipe for genuine Haarlem oil. A. Take of

Balsam of sulphur.....3 pints.  
Barbados petroleum.....1 "  
Oil of amber (crude).....1½ "  
Linseed oil.....4 "  
Oil of turpentine.....8 "  
Mix.

(11) J. M. F. wants to get a formula for making a cheap baking powder. A. Take of  
Tartaric acid.....15 oz.  
Sodium bicarbonate.....16 "  
Starch.....16 "  
Ammonium carbonate.....2 "

Powder the articles separately (with the exception of ammon. carb.) and dry each thoroughly, then rub through a fine sieve until a uniform mixture is obtained, the ammonium carb. being reduced to a fine powder immediately before adding. The ammonium may also be left out, but its use favors the production of a finer and whiter bread than can be obtained without it.

(12) H. M. U. asks: How can sheets of iron and steel in a red hot condition be rolled together and not stick? What is the powder or liquid that will prevent adhesion? A. Use powdered plumbago.

(13) News asks us to publish some good recipe for making liquid glue. A. Ordinary glue 5 pounds is dissolved in water, contained in a vessel which may be heated by means of a water bath, care being taken to stir from time to time. When all the glue is melted, 1 pound of commercial nitric acid is gradually added in small quantities. This addition creates an effervescence and a disengagement of red nitrous fumes. When all the acid has been passed in, the vessel is withdrawn from the fire, and the contents left to cool. This glue may be kept for a long time even in uncorked vessels.

(14) C. G. C.—Your ring should first be coated with graphite for copper plating. Shellac would appear to be the proper article to make your wood floor adhere together, but we do not believe you can form it into any composition in which the wood will not be burnt out at 1,000° of heat.

(15) D. L. R. D. writes: I have broken the amber stem of a pipe that I value on account of its associations, and would rather repair it than replace it by a new piece if possible. Will you kindly let me know the receipt for a cement that will stand the heat, if there is one? A. Smear the parts which are to be united with linseed oil, hold the oiled part carefully over a small charcoal fire, a hot cinder, or a gaslight, being careful to cover up all the rest of the object loosely with paper; when the oiled parts have begun to feel the heat, so as to be sticky, punch or press them together, and hold them so until nearly cold; only that part where the threads are to be united must be warmed, and even that with care, lest the form or polish of the other parts should be disturbed; the part joined generally requires a little re-polishing.

(16) T. H. L.—Perhaps the following will answer for the cement you want: Guttapercha, 1 pound; India rubber, 4 ounces; pitch, 2 ounces; shellac, 1 ounce; linseed oil, 2 ounces; melted together. This cement hardens on keeping, and needs remelting before application.

(17) W. E. A.—Irrigation has become a saving means to prosperity in many parts of the Pacific coast. We recommend you by all means to make your location a study as to the ways and means for irrigation. Building dams or embankments, cutting canals and ditches, anything to hold the water back, and at last to pump water with wind mills. We cannot give specific details of what you should do in your particular case, from want of exact knowledge of the lay of the land and the facilities at hand for constructing the most economical works, but we recommend you to examine the irrigating works in your neighborhood, and also consult with an engineer making this branch a specialty.

(18) J. S. C. asks: How can a gun barrel be blued—not browned? A. Polish the barrel; heat it in a tray, or box of sand, so that it may be heated its entire length evenly. When the blue comes, cool it in water. 2. Is a breech loading rifle using a cartridge with paper patched ball as accurate, on general principles, as a muzzle loader with cloth patched ball? A. Yes; more so.

(19) S. B. H.—There is nothing that you can add to lamp oil to make it less explosive. The explosive qualities of the oil are due to the volatile products of the petroleum. These can be distilled off. The best plan is to buy a higher grade oil.

(20) T. H. writes: Do you consider paraffine a good antidote to prevent the disintegration of building stones in this climate, or do you know of any better? A. The corrosive gases contained in city air attack the building stones, many of which are of inferior quality, especially the sandstones, as brown stone. Coating them with paraffine prevents all access of the air to the stone, and therefore arrests any corrosive action. The subject of the preservation of building stones is a new one, and at present it is not easy to say what is the best preventive. Our buildings are not made to last, or else they would be constructed from better material.

(21) H. S. H.—We are now beginning the 1885th year of the Christian era. In regard to the exact date of the birth of Christ, the best church historians agree in placing that event in the year 4 B.C.

