

## ENGINEERING INVENTIONS.

A car ventilator has been patented by Mr. Alfred S. Emerson, of Charleston, S. C. Combined with the car is a shaft driven from the axle, which works an air forcing blower, according to a special construction and arrangement of parts, to supply railway cars with fresh air, and carry off the foul air.

A piston rod packing has been patented by Mr. John W. Dudley, of Portland, Oregon. It is composite, comprising split metal rings with inclined meeting faces, causing their lateral expansion under pressure, to be placed around the piston rod or valve stem, with a fibrous elastic packing placed outside the metal packing rings, next the wall of the stuffing box.

An oscillating steam engine has been patented by Mr. William Elder, of Fort Coeur d'Alene, Idaho Ter. This invention covers a particular construction of the oscillating trunnion cut-off, the reversing valve and reversing mechanism, and arrangement of oiling chamber in the trunnion box, to make such engines more simple and easily controlled.

A car coupling has been patented by Mr. Philo J. Norton, of Bristol, N. Y. The drawhead has a transverse buffer bar arranged to slide therein in the direction of its length, the bar being guided by slots in the sides of the drawhead and pressed toward the outer end thereof by springs, while the coupling link has a longitudinal slot, prongs at each end, and a head or disk on the upper surface at each end.

A rotary engine has been patented by Mr. Adna Wildern, of Vienna, Ontario, Canada. Two cylindrical cores or rollers are fitted in contact and forming abutments, and to each of these cores a piston is rigidly attached, the pistons passing each other by means of a recess in each of the cores; steam is admitted through ports in heads of cylinder, and passes through grooves in ends of one roller to piston, and exhausts in similar manner through grooves in end of opposite roller and then through ports in heads of cylinder.

## AGRICULTURAL INVENTIONS.

A reversible plow has been patented by Mr. William C. Haulbrook, of Homer, Ga. The construction is such that the plowman can, by pressing a lever, release a handle block, so the plows can be reversed by swinging the beam to one side, and quickly fixed firmly in place, so that there can be no shaking of the parts when in use.

## MISCELLANEOUS INVENTIONS.

A strainer for funnels, etc., has been patented by Mr. Francis O. Butterfield, of Lynn, Mass. It is a funnel with a tubular form, and made slightly tapering to fit tightly in a tube at its lower end, to strain any liquid poured through funnels and obviate the clogging up of the funnels.

A bowling hoop has been patented by Mr. James H. Venners, of Philadelphia, Pa. It has an indicator tripper on its inner peripheral surface within the uninterrupted open space circumscribed by the hoop, for use in connection with a speed indicating propelling handle, for guiding as well as propelling the hoop.

A wheel has been patented by Mr. George W. Mecham, of Columbia, Texas. This invention covers novel features in that class of expanding wheels in which the hub has an inclined abutment on which the inclined ends of spokes rest, the spokes being clamped in position and adjusted on the abutment by clamping collars.

A cane has been patented by Messrs. John Dierks and Thomas B. Kail, of Harlan, Iowa. It is formed of a series of paper disks or wads, with strips on the surfaces and mounted on a rod, the disks being pressed together or united by adhesive substances, to produce upon a cane or similar article an ornamented outer surface.

A butter worker has been patented by Mr. James H. Taylor, of Westfield, Mass. This invention covers an improvement in that class of butter workers in which a roller works over the bottom of a box or tray containing the butter, the worker being operated by a rack and pinion and a crank, and so the brine and milk pressed out can flow away.

A hub for vehicle wheels has been patented by Mr. Alfred Bradley, of Dayton, Ohio. This invention covers a novel construction intended to so form the tenon that compression will not affect its fibers, and that the expansive force of compressed tenons will operate on the interior of the hub while the periphery will be free of strain.

A spring seat has been patented by Mr. George W. Murray, of Bluffton, Ohio. This invention covers a special arrangement of high and low springs in the same seat, with their action so controlled as to form a level seat or cushion on their united tops, and so their action shall be proportioned to the weight to be supported.

