

ENGINEERING INVENTIONS.

A steam valve has been patented by Mr. Arie Vogel, of Lake, Ill. It is a rotary reciprocating valve, formed with beveled bearing surfaces, with a hollow pivot formed with correspondingly beveled surfaces and a threaded end, with other novel features, that the steam may be alternately fed in before and behind the piston, so that the latter will receive its full force in each direction of the stroke.

AGRICULTURAL INVENTIONS.

A cultivator has been patented by Mr. Henry C. Leydord, of Haskins, Ohio. This invention covers a novel construction and combination of parts for cultivators that can be readily adjusted in width, and so the shovels can be easily regulated as to height and inclined to one or the other side.

A self-raking attachment for reapers and harvesters has been patented by Mr. Martin Dew, of Cass City, Mich. It has a slotted platform and an arrangement whereby an endless chain driven by the driving mechanism of the mower or reaper operates rake teeth on sliding bars, whereby the rake teeth are projected and withdrawn at the proper times.

A grain drill has been patented by Mr. Mildred Woner, of Kingston, Kansas. It has a series of rotary cutters mounted on a shaft having a series of inclined sections, and pivoted to bars sliding in grooves in stationary bars, so arranged that the inclination of the cutters can be readily adjusted, and they can be easily raised and lowered to deposit the grain at any desired depth in the ground.

MISCELLANEOUS INVENTIONS.

A clothes drier has been patented by Mr. Perse Deverell, of Rouseville, Pa. It is for drying clothes within the house, and its construction is such that it will automatically elevate the clothes to a position near the ceiling of the room, but the device is so arranged as not to take up floor space.

A saw tooth has been patented by Mr. William B. Risdon, of Trenton, N. J. This invention covers a novel construction and combination of parts in the saw plate, the bit, etc., whereby the teeth can be readily inserted and removed without detaching the saw from its mandrel, and without removing the holding spring from its seat.

A reclining chair has been patented by Mr. Lewis Davis, of Jackson, O. Combined with a supporting frame, with seat on a shaft, is a back rest and a leg rest hinged to the seat, braces connecting the back rest with a shaft actuating the shaft carrying the seat, with other novel features, whereby the chair can be easily adjusted to the desired position.

An inside shutter has been patented by Mr. Robert Blair, of New York city. Three blind sections are so arranged, with pulleys, cords, and weights, in connection with the window frame, by a novel combination of parts and details, as to facilitate the working of the shutters and have them entirely out of the way when not in use.

A shirt has been patented by Mr. Ernest A. Krone, of New York city. This invention consists of a reinforcing strip extending down along the sleeve from the shoulder seam to the wristband, and formed at its lower end with a placket facing for the slit at the lower end of the sleeve, and with a tab on the upper end of the placket facing, for strengthening sleeves.

A machine for pearling wheat and other grain has been patented by Mr. John J. Hubbell, of Benzonia, Mich. It has a revolving shaft carrying numerous disks of stone combined with a hollow drum or cylinder, and the feed is regulated by devices of a novel character, for the removal of the outer skin or bran from wheat and other grain, leaving the berries whole.

A vehicle brake has been patented by Mr. William J. Devers, of Providence, Lackawanna Co., Pa. This invention uses a spring connected with a pulling attachment applied to the brake, a crank shaft being arranged transversely to the vehicle for operating the brake, the brake connections with the spring and crank shaft embodying several novel features.

A quilting machine has been patented by Mr. Martin H. Marcus, of Baltimore, Md. It has a supporting frame, a laterally movable intermediate frame with a quilt carriage movable longitudinally thereon, with mechanism for moving the frame and the carriage, the machine forming the pattern clearly and accurately, and being simple in construction.

A water elevator has been patented by Mr. Johnson C. Davis, of Athens, Ga. This is an improvement in that class of water elevators employing a pivoted water spout and trip devices connected therewith, arranged to be engaged and actuated by the water bucket, the invention relating especially to peculiar features of the trip mechanism.

A drain pipe connection for wash bowls, water closets, etc., has been patented by Mr. William D. Schuyler, of New York city. It consists of certain attachments, with novel construction of parts, intended to prevent the escape of sewer gases or offensive odors into apartments, and to facilitate the detection of leaks in the drain pipe or its connections.

A tobacco drier has been patented by Mr. Arthur F. Forbis, of McLeansville, N. C. The invention consists of certain heating and ventilating appliances for the fitting up of a barn for drying tobacco, to regulate the admission of air and temper it to the desired degree, as well as discharge the air at a suitable point, regulating the heat and saving fuel.