(22) W. B. G. asks: 1. What is the chief cause of Asiatic cholera? A. The present theory in regard to the cholera is that it is caused by a germ. It is therefore a zymotic epidemic. 2. What preventive can be used? A. Quarantine and sanitary precautions are the best preventives. 3. What remedy can be used? A. There are various medicines known as cholera mixtures. The so-called Sun cholera mixture consists of equal parts tincture of Cayenne, tincture of opium, tincture of rhubarb, essence of peppermint, and spirits of camphor; mix well. Dose, 15 to 30 drops in a wine-glass of water. 4. Is it confined to any particular climate? A. It is generally confined to the warmer climates, including the temperate zones during summer. 5. Does it reach the lower class more easily than the higher? A. Owing to the lack of suitable sanitary conditions, the lower classes are generally attacked sooner than the higher. See articles on cholera on page 88 and page 89 of SCIENTIFIC AMERICAN for August 9, 1884.

(23) C. E. R.—An approximate method of estimating the contents of a cask is by determining the bung diameter and also the end diameter, adding them together and dividing by two, and then applying the rule of the cylinder, which is as follows: Square the radius, which will be the factor obtained (that is, the average diameter of the cask), and multiply by  $3\frac{1}{2}$  (or approximately  $3\frac{1}{2}$ ); this gives the area, which then multiply by the length of the cylinder, and the result will be the cubical contents of the cask.

(24) W. F. T.—For paste shoe blacking mix one part of ivory black,  $\frac{1}{4}$  treacle,  $\frac{1}{4}$  sweet oil, then add  $\frac{1}{4}$  oil of vitriol and  $\frac{1}{4}$  hydrochloric acid. Dilute each ingredient with three times its weight of water before mixing. For liquid polish take 2 lb. of ivory black in fine powder, treacle  $1\frac{1}{4}$  pounds,  $\frac{1}{4}$  pint of sperm oil. Rub the black well together, add the treacle, and mix. Another recipe is 4 ounces of ivory black, 3 ounces coarse sugar, a tablespoonful of sweet oil, and 1 pint weak beer. Mix them gradually together until cold.

(25) A. W. L. asks: How many cubic feet of air gas is made in winter from one gallon of 88° and 90° gasoline, in a Springfield gas machine, and how many cubic feet of ordinary city coal gas would it take to give the same amount of light as this one gallon of gasoline gives? A. Professor A. A. Hays, in his report on the Springfield gas machine, gives the following: The richest gas at 60° requires 6 to 7 ounces of gasoline for the production of a hundred cubic feet; this is about seven-tenths of a gallon, and seven-tenths of the price of one gallon of gasoline will be the cost of the material for 100 cubic feet of such gas. In quality it generally burns with an intensity equal to an 18 candle city gas. In comparison with city gas, the value of the latter depends entirely upon its intensity, an element which varies according to several circumstances.

(26) H. B. L. asks how to extract coloring matter (lampblack) from grease? A. By melting the grease, and then filtering it through cloth or paper. It will probably be necessary to use a hot water filter to prevent its solidifying during filtration.

(27) C. S.—Gas is not literally in coal, but the coal is almost solidified gas; that is to say, the distillation of coal yields gas.

(28) W. O. C. asks: 1. What do you recommend for softening and whitening the hands? A. Use a solution of one part glycerine in seventeen parts distilled water. 2. Also for removing warts and moles? A. Warts may be removed by the application of lunar caustic, nitric acid, or aromatic vinegar. Croton oil, under the form of pomade or ointment, and tartar emetic, under the form of plaster or paste, have been successfully employed in the removal of moles, etc. Such operations should only be performed under the direction of a physician or some one competent to direct their application.

(29) A. L. T. asks: Is there any composition used in ornamenting picture frames better than equal parts of glue, whitening, and linseed oil? A. The following might be better for some purposes: Mix 14 lb. of glue, 7 lb. resin,  $\frac{1}{2}$  lb. pitch,  $2\frac{1}{2}$  pints linseed oil, 5 pints of water, more or less according to the quantity required. Boil the whole together, stirring well until dissolved; add as much whitening as will render it of a hard consistency, then press it into mould, which has previously been oiled with sweet oil.