A water color solution has been patented by Mr. Charles F. Nicholson, of Rochester, N. Y. This invention is intended to provide artists with colors in a moist form or state, and provides a solution or vehicle for the colors, composed of glucose, gum arabic, and sirup, the colors being thus prepared in a special manner, to avoid too much wetting and drying.

A combined stern sheet block traveler, oar lock, and cleat, for boats and other vessels, has been patented by Mr. John Richardson, of St. Mary's, Ga. This invention covers a plate attachment designed to be arranged across the stern or rear end portion of the deck, and carrying various appendages to promote convenience, but which may be changed or added to as desired.

A heel plate for skates has been patented by Mr. John B. James, Jr., of Riverdale, N. Y. It has an elliptical aperture through it around which is formed a flange or collar to support the flanges of the skate stud, the opposite sides of the collar having op-

positely inclined edges to act as cams to draw the heel of the skate firmly against the heel of the boot or shoe.

A machine for measuring and trimming fabrics has been patented by Mr. George W. Parsons, of Burlington, Iowa. Combined with a fabric roll and bar for winding the fabric is a tension bar over which the fabric is passed, a measuring roller, with a knife and means for operating it, so it can be adjusted a greater or less distance from the edge of the fabric.

A cant hook has been patented by Mr. Aaron Brown, of South Barton, Vt. Combined with the handle or lever and the hook, with its retaining collar, is a plate opposite the inner end of the hook, let into recess in the lever, and having studs at its ends to limit the movement of the hook, the device being cheap, and presenting a considerable range of adjustment.

A process of making a fertilizer from tank waters has been patented by Mr. Charles Gibson, of Chicago, Ill. It consists in adding acid sulphate of an alkali, aluminous cake, or sulphate of alumina to the waters, then boiling down to expel the surplus water, agitating the mass with a carbonate, oxide, or hydrate of an alkali or alkaline earth, and finally cooling and grinding.

A heating and ventilating apparatus has been patented by Mr. John L. Hamilton, of St. Joseph, Mo. The invention consists in a peculiar construction and arrangement of hot air flues and passages, air chambers, and ventilating flues, with a fireplace in the lower room, and its smoke flue, designed to heat and ventilate upper and lower rooms by a fire on the hearth in a lower room.

A nut lock has been patented by Mr. Isaac Van Kuran, of Omaha, Neb. This invention covers an improvement on a former patented invention of the same inventor, and consists in combining with a base plate, having lips or ledges at the corners, a top plate over the corners of which the lugs are bent to hold the plates together, the two united plates forming a spring washer for locking nuts.

A turbine water wheel has been patented by Mr. Barnett V. Idol, of Idol's Mills, N. C. This invention covers a wheel with two series of curved arms, making buckets both horizontal and vertical, inside the casing, giving the water a wide passage where it enters, which gradually diminishes, the water doing duty first on the horizontal and then on the vertical buckets.

The manufacture of white lead forms the subject of a patent issued to Mr. William H. Wetherill, of Philadelphia, Pa. This invention covers an improvement in the method of manufacturing white lead, by the use of a special apparatus for separating the acid and buckles of lead with a layer of ground of fibrous spent licorice root.

A road grader and leveler has been patented by Mr. John Skinner, of Newman, Ill. The machine combines a main frame with harrow and scraper, a shoe pivoted at one end to the framing and adjustable thereon in position to engage the ground with pivoted levers, and other novel features, for loosening and scraping soil and earth to a grade, and filling ruts and depressions.

A hammock support has been patented by Mr. Charles A. Lindblom, of New York city. The device consists of a number of pieces of wood and metal so shaped that when put together they form two uprights or standards connected by and braced to a tie bar, making a frame with removable extensions, and one which can be easily and quickly taken apart and its pieces packed into a small space.