A nut lock has been patented by Mr. Aaron C. Vaughan, of Shane's Crossing, Ohio. It is an elastic jam nut consisting of a continuous elastic band or ring of metal, having an elongated opening and a tapered screw thread cut in its proximate inner sides, making an inexpensive lock for preventing a nut from turning off of the threaded end of its bolt.

A pianissimo stop for piano fortes has been patented by Mr. Vital Bèssier, of New York city. This invention consists in a piano with a damper rail between the sounding board and the strings, in addition to the usual damper devices, whereby the tones can be subdued as much as desired, or rendered inaudible altogether.

A lawn tennis net support has been patented by Mr. James H. Lee, of Canandaigua, N. Y. It consists of a pole for the attachment of the net cords, a ground socket to receive the pole, and retaining devices on the pole and socket to prevent the turning of the pole in the socket when the pole is in position to support the net.

A portable folding hammock stand has been patented by Messrs. Charles L. Rudd and Eben J. Manning, of Lake City, Minn. This invention covers an improved arrangement of the guy and supporting cords and in a novel canopy-suspending frame, as compared with that described in a former patented invention of the same inventors.

A folding bed has been patented by Mr. Karmell Brooks, of New York city. Combined with the folding and the stationary parts of the bed is a spring and its adjustable pivot arm and slotted bracket, the spring being so arranged that its tension can be readily regulated as the weight of the folding part of the bed may require.

A permutation padlock has been patented by Mr. William B. Turman, of Waldron, Ark. It is for use either as a padlock or doorlock, and is so made as to be opened when its parts are in certain relative positions, which may be changed at will, but it cannot be opened unless the parts are in the particular positions predetermined upon.

A washboard holder has been patented by Mr. Benjamin N. Merrill, of Lisbon, Me. It consists in a bar for attachment to the sides of the board, on each of the bars a swinging arm piece being held, having a ball head on its outer end, to rest against the inner sides of the tub and prevent the washboard sliding or slipping upward.

A satchel holder has been patented by Margret Smith, of Baltimore, Md. It consists of a metal plate with its upper end turned down and provided with a catch, the lower end turned up, crimped, and having a slot through which the down-turned catch is hooked, permitting satchels to be thereby readily affixed to and supported from garments.

A check hook has been patented by Mr. Joseph Darling, of Karns City, Pa. The back pad has a locking pawl and means for operating it, in combination with a notched check hook adapted to slide in a slot in the pad, with other novel features, the invention being an improvement on a former patented invention of the same inventor.

A device for converting motion has been patented by Mr. Jarvis M. Flint, of Thayer, Kan. Combined with a ring and turntable is a pivoted lever operated by the turntable and connected with a pump rod, for converting rotary into reciprocating motion, the device being especially applicable in working a windmill patented by the same inventor.

A privy has been patented by Mr. Edmund R. Angell, of Derby, N. H. It has a removable closed vault with a detachable pipe leading from the vault to earth, so arranged that an excess of gases will be conducted to earth, and prevent the poisoning of the atmosphere, the fittings being such as are not liable to get out of order.

A bottle stopper has been patented by Mr. Frank C. White, of Woodbury, N. J. The bottle has lugs on the opposite sides of its neck, and there is a ring surrounding the neck with spiral cams and offsets, arranged to engage projecting lugs, a bail carrying an elastic stopper, with its ends received in opposite sides of the ring.

A machine for stamping cigars has been patented by Mr. Leopold Grathwol, of Troy, N. Y. Combined with a vessel holding hot water, with pockets for type, are plates and springs for pressing the plates toward the types, the types being heated by the hot water surrounding the pockets, and names, trade marks, numbers, etc., therewith recessed or sunken in the faces of the cigars.

A honey box case and clamp has been patented by Mr. Oliver S. Foster, of Mount Vernon, O. Its construction is such that several tiers of honey boxes can be used without leaving spaces between them, and the tiers readily changed, or a tier nearly filled easily reversed, so the bees will fill all parts of the comb, and the boxes will not be discolored or disfigured with wax.

A wheel hub has been patented by Messrs. Stephen H. French and William J. Maltby, of Baird, Texas. This invention relates to wheel hubs which are made in several parts that they may be cast in metal, and provides a construction to adapt the mortise piece of the hub to be cast independently of the flanges, to form a positive clamp for the shoulders and protect the bearing from sand.