(30) F. H. asks: 1. What is acetate of soda? 1. Sodium acetate is a salt consisting of soda and acetic acid, the acid of vinegar. 2. What is the common name? A. It has no common name. 3. By using it as a heater, is it put dry in the holder? If not, what else, and the proportion of each? A. In using it as a heater, sufficient water is added to dissolve it at a boiling heat, then as it solidifies it gives off a great amount of heat. 4. Will it not eat through tinned iron (common tin)? A. It is not specially considered as a corrosive compound. 5. Should it be partially filled, and how far filled? A. It is safe to fill the vessel two-thirds full. 6. Must it be hermetically sealed? A. It should be hermetically sealed. 7. Will frost hurt it or burst the holder, like water? A. Frost does not affect it. 8. Is it poisonous or dangerous to handle? A. No. 9. Where can it be got the cheapest, besides drug stores? A. From the wholesale jobbers. 10. What should be the price about by 25 or 50 lb.? A. It is quoted at from 40 cts. to 45 cts. per lb. In the quantities you mention, it is probably slightly cheaper.

(31) H. G. A. asks how to prepare academy board and canvas for painting. A. The various earths and metallic oxides tempered with the most tenacious drying oils are laid evenly over the cloth, which first, however, must be coated with size. In order to preserve the elasticity of the ground, some drying oil is generally mixed with the glue or size with which the canvas is prepared. For the same purpose beeswax, sugar, treacle, albumen, etc., have been added with various degrees of success. It is said that Titian used beeswax dissolved in oil.

(32) W. D. R. asks: 1. How to polish wood to get a good polish? A. The polishing of wood varies according to its hardness. Woods such as mahogany may be readily polished by rubbing over with linseed oil and then against a cloth dipped in fine brick dust. 2. How to polish stone such as granite, etc.? A. The polishing of stone is usually performed by rubbing the desired specimen with a piece of very fine sandstone (in the case of granite, something harder is used), rubbing backward and forward, using very fine sand and water until the slab appears equally rough and not in scratches; next use a finer stone and finer sand, then rub until smooth with fine emery powder and a piece of felt. Finish with putty powder and clean rags.

(33) W. R. T. desires to know the composition of purple colored copying leads or pencils, and also of ordinary colored writing pencils? A. Faber makes four grades as follows:

	No. 1.	No. 2.	No. 3.	No. 4.
	Very soft.	Soft.	Hard.	Very hard.
Aniline.....	50 parts.	46 parts.	30 parts.	25 parts.
Graphite.....	37.5 "	34 "	30 "	25 "
Kaolin.....	12.5 "	24 "	40 "	50 "

For purple an aniline violet is used. For other colors various shades of aniline can be used. The cheaper qualities of colored pencils consist simply of the coloring material mixed with kaolin or clay. Receipts for colored pencils are given on page 2949 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 185.

(34) H. B. asks if it is necessary to use the water bath, or the kettle to be surrounded by water, in the distillation of cider, illustrated in SUPPLEMENT, No. 110? A. The use of the water bath is to prevent the temperature from increasing above 212 degrees. The same effect can be produced by using a lower temperature, and also by interposing a tin plate containing sand between the flame and the still. 2. After the cider is boiled once, should the distillate be boiled again before it is brandy? A. That depends upon its strength. If of proper strength, a second boiling can be dispensed with. 3. Could an oil stove be used to good advantage? A. The source of the heat is immaterial as long as you get it, be it from coal, oil, or gas. 4. Where there is no hydrant, how or what convenient way could be arranged for the water that is used for the condenser? A. Use any convenient reservoir of water, for instance, a pailful placed above the condenser, and of course connected with it by a rubber tube. 5. For the kettle that is called the water bath, should the rim be soldered or riveted? Could any iron kettle be used for the copper bath to set into, or should it be made of copper the same as the other? A. The variety of vessel to be used as a water bath is of no consequence, a tin pan will answer. If your still is small enough; an ordinary tin tomato can will answer for water bath.

(35) W. M. R. asks what cement to use in putting together a slate trough that will withstand cyanide of potassium, or if put together with plaster of Paris, what to use over that to make it proof? A. Coat the plaster of Paris with a good asphalt varnish; this allowed to dry thoroughly should be perfectly satisfactory.

(36) G. B. S. desires a receipt for mixing fresco paint? A. The pigments used in fresco painting are generally mineral or vitreous, finely ground, and applied with pure water. They are absorbed by the plaster, which must be in a moist condition.

(37) C. A. B. asks how to make batteries, such as sold by druggists, and worn on a silk cord around the neck? A. These batteries generally consist of plates of zinc and copper. They generate a slight current of electricity.