A tobacco box has been patented by Mr. Albert M. Guyton, of Broad Top, Pa. It has two compartments, one for holding the plug and another for a knife to cut it, with slides, push knobs, and a hinged cover, and so arranged that the end of the plug may be projected sufficiently to allow the desired portion to be cut off without handling the whole, the plug being thus kept moist and clean.

A ratchet wrench has been patented by Mr. Albert H. Rollin, of Coldwater, Mich. The ratchet head has a series of cams which coincide with and work movable jaws, peculiarly constructed pawls engaging with teeth on the cam head, there being a spring for releasing these pawls, an oscillating handle with operating pawls, and a collar adapted to throw out of engagement either or both of the operating pawls.

A windmill has been patented by Messrs. Daniel D., George L., and Charles W. Wiley, of Lanark, Ill. This invention covers improvements in mounting the side vane to be easily shifted in contrivances for automatically shifting it, and so the side vane may be used as an automatic regulator to prevent the wheel from being suddenly thrust around with the shaft in geared mills when the load is suddenly turned on or clutched with the shaft.

An apparatus for filling bottles with highly aerated liquids without pressure has been patented by Mr. August Werner, of New York city. The invention provides for the use of a fountain charged in the ordinary manner, such fountain to be placed upon a peculiarly constructed cradle, and the unabsorbed gas allowed to escape at the top; by a hand wheel the cradle is then so inclined that the liquid will flow out of a rubber tube at the top into the bottles to be filled.

A cylindrical amalgamator has been patented by Mr. James W. Hilton, of New York city. The shell has V-shaped flanges on its interior, with perforations and slots, to facilitate in the operation the constant stirring and mixing of the ore and quicksilver, bringing the quicksilver into contact with every part of the ore, so that all the gold and silver will be removed therefrom. The same inventor has likewise obtained a patent for a machine for pulverizing ores, adapted for either dry or wet crushing; the case is lined with steel plates to form the wearing surface, and the grinders are moved out by centrifugal action and gravity against the sides and lower part of the shell, thus crushing and pulverizing the material.

## NEW BOOKS AND PUBLICATIONS.

**HISTORY OF THE KINGDOM OF COTTON, AND COTTON STATISTICS OF THE WORLD.** By Morris R. Chew. New Orleans: W. B. Stansbury and Co., 1884.

This little brochure on cotton statistics and the cotton producing countries was evidently written with an eye to the New Orleans Exposition, for the purpose of providing a convenient morsel of cotton literature. It has been presented to the public with the hearty indorsement of various officials of the cotton exchanges in New Orleans, and even of the Exposition itself, but although the historical part possesses some interest, and the statistics are presumably reliable, the general style, and particularly the illustrations, leave much to be desired. The book is not to the point. One must be charitable to appreciate even what is good, for the accompanying matter is often so irrelevant as to become amusing. The author has, however, been at some pains to collect his information, and greater discrimination, with more careful editorship, would have made his work of value.

**POOR'S MANUAL OF RAILROADS OF THE UNITED STATES, 1885.** H. V. & H. W. Poor, New York.

This work, taking the size of the book and its great amount of statistical matter, may appropriately be styled a "dictionary of railways" in all matters of record pertaining to their business growth and financial situation. From its pages we learn that there were 3,977 miles of railroad built in the United States in 1884, against 6,753 miles built in 1883, the total mileage up to December 31 last being 125,379. The net earnings of last year were, however, \$25,000,000 below those of 1883, and \$4,000,000 below those of 1881, when 23,000 miles of railroad were in operation. Railroad building on speculation, as the result of previous profitable railroading and the extensive "watering" of stocks by many of the older corporations, is given as the principal reason for the great falling off in earnings, as the retroactive effect has undoubtedly been largely the cause of the prolonged dull times in nearly all lines of business.

**THE INSURANCE YEAR BOOK, 1885-86.** The "Spectator," New York.

This is a handsome volume of statistics of the insurance business, being the thirteenth annual number thereof. A valuable feature is the statistics showing how the cities and villages of the country are equipped for fire protection, and another is found in the chapters giving the statutory requirements of the different States for companies doing business therein.