A tree feller and pile cutter has been patented by Mr. William G. Rendall, of Portland, Ore. It consists of a rotatable cutter mounted at the extremities of a series of arms pivoted to each other and to a frame mounted on a truck, the power to be applied by pulleys and belts from an engine on the truck, and a frame being fixed to the tree or pile to be cut for guiding the cutter.

The manufacture of spoons forms the subject of a patent which has been issued to Mr. William A. Warner, of Syracuse, N. Y. This invention covers the making of such articles in plated ware by inserting in the blanks, at points where the most wear will come on the finished article, a filling of precious metal or alloy, so that after the whole is plated the wear of these points will not expose the base metal or alloy of which the article is mainly composed.

A revolving fan has been patented by Mr. Henry Menke, Jr., of De Witt, Neb. This inven-

tion covers a novel construction and combination of parts in the driving gearing or springs and cog wheels, pinions, etc., to make an effective device for driving away insects, and for briskly circulating air for cooling persons near the machine.

An automatic fan has been patented by Mr. James McK. Johns, of Glenmore, Ga. It has clock work which oscillates a pendulum, to which is adjustably fixed a central fan, side fans being hung by arms pivoted to the pendulum and connected with the central fan by brace links, the apparatus being so contrived that it can be run to fan the air fast or slow, as desired, by power obtained from a spring or weight, and so the fan can be conveniently located high up or low down in a room.

A gate has been patented by Mr. Theodore L. Patrick, of Paw Paw, Ill. It is made to slide back and forth between parallel posts, supported by a roller pivoted between the posts, upon which rests a horizontal bar of the gate, while rearwardly projecting horizontal bars slide between posts set at a suitable distance from the side of the roadway, and carrying upper and lower sets of rollers, so the gate is prevented from sagging in whatever position it may be in.

An automatic gate has been patented by Mr. John Clark, of Greenville, Cal. It has a swing post, with axial support at its upper end from the hinge post, and at its lower end in one of a system of levers pivoted in the gate sills, the swing post having an inclined groove, a platform adapted to be depressed resting on the levers, with other novel features, whereby the gate may be lifted and opened by depressing the platform, and will swing shut by gravity.

A combined button hook and coat and hat hanger has been patented by Mr. Louis B. Prahar, of Brooklyn, N. Y. Combined with the shank of a button hook having a slot and recess is an arm pivoted in the slot with a prong upon its pivoted end, the invention being an improvement on a former patented invention, to make such articles neater in appearance, less expensive, and more reliable.

A fastening for hand bag, pocket book, and purse frames forms the subject of two patents issued to Mr. Louis B. Prahar, of New York city. The two main parts of the frame are hinged to each other at their ends in the ordinary manner, but the construction is such that they will securely fasten themselves when the frames are closed, and can be readily opened, while they are reliable in use, neat in appearance, and inexpensive to manufacture.

A fastening for hand bag, pocket book, and purse frames has been patented by Mr. Gustave Hood, of Newark, N. J. Both sections of the frame have recessed parts, a plate with a flange and shoulder being hinged to one section, to engage with the recessed part of the other section, so that the frames will be fastened automatically when closed, and can be readily unfastened.

A shirt has been patented by Mr. Moriz Blau, of New York city. Its body and the main part are made in the usual way, but the sleeves have placket facings with narrow extensions, reaching up and stitched at intervals to the body of the sleeve, and formed with button holes, in connection with a reinforcing piece extending from the shoulder, whereby the sleeves may be conveniently shortened.

NEW BOOKS AND PUBLICATIONS.

THREE YEARS OF ARCTIC SERVICE. The Expedition of 1881-84, and the Attainment of the Farthest North. By Adolphus W. Greely. Two vols., pp. 428, 444. New York: Charles Scribner's Sons.