(38) S. McI.—Mercury will keep in iron vessels without injury to itself or the iron. The iron expands a little less than the mercury, but you could not observe the amount of expansion in a half inch tube from a ball of three inch diameter, of iron, for a change of 150 degrees in the temperature, although the difference would be enough to burst the ball if closed full of mercury. The heat required to raise steam to 1,000 pounds pressure would decompose or destroy wood fiber. Steam cannot be raised to 1,000 pounds pressure at 300 degrees temperature. The act of compression raises the temperature to its normal point. If cooled below this point, the pressure falls with the temperature.

(39) W. S. C.—Oak saw dust will not injure the boiler, but might give some trouble by getting into the water gauge and gauge cocks, or by foaming over to the cylinder. If you have oak saw dust, you may also have oak bark, which is still better. By soaking the bark in hot water and pumping the solution of tannin into the boiler, with a little soda, you will have what is sold in the market for a first class boiler cleaner. A pailful of bark extract and one pound of soda is enough for a dose once in one or two weeks, and perhaps only one a month, according to the quality of water that you use in the boiler. Blow off a little from your boiler every day, and examine the interior once in one, two, or three months, as your experience may suggest.

(40) E. M. B.—All of the explosives may be confined to the chamber in which they are exploded, provided the chamber is strong enough. A chamber that will withstand 40,000 lb. pressure to the square in. will do for most kinds of gunpowder. If the chamber is larger than the bulk of the charge, there will be less pressure, in the ratio of the size of the cavity to the bulk of the charge. Gunpowder engines have been invented and patented, but are a total failure in practice.

(41) E. W. G.—Various expedients are used for deadening the sound in public hall floors, such as the ordinary deafening of loose boards let in between the joists resting on wall strips nailed on the side of the beams, and plastered from 2 to 3 inches thick. Then lay a common board floor upon the beams. Upon this lay the ordinary roofing felt, and upon the felt the matched flooring. Another way is to put in two sets of beams, one for the floor and one for the ceiling—every other beam projecting several inches above, so as to allow of the ordinary plaster deafening to be attached to the floor beams only. This will allow the ceiling beams to be free from vibration.

(42) G. M. S.—The belting of an engine to a main shaft is considered a great convenience to save the high speed otherwise required of the engine. The friction is of less value than the convenience. But where it is convenient to connect to a main shaft by coupling, where the shaft is to run no faster than the proper speed of the engine, you may save 5 per cent of the power. We know of nothing better than lacing or hooks for ordinary sized belts. Very wide and thick belts are sometimes glued and riveted, but require tightening pulleys. Rubber belting under the same circumstances may be connected with rubber cement, and riveted.

(43) C. N. asks if there is an acid for testing butter and oleomargarine, and what are the results. A. There is no very simple and complete test. One proposed by Hager is as follows: A bit of wick is inserted into melted butter, lighted, and then blown out. If the butter is pure, there is little odor; but if artificial, a tallow-like smell is perceived. The general method however is by microscopical examination or by qualitative tests of the fatty acids.

(44) H. F. K. writes: I have made soap 1 part potash, 4 of grease, and would like to know how to harden it for use? A. The soda soaps are generally harder than those made with potash. For every 100 pounds of the fat, use one-eighth of caustic soda; and one-third to one-fourth of the fat can be substituted with advantage by rosin. This will harden the soap.

(45) G. W. W. writes: I have some books I want to letter with gold. Would you be kind enough to tell me how to go about it, and what kind of size is used? A. The leather or cloth is sized with albumen, and gold leaf laid on with small portion of boiled linseed oil. The lettering being fastened in an embossing press and heated, is brought with sufficient pressure on the cover to make the gold leaf adhere. The surplus gold being brushed off, leaves the impression of the die.

(46) J. H. Z. asks a recipe for a transparent paste, to paste pictures on glass. A. Gum tragacanth is much used for such purpose. A colorless cement can also be prepared by dissolving 75 parts India rubber in 60 parts chloroform, and add to the solution 15 parts of gum mastic.

(47) W. H. H. writes: In relation to the locomotive: 1. Would it not be more economical to condense the exhaust, and create an artificial blast by means of a blower? A. No. Where would you get water for condensing? 2. Where can I find a description of the most approved condenser? A. Any book on low pressure engines.

(48) F. E. W.—It is claimed that Trevithick made the first successful locomotive which was placed in actual service, in 1803, in England. The first railroad in the United States was built in 1820. The 20th day of December, 1867, was Friday.