## 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.

Appleby's patent Valve, illustrated on page 130, this issue, for sale, or on royalty.

Pattern and Brand Letters, Steel Punch Letters. Vanderburgh, Welis & Co., 110 Fulton St., New York.

The best Upright Hammers run by belt are made by Beaudry & Cunningham, Boston, Mass.

Seam and Looping Machines, patent Burr Wheels, Brushing Machines. Tubbs & Humphreys, Cohoes, N. Y.

Wanted.—Mechanical Automatic Figures. Must be new and original designs and work natural. Address, with full description and price, Lock Box B, Waterbury, Conn.

Wanted.—A Foreman of a foundry would like to change his position. Can furnish best of references in regard to qualifications, and also good reasons. "W. S.," P. O. Berlin, Ontario, Canada.

Business for Sale.—A new ornamental and cheap Wrought Iron Fence Patent. H. B. Van Eps, Peoria, Ill.

Haswell's Engineer's Pocket-Book. By Charles H. Haswell, Civil, Marine, and Mechanical Engineer. Giving Tables, Rules, and Formulas pertaining to Mechanics, Mathematics, and Physics, Architecture, Masonry, Steam Vessels, Mills, Limes, Mortars, Cements, etc. 900 pages, leather, pocket-book form, \$4.00. For sale by Munn & Co., 361 Broadway, New York.

Cotton Factory, complete equipment, for sale. Address W. W. Jennings, Harrisburg, Pa.

Astronomical Telescopes, from 6" to largest size. Observatory Domes, all sizes. Warner & Swasey, Cleveland, O.

Peerless Leather Belting. Best in the world for swift running and electric machines. Army & Son, Phila.

"How to Keep Boilers Clean." Send your address for free 88 page book. Jas. C. Hotchkiss, 86 John St., N. Y.

Send for catalogue of Scientific Books for sale by Munn & Co., 361 Broadway, N. Y. Free on application.

Shafting, Couplings, Hangers, Pulleys, Edison Shafting Mfg. Co., 36 Goerck St., N. Y. Send for catalogue and prices.

Air Compressors, Rock Drills. Jas. Clayton, B'klyn, N. Y.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn.

Wanted.—Patented articles or machinery to manufacture and introduce. Lexington Mfg. Co., Lexington, Ky.

Presses & Dies. Ferracite Mach. Co., Bridgeton, N. J.

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

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.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

If you want Engines, Boilers, or Machinery of any kind, send your address to Henry J. Snell, 135 North Third Street, Philadelphia.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. Complete outfit for plating, etc. Hanson, Van Winkle & Co. Newark, N. J., and 92 and 94 Liberty St., New York.

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.

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.

Curtis Pressure Regulator and Steam Trap. See p. 12.

Wood Working Machinery. Full line. Williamsport Machine Co., "Limited," 110 W. 3d St., Williamsport, Pa.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 46.

Knots, Ties, and Splices. By J. T. Burgess. A Handbook for Seafarers and all who use Cordage. 12mo., cloth, illustrated. London, 1884. Sent, postage prepaid, on receipt of 75 cts., by Munn & Co., New York.

Iron and Steel Drop Forgings of every description. Billings & Spencer Co., Hartford, Conn.

Cushman's Chucks can be found in stock in all large cities. Send for catalogue. A. F. Cushman, Hartford, Conn.

Cyclone Steam Flue Cleaners are the best. Crescent Mfg. Co., Cleveland, O.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

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

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 126.

Blake's Belt Studs. The strongest and best fastening for Leather and Rubber Belts. Greene, Tweed & Co., N. Y.

Wanted.—Patented articles or hardware specialties to manufacture on contract or to manufacture and place on the market. First-class facilities. Correspondence solicited. Address Hull Vapor Stove Co., Cleveland, Ohio.