In one highly important particular these two sumptuous volumes on Arctic discovery far surpass in interest and value any former publications in the same department. The Greely expedition had the advantage of having been accompanied by a professional photographer, Mr. George W. Rice; and, besides the numerous official maps and charts, this work is profusely illustrated from excellent photographs, which give a realizing sense of the bleak and forbidding surroundings of the desolate regions visited that mere word painting could never produce. Of the most important work done by the expedition, the "attainment of the farthest north," the mapping of the northern shores of Greenland and Grinnell Land, and of Smith's Sound, Kennedy Channel, and Robeson Channel, with the average temperature and the currents in both water and air in these high latitudes, the public has already been made familiar by the accounts hitherto published, but there are many details here given which have never before appeared in print. These details are mainly based on the diary of Lieut. Greely, and give a succinct account of the daily experience of the explorers, the making and arrangement of their permanent quarters at Fort Conger, and how they passed the time there, their expeditions, by boat and overland, the difficulties met with and how they were overcome, and the part taken therein by each participant in their hard struggles—but all told in a simple and natural way that more effectively brings out the hard facts than could be done by any coloring in the narration, which is everywhere avoided. The tale is a plain one, but it is of thrilling interest throughout, and full credit is given to the work done by every member of the party, Lieut. Greely leaving his own part to speak for itself only as the simple statements of the facts bear their witness. It is pitiful to note, at the conclusion of this narrative of an amount of suffering and endurance never exceeded and but rarely endured by human beings, that the author feels called upon to call attention to the absence of any proper recognition by the Government of the services of those who served under him—that Sergt. Brainard, after eight years of stainless and such extraordinary service, still remains a sergeant in the ranks; that even the meager allowances originally promised for Arctic services have not been fully paid, and that one most self-sacrificing and soldierly man is being kept by private charity in a city hospital, his pension not even awarded.

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.

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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.

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

Hercules Lacing and Superior Leather Belting made by Page Belting Co., Concord, N. H. See adv. page 158.

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.

Timber Gaining Machine. All kinds Wood Working Machinery. C. B. Rogers & Co., Norwich, Conn.

Curtis Pressure Regulator and Steam Trap. See p. 142.

Bradley's Improved Cushioned Helve Hammer. New design. Sizes, 25 to 500 lb. Bradley & Co., Syracuse, N. Y.

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Notes & 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 Written Information on matters of personal rather than general interest cannot be expected without remuneration.

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

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(1) If X and S, "readers for many years," will send their address, we will mail them an answer. Their question is not of sufficient general interest to take up room with here. Inquirers should read the notice at heading of this department.

(2) W. A. C. writes: In scaling saw logs by Doyle and Scribner's rule, should we allow half inches in measuring or should inches be counted, and not fractions of an inch? A. Use inches only in the register; when measuring, take the nearest whole number.

(3) W. K.—Your 1 pound of mercury will occupy a length of 2.564 inches in a 1 inch tube, and will expand, from zero to 90°, 1/1000 of an inch, or decimally 0.01923 inch.

(4) G. E. A. writes: I have made soldering iron of copper, which I cast in a mould. Now, when I want to hammer the copper into a point, it breaks off, whether cold or hot. 1. Can you tell me a remedy for it, so I can hammer it? A. Good copper can be hammered at a red heat; probably you have not pure copper. Better cast the point on. 2. What is an electrode? A. Electrodes are the poles of the electric circuit.

(5) H. W. S.—There are records of rainfall in the United States in a few places for 50 or 60 years past. The early records are not strictly reliable. The whole record shows variations of rainfall through decades of years, but not equalized, nor corresponding with any astronomical cycles. The reliable time of observation has not yet disclosed a secular decrease of rain for the United States, although in special localities such may be apparent.

(6) P. D. P. writes: Our boiler feed pipe and heater pipes are partly filled with hard lime scale, and will not work. How can we clean them? Have tried burning, but could not loosen scale. We keep boiler clean by using zinc scraps. A. We know of nothing cheaper than to renew the pipe if required at once. Filling the pipe with a solution of hydrochloric acid 1 part to water 6 parts will soon dissolve the lime, when it can be washed out. Not knowing what your incrustation is, whether carbonate of lime, sulphate of lime, or their mixtures with alumina from your clay beds, we are at a loss to say exactly what you require, but would recommend you to try to purify the feed water by filtration, by acid and soda treatment in a large tank, and settling, or heating the water in the tank by a coil, using the exhaust steam, or otherwise changing your boiler cleaning method from zinc scrap in the boiler to caustic soda in the feed water, about a quarter of a pound to a hoghead of water twice a week, and clean out boiler thoroughly of sediment once a month, or oftener if required.