(49) H. E. D.—A can filled with air and the vapor of gasoline is liable to explode by contact with fire or a light. It will not explode spontaneously nor by the mere heat of a hot day.



(50) V. C.—Coal tar is a good preservative for wood of any kind, and contains the antiseptic principle of creosote. If applied hot by dipping the ends of the posts in a kettle of hot tar, you will accomplish all that may be desired. The creosote costs more, and both can generally be obtained where there are gas works.

(51) D. H. E.—The great trouble with cams in stamp mills arises from bad construction, in allowing the shape of the cam to cause a concussion with the stamp catch. The point of the cam should not strike, but some part of the curve nearer the shaft should first lift the stamp. Much also depends upon the relative position of the shaft and stamp bar. A true spiral from a center is considered the best.

(52) N. A. W. asks the exact number of English feet in a nautical mile, and how it is figured. A. 6086.44 feet according to some authors, and 6085.88956 according to some other authors. A nautical mile is one-sixtieth of a degree on the equator, and is obtained by dividing the earth's circumference by 360° and then dividing the dividend so obtained by 60.

(53) A. S. G. asks a receipt for preserving the hair, and prevent it from falling out. A. The following is frequently used for strengthening the hair: Castor oil..... ½ pint. Alcohol 95 per cent..... ¼ " Tincture cantharides..... ¼ oz. Oil of bergamot..... 2 drachms. Color a pale pink with alkanet root. Tincture of cantharides and glycerine mixed together is a more active compound, and is frequently used to prevent baldness.

(54) L.—A good black varnish for leather belts may be made with boiled linseed oil, litharge, and lampblack. A spirit varnish may be made with shellac varnish and lampblack.

(55) J. O. S. asks for a corn remedy.

A. Corn cure. Take of—Salicylic acid..... gr. xxx. Ext. cannabis indic..... gr. x. Collodion..... 5 ss. M. 2. A remedy for squeaky shoes. A. There is no satisfactory cure for a squeaky shoe. It will sometimes cure itself, from getting wet, or as it gets older and the parts better set together. The squeak generally comes from the inner sole not fitting well in its place, but may also come from the shank piece, or counter, or other parts.

(56) A. P. F. asks how opodeldoc soap is made. A. White Castile soap, cut small, 2 pounds; camphor, 5 ounces; oil of rosemary, 1 ounce; oil of origanum, 2 ounces; rectified spirit, 1 gallon; dissolve in a corked bottle by the heat of a water bath; and when considerably cool, strain, then add aqua ammonia 11 ounces; immediately put it in bottles, cork close, and tie over with bladder. It will be very fine, solid, and transparent, when cold.

(57) W. J. H. asks how to prepare the various articles for the gelatine pad, and if it is really necessary to use kaolin. A. First dissolve the glue in water, heat it, add then the glycerine. Leave the kaolin out if you prefer, or use finely powdered barium sulphate instead. 2. Also a recipe for making the purple ink used on the gelatine pad. A. Dissolve 1 part aniline blue violet in a mixture of 7 parts water and 1 part alcohol.

(58) S. P. B.—Frictional electricity is frequently generated in the process of buffing. It is more common in cold clear weather than in warm damp weather. Common glue is not a very good conductor; when perfectly dry, it is a fair insulator. To line nickel plating baths, melt together 1 part pitch, 1 part resin, and 1 part plaster of Paris, perfectly dry. A good asphalt varnish, if allowed to dry properly and completely, will also stand.

(59) J. L. G. asks if there is anything that will take off the hulls in making hulls. I am using Babbitt's concentrated lye, but before the hulls come it is liable to burn. A. Your experience shows the impossibility of using too concentrated a lye. It will not injure the corn to soak it in lye, provided too strong an article is not used, but the alkali must then be removed by repeated washings, using, if necessary, a little acid; hydrochloric would answer.

(60) L. D. V. L. asks how to prepare a green coloring for ice cream. A. Green ice cream is made with pistachio nuts. These closely resemble almonds, but are sweeter, and form a green emulsion with water. The cook books will give you the proportions to use.

(61) S. D. G. asks by what process it is that by the use of sulphuric acid potatoes are hardened so they can be used for pipes. A. Boiled (dry) potato mixed with zinc chloride and barytes has been used to form an imitation alabaster. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 313.