Roofing Slate, best quality, shipped to all sections in any quantity. Jesse B. Kimes, Philadelphia, Pa.

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

Economy Belting. A new article for driving belts. Send for circular. Greene, Tweed & Co., N. Y.

Manufacture of Soaps, Candles, Lubricants, and Glycerine. Illustrated. Price, \$4.00. E. & F. N. Spon, New York.

"To Mechanics."—When needing Twist Drills, ask for "Standard," or send for catalogue to Standard Tool Co., Cincinnati, O. See page 21, Export Edition.

## 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) C. A. R.—The pitch of a screw is the distance that the outer edge of the blade will travel in one revolution, without slipping, or in a cylindrical groove corresponding to the angle of inclination of the edge of the blade.

(2) F. T. T.—Six mercury flasks arranged as a boiler would be equal to  $\frac{1}{4}$  horse power, and would run an engine with  $1\frac{1}{4} \times 3$  inch cylinder, but not to its full capacity. Use  $\frac{3}{8}$  inch pipe for connections for both water and steam. A steam gauge and safety valve are always necessary on a boiler.

(3) W. C. R.—A ball thrown across a moving railway car will pass across the car in the precise direction that it is thrown, exactly as if the car was not moving. Its movement in regard to the ground makes quite a different figure. It will move in a diagonal direction with the track, of which the speed of the ball will be represented by one leg, and the speed of the car by the other leg of a right angle triangle, the hypotenuse representing the direction of the ball.

(4) "Molder" asks how to make a mould to cast chilled iron runners about 2 inches diameter. A. By placing a bar of iron in the mould, so that the molten iron will run in contact with the chill bar.

(5) A. J. C.—The first steel rail was made in 1857 by "Mushet" at the Ebbwvale Iron Company's Works in South Wales, and put on trial. Two steel rails were laid on trial in 1862, on an English railway, after which they came rapidly into use both in England and the United States.

(6) J. S. asks how to make the white cement or pointing that is used on the front of granite buildings to make the nice white seams. A. Use equal parts hydraulic cement (Portland), lime, and fine white sand.

(7) J. W. A. asks: Is there any chemical that will deodorize cistern water, rendered offensive on account of a wooden pump? A. Know of nothing better than thorough cleaning out of cistern; take out pump, clean and dry it, then give it a coat of melted

resin, inside and outside; drive in the resin with a hot iron. Any chemicals will either make the water hard or add to the odor of goods washed in it.

(8) W. S. R.—Cut dogwood in winter. To dry, heat in a drying room with open steam until the sap is cooked, then continue the heat by steam coils or otherwise, with a little ventilation, until thoroughly dry. The drying should not be hurried; 4 to 6 days is not too much time for good results.

(9) C. S. P. asks: Is it practical to use steam heating apparatus under a pressure of say 40 pounds steam, for power, and also to heat building needing some 1,800 feet of pipe, at same time returning water to boiler by gravity, without traps or pumps? A. Yes, provided the conditions for a gravity system are observed. For these it is advisable to consult with a steam-heating engineer.

(10) T. K.—Gas should be furnished to the burner under a pressure of 1/2 inch water pressure to be effective and economical. The service pipes vary from 1 inch to 2 inches diameter under the varying circumstances of shutting off or turning on of a large number of lights. The variation of the measure of the meter is too small for serious consideration under so slight a difference as 1 or 2 inches of water pressure.

(11) E. R. writes: I am about to build an engine; the cylinder is to be 4 1/2 x 3 1/2; what size boiler will I need? If made of one-sixteenth inch copper, what would it safely stand? What should be size of fly wheel, and what would be the power of such an engine? A. Your engine will be equal to a 1/2 horse power, and will require a boiler containing 9 square feet effective fire surface. A horizontal boiler 14 inches diameter, 2 feet long, lower half filled with 1 inch tubes in the same proportion as you will see by examining any horizontal tubular boiler. The shell should be made of 3/8 copper, riveted and brazed; head should be 1/2 inch thick. The tubes may be one-sixteenth inch, well expanded and edges turned. Three stay bolts, from head to head above the tubes, should be arranged to divide the space equally. If such a boiler is well made, it should be safe for 40 pounds working pressure. It should be made by a coppersmith that understands his business. Fly wheel may be 12 inches diameter and weigh 25 pounds.