(7) S. H. R. asks (1) if there are any acids or any compounds with acids that he can use to cut or eat through plate iron an eighth of an inch thick. If so, how to use same and with what results, the time it takes, etc.? A. Use nitro-hydrochloric acid equal parts, with fresh renewals every half hour. You may get through an eighth inch of iron in 5 or 6 hours. 2. The best book for information on the production and working of iron and metals. A. We recommend as the best book Osborn's Metallurgy of Iron and Steel (American practice), with large plates and illustrations, 8vo, \$25. A cheaper work by "Greenwood," on the practice and theory of manufacture of iron and steel, \$2. A general work comprising the manufacture and working in metals and alloys, by Byrne, "The Practical Metal Worker's Assistant," \$7. All or any of which we can furnish.

(8) G. S. writes: Is there a formula by which to determine the temperature of water in a boiler generating steam under any pressure, say from 1 to 200 pounds per square inch? A. The formulas for

determining temperature and pressure of water and steam in a boiler under pressure are derived from the experiments of Regnault and others, and are tabulated in engineering works. For full explanations and tables see Haswell's Engineer's Pocket Book, \$4.50, which we can furnish.

(9) B. M. G. and others.—A full illustrated description of the cable grip in use on the New York and Brooklyn Bridge, and the mechanism for operating it, was printed in the SCIENTIFIC AMERICAN of October 13, 1883.

(10) L. S. asks how modeling wax is made, such as sculptors sometimes use for modeling very small figures, etc. It is made of white wax melted and mixed with lard to make it workable. In working it, the tools used, the board or stone, are moistened with water, to prevent its adhering; it may be colored to any desirable tint with a dry color.

(11) W. W. asks how to varnish chromos. A. Take equal quantities of linseed oil and oil of turpentine, thicken by exposure to the sun and air until it becomes resinous and half evaporated, then add a portion of melted beeswax. Varnishing pictures should always be performed in fair weather, and out of any current of cold or damp air.

(12) C. B. asks what will take machine oil spots out of plain colored wall paper. A. Oil stains may be removed from paper by applying pipe clay powdered and mixed with water to the thickness of cream; leave on for four hours.

(13) E. G. P. asks what is used to kill the odor of benzine. A. Shake repeatedly with plumbate of soda, made by dissolving oxide of lead in caustic soda, and rectify. Simply shaking with charcoal and filtering will partially remove the odor.

(14) J. S. asks about the preparation of quicksilver for making mirrors, and the mode of applying same to the glass. A. The essential features of the process are the coating of the glass with tin foil, and then pouring quicksilver or mercury on the tin, thereby forming an amalgam which adheres to the glass. The exact method is given in Spon's Workshop Receipts, 1st series, which we can send for \$2.00. The remuneration for such work is not high, and the wages are similar to those received by an ordinary mechanic.

(15) W. H. B. asks: 1. How much less is obtained by assaying copper by the dry method than by the wet? A. The fire assay of copper is by no means accurate, while the wet method of separation by the battery is very exact. 2. What is the difference between control assays and that of ordinary assays? A. Control assays are methods used to corroborate results obtained by other processes.

(16) A. P. S. asks for (1) a good solvent for nicotine. A. Nicotine is soluble in water, alcohol, and ether. 2. Several common roots, like the carrot, that will sprout or blossom when hollowed, hung up indoors, and filled with water. A. The sweet potato is said to be very beautiful when used as described by you. Wet sponges filled with seed are likewise commonly seen.

(17) W. J. H. writes: 1. A clock has twelve hands, and at twelve o'clock are all started together from the same point. The first hand makes a tour of the dial in one hour, the next in two hours, next in three hours, etc.; how long will it take all the hands to meet at their starting point? A. 27,720 hours, that number being the least common multiple of all the terms from 1 to 12. The 12 hour revolution hand goes around 2,310 times; the 11 hour hand, 2,520 times; the 9 hour hand, 3,080 times, etc. 2. I desire a recipe for making an indelible ink that I can use with an ordinary rubber stamp. A. See the recipe given for an indelible stamping ink, published on page 19 of SCIENTIFIC AMERICAN for July 11, 1885.

(18) J. N. writes: During an argument to-day, one of the parties asserted that a ton of wood and a ton of iron placed in a vacuum, the wood would weigh more than the iron. State if such is the case, and if so, why so? A. The wood would be the heavier on account of its larger volume of air. Its bulk would represent a cubic foot of air at 60° Fah., weighing 586.96 grains.

(19) C. I. asks (1) what kind of wood is best for ebouizing. A. Cherry is most used, but apple, pear, and hazel woods are also suitable. 2. Please give best receipt for ebouizing. A. See answer to query 11, given in SCIENTIFIC AMERICAN for July 11, 1885. Spon's Workshop Receipts, 2d series, devotes several pages to the subject. We can send it for \$2.