(62) J. J. K. asks: 1. Which is the most economical in feeding a boiler—the steam pump, the power pump, or an inspirator or injector, and why? A. A power pump with a heater is cheaper than a pump alone, but not always the most desirable, on account of the occasional necessity of feeding the boiler when the machinery is not running. The injector in connection with a heater is claimed to be the most economical, because it returns all of the heat used as power to the boiler. 2. What change is produced in hardening steel, that is, in molecular arrangement? A. This is too large a subject for discussion here. You will find interesting articles on the theory of hardening steel in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 337, 375, 223, 224. 3. Is there any economy in heating the feed water when using an inspirator? A. Yes. Every degree of heat gained is economy.

(63) A. G.—We have no knowledge of paper floors for skating rinks, and believe that floors of that material, to be serviceable, would cost very high. We do not suppose there is anything better for skating rink floors than hard wood, preferably maple, well seasoned, narrow and thick strips, tightly driven together, carefully planed, and then waxed or oiled.

(64) W. W. P.—As the running parts of locomotives are balanced, and with nothing but gravity to hold them to the track, there is consequently no more pressure downward whether running or standing. The absolute traction or pull on the track is more when starting and moving slowly than when under full speed.

(65) W. H. P.—We have no knowledge of any water pitchers or urns for cooling water separate from the ice; but coils of block tin pipe placed in ice boxes, drawing water from the regular supply through the coil, are in common use. A refrigerator with a separate ice and water chamber is a subject of patent, and on the market. Any of our silversmiths would no doubt undertake to make the device in the form of pitcher or urn.

(66) F. L. B. asks: With 80 pounds pressure, 100 revolutions, and 200 horse power known, how many revolutions will 60 pounds, steam developing 125 horse power, give? A. Our computation gives 67½ revolutions, due to the other conditions you name. This is rather a crude way of deciding the fact as to whether a mill had been run to its full capacity. What speed the mill should run and what it did run should be matters of fact derived from observation.

(67) M. G. K.—The three largest equal circles that can be described in a square containing 160 acres will have a diameter of 1366.6 feet, according to our computation. A diagram and formula is too complex for Notes and Queries. Human fat resembles beef tallow. Kerosene does not pass through metal or glass, but crawls over the top by capillary attraction, and will thus accumulate on the outside of vessels so as to run down.

(68) W. A. E. asks what the preparation is made of that is put on canvas so it can be used just the same as a blackboard. A. 1 gallon 95 per cent alcohol, 1 pound shellac, 8 ounces best ivory black, 5 ounces finest flour emery, 4 ounces ultramarine blue. Make a perfect solution of the shellac in the alcohol before adding the other articles. To apply the slating, have the surface smooth and perfectly free from grease; well shake the bottle containing the preparation, and pour out a small quantity only into the dish, and apply it with a new flat varnish brush as rapidly as possible. Keep the bottle well corked, and shake it up each time before pouring out the liquid.

(69) H. W. F. says: I have had the pleasure of reading your valuable paper for the last fifteen years, and knowing your willingness to give your subscribers information, I take the liberty of asking you for the dimensions of the Washington monument that is now being completed. A. The dimensions of the Washington monument are:

Height of obelisk.....	500 feet.
" " pyramid top.....	55 "
" " total.....	555 "
Base, outside.....	50 ft. sq.
" inside.....	25 "
Outside of obelisk at 500 feet is.....	36½ ft. "
Inside at 150 feet is.....	31½ ft. "
Original foundation.....	80 "
Sub or added foundation.....	146½ "

(70) G. H. W. asks how to make a preparation that will be harmless in bleaching the human skin. A. In a general way, we should recommend that hydrogen peroxide be experimented with. A description of it and its uses will be found in SCIENTIFIC AMERICAN SUPPLEMENT, No. 339. There can be no directions given which will answer every case.

(71) M. N. B. desires an ink with which more than one copy can be obtained. A. Mix about 10 parts of jet black writing ink and 1 part of glycerine. This, if used on glazed paper, will not dry for hours, and will yield two fair, neat, dry copies by simple pressure of the hand in any good letter copy book. The writing should not be excessively fine nor the strokes uneven or heavy. To prevent setting off the leaves after copying, should be removed by blotting paper. By changing the quantity of glycerine you can get an ink which will give several copies.