(12) W. W. K.—A direct line pipe for water is always the best for economy in material, for tightness, and a large saving in friction. You can easily force water through 900 feet of pipe. To use it as a suction pipe will be rather difficult, from the great quantity of air to be pumped out and liability to lose the charge by leakage. You will, if the pipe be used as a suction, require a larger pump than usual and a good foot valve at the spring, and also will probably have to charge the pump and suction with water at the start.

(13) A. B. J. asks: 1. Has electricity ever been utilized for heating purposes to any practical extent, such as fusing metals, or the fusing of ores for making iron, such as is made in blast furnaces? A. No. 2. Do you consider it practicable that it can be so used? And could it be transmitted to the distance of 10 miles with any degree of certainty and regularity? A. It is not possible by any means at present known. 3. What is the relative heating power of gas as compared with coal, that is, how much coal is equal to say 10,000 feet of gas for heating purposes? A. About 1,500 pounds bituminous coal. Different coals vary very much in heating quality.

(14) C. A. L. asks if there is any way to make the hair turn gradually and permanently gray. A. No. The hair turns gray in the disappearance of the pigment from the hair, generally in consequence of age. You can bleach your hair with hydrogen peroxide. In this manner a very light color can be obtained.

(15) L. A. D. asks the cause of brewers' horses being so strong, and powerful, and fat. A. The horses are well selected from costly stock, and fed on best feed, not on the mash sold for feeding cows. Some of these horses are also great beer drinkers.

(16) C. H. F. asks: What are the composition and ingredients used in the manufacture of Cutler's carbolate of iodine inhalant? A. The following formula is considerably used; whether it is the specific make desired, we are unable to say:

- Compound tincture of iodine..... 180 minims.
Carbolic acid No. 1..... 48 "
Glycerine..... 1 fl. oz.
Water..... 5 " "

Mix and expose to the sunlight until the mixture is entirely colorless. The proportion of carbolic acid and tincture of iodine may be largely increased without a corresponding addition of glycerine.

(17) F. W. P.—Parchment paper is made, by dipping ordinary unsized paper for 5 or 6 seconds in dilute sulphuric acid, and then washing with extremely weak ammonia.

(18) R. H. K. desires a remedy for skin burn. A. Take 6 drachms avoirdupois powdered borax, pure glycerine 1/2 ounce, rose water or elder flower water 12 ounces; mix. Its daily use as a cosmetic wash renders the skin beautifully soft and white, and prevents and removes chaps, sun burns, etc.

(19) C. A. S. writes: 1. Can you tell me why an iron smokestack rusts through quicker in the city than in the country? A. City air is always more corrosive, on account of the acids, etc., which are present in the atmosphere. 2. The ingredients in the Hamlin Wizard Oil? A. The formula for this article is given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 342.

(20) H. M. D. asks for a method employed in embalming (or preserving without stuffing) birds, animals, etc. A. By consulting the article on "Embalming the Dead," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 155, you will find the general modus operandi given. The solutions vary with different authorities. The following is one that has been extensively used in Paris: Mix together 5 pounds dry sulphate of alumina, 1 quart warm water, and 100 grains arsenious acid. Inject 3 or 4 quarts of this mixture into all the vessels of the body. This process is applicable to fish as well as birds and animals.