(20) C. E. T. asks about a cemented cistern, the water from which tastes badly, probably the cement has an excess of magnesia. A thick wash of pure Portland cement will probably correct the strong taste. If not, a coat of paraffine put on the surface and melted in with hot iron will make the cistern odorless.

(21) F. F. Z.—The holes in material on which porous plasters are made are punched in a machine that makes a whole row at once, moving the cloth along by a ratchet. The machines are not on sale. Tracing cloth is thin muslin sized with isinglass and passed through polished rolls heated by steam. Tracing paper is either sized with isinglass and calendered, or oiled with linseed oil. Silver ink is composed of 1 part white gum arabic, 4 parts distilled water, 1 part silicate of soda in solution. Triturate with the best silver bronze powder sufficient to give the solution the required brilliancy. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 157, for gold and silver inks. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 249, how to make luminous paint.

(22) M. A. P.—See list of ink erasing materials given in the article on "Inks," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 157.

(23) J. M. F.—Experts examine the inks of writings by comparative means. See "Detection of Inks," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 255. The condition of the paper under the microscope and different qualities of ink on the paper are noted, but the age is difficult to determine. Old

ink is not as easily removed from the paper as that more recently written with.

(24) J. E. M. asks about producing sulphate of zinc. A. The most convenient method is by dissolving metallic zinc in sulphuric acid (dilute). It can be commercially produced by roasting the mineral sulphide in the air.

(25) N. C. R.—The wood mouldings for picture frames are cut in a machine, brushed over with the plaster of Paris, and smoothed down with a steel trowel of the same form as the moulding. The plaster has a little glue mixed with it. For your blackboard to use with chalk use shellac varnish, lampblack, and powdered pumice; mix as a paint and brush over quickly. For your artificial slate, use shellac varnish, lampblack, and finest flour of emery. Thin the shellac varnish with 95 per cent alcohol, so that the emery will have a cutting surface. The exact proportions you must find by trial.

(26) J. B. writes: I would like to know the composition of red and white liquids in the little tubes in storm glasses. A. 1. The red consists of alcohol slightly colored with a little aniline or logwood. 2. The white is composed of:

- Camphor..... 2 1/2 drachms.
 - Alcohol..... 11 "
 - Water..... 9 "
 - Salt peter..... .36 "
 - Sal ammoniac..... .36 "
- Dissolve the camphor in the alcohol and the salts in the water, and mix the solutions together.

(27) C. writes: I have a plaster Venus de Milo, which has been painted white. I do not know if lead or zinc white. It has begun to peel, and looks as if it had had the small pox. How can I remove the paint that still sticks, preparatory to repainting? A. Take a hot solution of washing soda in the proportion of 3 pounds of the soda to a gallon of water. This mixture will readily soften the paint, so that it can be removed by simply scrubbing with a stiff brush.

(28) C. K. asks how to remove candle grease from furniture without injuring the varnish. A. Rub it off with a little warm water and a rag.

(29) G. K. desires a receipt for making antique brass. A. Dissolve 1 ounce sal ammoniac, 3 ounces cream of tartar, and 6 ounces common salt in 1 pint hot water; then add 2 ounces nitrate of copper, dissolved in a half pint water; mix well, and apply it repeatedly to the article by means of a brush.

(30) C. W. F. asks: 1. What is the ore found between lumps of soft coal? A. Probably pyrite, or iron sulphide. 2. How near completion is the statue of Liberty? A. The pedestal, it is said, will be completed in May. It is uncertain when the statue will be in place.

(31) D. M. R. writes: I have a one-half horse power engine; how large a boat would it run with stern paddle wheel, said boat to be very light and of good model? A. A boat 25 to 30 feet long, depending upon the size of boiler, pressure, and speed of engine. With all these large, a 25 foot boat will be appropriate.

(32) L. D. H.—As air weighs 0.076 pound per cubic foot, your cylinder of 10 cubic feet and 100 pounds weight would weigh 99.24 pounds without air inside.

(33) H. H. L. writes: We have an 80 horse power automatic cut-off engine, which only has load enough to require 40 pounds steam. Is it more economical to run with 80 pounds and large expansion or 40 pounds with small expansion? A. Run with high pressure and cut-off for required power for economy.

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