(72) J. A. M.—There is no such thing as "agricultural ammonia" as distinguished from ordinary ammonia, composed of one volume of nitrogen and three of hydrogen, which condense to two volumes of gas, or combination. It is not used in agriculture except in nitrogenous manures, such as guano, fish manures, flesh, etc., and in stable manure. A teaspoonful in a quart or more of water is often used as a fertilizer for pot plants. It is also used, but not so extensively, in the salts, sulphate, and chloride of ammonia; but owing to the solubility of these salts, they are very liable to be washed out in drainage water if not promptly taken up by the plants. They should, when used, be applied as a top dressing in spring. Nitrogen is, more profitably, supplied in nitrates.

(73) H. J. D. asks (1) for a receipt for making mead. A. Mead wine consists of honey, 20 pounds; cider, 12 gallons; ferment, then add rum, ¼ gallon; brandy, ½ gallon; red or white tartar dissolved, 6 ounces; bitter almonds and cloves, of each, ¼ ounce. Then cleared and bottled. 2. Also one to make a good drinking bitters to give one an appetite. A. For bitters grind to a coarse powder ¼ pound cardamom seeds, ¼ pound nutmegs, ¼ pound grains of paradise, ¼ pound cinnamon, ¼ pound cloves, ¼ pound ginger, ¼ pound galanga, ¼ pound orange peel, ¼ pound lemon peel; then macerate with 4½ gallons 95 per cent alcohol, and add a sirup made of 4½ gallons water and 12 pounds sugar, then filter.

(74) B. R. T. asks: 1. What is used to form plumbago into a paste for stove blacking so that it needs no other preparation? A. Plumbago pulverized, 1 pound; turpentine, 1 gill; water, 1 gallon; sugar, 1 ounce, constitutes the liquid black lead polish. 2. What is the best for boots and shoes to keep new water out, and make them pliable and not injure the leather? A. Beef tallow, 4 ounces; resin, 1 ounce; beeswax, 1 ounce; melt together. Add when cold a quantity of neatfoot oil equal to the mass. Apply with a rag, warming the boots, and rub in well with the hand.

(75) E. A. M. writes: I have a boat 36 feet long, 8 feet beam, with flat bottom and round sides and pointed bow; draws 1 foot of water without load, aside from keel. Now, is it possible to run this boat against a current running at the rate of 7 miles an hour with 30 inch screw, 4 blades, and driven by 4 horse power engine? And how far from end of boat should the wheel sit to get the best results? A. Very doubtful whether you can make headway against a seven mile current, unless the boat is of the best model. The screw should be placed close under the stern, and entirely submerged.

(76) C. W. M. asks: 1. How can I bleach shellac? I want to make a varnish as near transparent as possible. A. Dissolve the lac in a boiling lye of pearl ash or potassium hydroxide (caustic potash), filter it, and pass chlorine through the solution until all the lac is precipitated. Collect the precipitate; wash well in hot water, and finally with tincture of soda, and throw them into cold water to harden. 2. How can I mix the aniline dyes, either soluble in water or alcohol, with an oil varnish? A. Use aniline dyes soluble in alcohol; and having made an alcoholic solution of them, they should readily mix with any varnish.

(77) T. P. L. asks how and what the laundries use to stiffen collars, cuffs, etc. A. Melt 2½ pounds of the very best paraffine wax over a slow fire. When liquefied, remove from the fire, and stir in 100 drops of oil of citronella. Have a number of round new pie tins, clean and nice; place them on a level table and coat them slightly with sweet oil, and pour about 6 tablespoonfuls of the mixture into each tin. The pan may be floated in water to cool the contents sufficiently to permit the mixture to be cut or stamped out with a tin cutter into small cakes about the size of a peppermint lozenge. Two of these cakes added to each pint of starch will cause the smoothing iron to impart the finest possible finish to muslin or linen, besides perfuming the clothes in first class style.

(78) V. C. T. writes: I am troubled with dandruff in my whiskers, and am rapidly losing them; have tried tonics, washings, oil, without any success. Can you recommend anything? A. A serviceable application is two drachms of borax dissolved in a pint of camphor water, washing with this lotion once or twice a week; or much benefit may also be derived by washing with tepid water, agitated with a piece of quill bark until a strong lather is produced; or with water containing salt of tartar in the proportion of two drachms of the salt to a pint of tepid water. See also Dr. J. V. Shoemaker's paper on "The Hair, its Use and its Care," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 388.