(21) J. S. Y. asks for information as to how black lead is cemented in the construction of crucibles, etc. A. After the graphite is ground to powder, it is mixed with a small proportion of china clay, varying according to the use for which the crucible is intended. To every 10 parts of graphite is also added 7 parts of a gray (Bavarian) clay, besides a little ground charcoal. These ingredients are mixed dry; water is afterward added, and the compound passes to a cast iron cylinder. After treatment in this apparatus the material emerges in the form of thick mud, and is at once moulded either by hand or machinery, the operation being performed in almost exactly the same way as by potters. The same may be said of the subsequent baking.

(22) F. H. W. asks (1) for a good recipe for making sticky fly paper to catch them alive. A. To one pound of resin add two fluid drachms of linseed oil. While the mixture is warm, spread it on foolscap paper. 2. How much mercury, either in cubic or weight measurement, confined in a glass bulb at base of the column of air diameter inside of tube, will raise an increase of the temperature of water in height at approximately 100 cubic inches of mercury. 3. How much force in pounds or ounces would the mercury give on a piston inserted in the tube and in contact with the mercury, without danger of breaking glass tube or bulb of ordinary tubes of that size? A. The force would be very great; its development would depend on the thickness of the glass tube and bulb.

(23) G. D. S. asks: 1. What is the best method for hulling corn? A. The hull may be removed by beating in a mortar, or on a large scale by machinery. Corn may also be hulled by allowing it to soak over night in a dilute solution of lye. Any excess of lye can be removed by washing. 2. Can the Pyrethrum roseum, from which the Persian insect powder is manufactured, be successfully grown in the climate of Canada? A. The season is probably too short for cultivation in Canada. 3. What authority can I consult with reference to its cultivation? A. See "The Cultivation of Pyrethrum and Manufacture of the Powder," contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 299. As to your query about preserving eggs, it is best to coat the eggs in such a way that air cannot penetrate the shell. Paraffin is an excellent article for this purpose. See also "How to Preserve Eggs for the Market," contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 317.

(24) W. R. E. writes: Can you give me a process for making walks with gravel and coal tar, or whatever they use for that purpose? Want something that will set hard for a workshop floor, and resist water. A. Take 2 parts very dry lime rubbish and 1 part coal ashes, also very dry, and both sifted fine. In a dry place, on a dry day, mix them, and leave a hole in the middle of the heap as bricklayers do when making mortar. Into this hole pour the mixture, mix, and when as stiff as mortar put in three inches thick where the walk is to be; the ground should be dry, and beaten smooth; sprinkle over it coarse sand. When cold, pass a light roller over it; in a few days the walk will be solid and waterproof. See also SCIENTIFIC AMERICAN SUPPLEMENT, No. 82, under title of "The Best Footwalk Pavement," also Gen. Gillmore's "Treatise on the Construction of Roads, Streets, and Pavements" is an excellent work; we can send you for \$2.

(25) H. S. D. asks if nasal gleet in horses is contagious. Is there any remedy for it? If so, what is the best, and how given? A. The disease is not a contagious one. The usual treatment consists of the injection of an astringent solution of carbolic acid, or else of copper sulphate or zinc sulphate, through the maxillary sinus. As this operation is a delicate one, it is best performed under the direction of a veterinary surgeon. 2. Have they got the lenses of the Lick telescope perfected yet? Would it be possible to clarify obsidian? It appears to be very fine glass, but dark? A. The lenses are being manufactured under the direction of Messrs. Alvan Clark & Sons. Glass seems to have the best qualifications for lenses. It is doubtful if a piece of obsidian could be procured of suitable dimensions and quality for the lens, independent of its color.

(26) J. W. W. writes: I have two powdered substances; one I think is powdered borax, the other bicarbonate of soda. Will you please tell me how I can test them, to be sure as to the correctness of my experiments with them? A. If alcohol is poured over borax, with addition of a sufficient quantity of sulphuric acid to liberate the boric acid, and the alcohol is kindled, the flame appears of a very distinct yellowish green color, especially upon stirring the mixture; this tint is imparted to the flame by the boric acid, which volatilizes with the alcohol. The effervescence of sodium bicarbonate with an acid is one of the tests used to determine the desired mineral.