(79) H. C. asks: 1. Will a continuous coil boiler containing 75 feet of 1½ inch pipe, heated by a blast spraying kerosene oil, generate sufficient steam at 100 pounds pressure to run a 2 inch by 3 inch engine at 500 revolutions per minute? If not, how many feet of pipe will it require? A. You have enough fire surface, but your boilers are not arranged for the greatest effect. If you could divide your pipe so as to make a shorter circulation, with two or more sections, you would have a better effect. It will require double the amount of pipe for the work required. 2. Which is better—to feed coil from the bottom, keeping it half full of water, or to feed from the top, allowing all the water to evaporate into steam? A. Feed at bottom. 3. Will steam, at the temperature consequent to 150 pounds per square inch pressure, injure Babbitt metal valves and fittings? A. Babbitt metal is too soft or tender for valves or fittings. Better use the regular trade stock for such work.

(80) W. X. H. asks how many horse power a 6 inch leather belt (single) will transmit running over 20 inch pulley at 80 revolutions per minute. A. ¾ horse power.

(81) H. M.—The best way of finishing floors is described in SCIENTIFIC AMERICAN, November 17, 1883. An oiled floor is generally considered more durable than carpet. Oiled floors are not generally washed, but are wiped up with coarse woolen cloths, or else washed with turpentine. It is always possible to oil a floor, but it must first go through a preliminary preparation. Floors are generally oiled first, and then polished. They require constant attention, and for a stone floor we think you would find it exceedingly difficult to keep it in proper condition. For an office it is well adapted, and when protected by rugs a very pleasant and cleanly flooring.

(82) J. J. K.—Water will filter through bricks, provided you make the filter well or cavity in proportion to the quantity of water to be drawn. Such a filter box two feet square in a cistern might do for the use of a small family, but its capacity would largely depend on the water pressure.

(83) A. H. P. writes: I wish to apply paraffine wax to a wood surface. Is there any way of dissolving it so that it may be applied with a brush, same as paint, and that when dry will have a smooth waxed surface? A. Paraffine may be dissolved in coal tar benzol, and then applied with a brush. The solution will be rather dilute, and several coats will be necessary before the proper thickness of surface is obtained. As a general thing, it is best to use melted paraffine. 2. Can you tell me a cheap way of preparing a wood stain from red sanders? A. An imitation rosewood is made by mixing ¼ pound of potash in 1 gallon of hot water, and ¼ pound of red sanders wood is added thereto; when the color of the wood is extracted, 2½ pounds of gum shellac are added and dissolved over a quick fire; the mixture is then ready to be used on a groundwork made with logwood stain.

(84) B. F. G. writes: After boiling the bones preparatory to grinding them, I find a good deal of grease, but it is very dirty, and I wish to know if there is any way of clarifying or bleaching it, at a small cost, so as to make it marketable? A. Melt the grease with a small quantity of salt peter; then add sufficient sulphuric acid to decompose the salt peter. The mass, after the scum is removed, becomes a light yellow color, and is completely deprived of all offensive smell and animal impurities. The grease thus obtained can be used to advantage in making soap.

(85) W. M. C. writes: I am making a medical coil similar to that described in Sprague's latest edition. 1. What is the object in having the pasteboard tube tapering? A. In a small coil, tapering the tube would make but little difference. In a large coil, it is of some advantage, as it allows part of a secondary wire to be nearer the primary wire than it could be if the tube were as thick as is necessary to prevent the secondary current from leaping to the primary coil. 2. Does it not require more insulation between its several layers of wire than a coating of paraffine, also between the primary and secondary coils? A. If the wire is well covered, a coating of paraffine is sufficient. 3. Does it require a condenser? A. No condenser is required for a medical coil. 4. How many pounds of No. 18, 22, and 26 wire respectively will it require? A. It depends upon the size of your coil; you will not need more than two or three ounces of No. 18 wire, and but little more of the other sizes. 5. If the tube is tapering, how can a brass tube be made to fit it tightly? A. The taper of the tube should be all upon the outside.

(86) J. B. P. writes: In our work at this place, we use to a large extent the common Faber pencil, for ciphering and memo. writing. Do you know of any wash or other substance by which the sheets can be covered, so as to prevent the figures and writing from erasure, or blurring? A. To a solution of collodion of the consistency used by photographers, add two per cent of stearine. This solution is then spread over the paper in a similar way as in photography. It dries in from 10 to 20 minutes and thoroughly protects the pencil marks. This solution is used to preserve pencil and India ink sketches.

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January 20, 1885,

AND EACH BEARING THAT DATE.

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