(27) J. W. asks (1) a good remedy for taking moles from the face. A. Croton oil under the form of pomade or ointment, and tartar emetic under the form of paste or plaster, have each been successfully employed for the removal of moles or birthmarks, thus: Take tartar emetic in impalpable powder 15 grains, soap plaster 1 drachm, and beat them to a paste. Apply this paste to nearly a line in thickness (not more), and cover the whole with strips of gummed paper. In 4 or 5 days eruption or suppuration will set in, and in a few days leave in place of the birthmark only a very slight scar. 2. A good remedy for removing freckles? A. Sulphocarbolate of zinc..... 1 ounce. Glycerine..... 12 " " Rose water..... 12 " " Alcohol..... 3 " " Spirits of neroli..... 1/2 dm. Mix them. To be applied twice a day, leaving them on for half an hour to one hour.

(28) P. & Co. ask (1) whether cistern water that is caught from an iron or tin roof that is painted every year is unhealthy. A. The water does not necessarily become impure from its passage over a painted roof, but it is very likely to become so by dissolving out certain injurious constituents of the paints, such as lead, etc. 2. The probable age of a catfish that will weigh 50 pounds? A. There are so many variations

within each species of fish that there is no general rule of determining age by weight; and in fishes closely conforming to the species the rate of growth is extremely irregular, depending on amount of food and the more or less favorable circumstances. Some kinds of catfish attain to a weight as great as 300 pounds. Fish which rapidly grow to a definite size are short-lived, while those which steadily and slowly increase in size attain to a great age. Carp and pike have been ascertained to live beyond a hundred years.

(29) C. F. asks if the piston head to a locomotive engine works back and forward itself in the cylinder, or is it always on the forward motion, caused by the cylinder moving away from it. A. It always moves forward relatively to the rails, but back and forward relatively to the cylinder.

(30) W. C. B. asks if there is any receipt for making a cement to fasten a rubber tire on a bicycle that will be strong and yet flexible. A. Use ordinary rubber cement prepared as follows: Digest crude rubber cut fine with about four volumes coal tar, benzol, or naphtha in a well covered vessel for several days.

(31) C. F. R. writes: I am using paraffin black. While painting the iron parts of machinery for use, what shall I mix with the paraffin too thick. A. Thin down with benzine. The paraffin consists of coal tar boiled down, with the addition of sufficient asphaltum to harden the mixture, and then benzine is added to thin it.

(32) A. P. A. asks how the inside of a cask or barrel can be treated so it will not make water taste, the water supposed to be medicinal. A. Coat the inside of your barrel with a lining of paraffine. This substance is not soluble at all in water, and, if properly applied to the wood, will prevent the contact of water with the barrel. To keep the water on account of its medicinal qualities should demand its immediate preservation in glass bottles.

(33) B. J. R. asks (1) how to make pear phosphates. A. Take Bartlett or other good pears; cut or chop fine, press, allow to settle, pour off supernatant liquid. To one pint of this pear juice add one pint acid phosphate and one pound sugar or enough to sweeten. 2. Is there anything in the least unhealthful in carbonating water by means of marble dust and sulphuric acid, etc., even if the water so carbonated is drunk freely? A. The method suggested is the one ordinarily used in the manufacture of carbonic acid for soda water, and when it is properly done, and the water held in proper vessels, is not considered unhealthful.

(34) F. M. Z. desires a good recipe to make Florida water. A. Dissolve in 1/2 gallon 90 per cent alcohol 1 ounce each oil of lavender, oil of bergamot, and oil of lemons, and of oil of cloves and cinnamon, 1 drachm each; add 1 gallon water and filter. Or, use oil of bergamot, 3 ounces; oil of cinnamon, 4 drachms; tincture of benzoin, 2 ounces; 75 per cent alcohol, 1 gallon. Mix and filter.

INDEX OF INVENTIONS

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[See note at end of list about copies of these patents.]

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