

RECENTLY PATENTED INVENTIONS.

Railway Appliances.

RAIL JOINT.—Edwin M. Cooke, Brooklyn, N. Y. According to this invention, a jacket is formed to receive the meeting ends of the rails, and wedges are driven between the jacket and the base of the rails, goffers or corrugated portions forming the walls of the wedge recesses, while side plates extend up and bear snugly under the base of the rail. Another patent has also been granted to the same inventor for a rail joint of different construction, in which ways or recesses are provided between the upper side of the base of the rail and the jacket, the wedges fitting these recesses being formed of sections having each a straight and an inclined face, one section being inserted in the way and the other section driven upon the first one.

SWITCH STAND SIGNAL.—Michael B. Hurly, Quebec, Canada. A lantern is secured on a rotating sleeve and made to revolve on a stationary lamp and hood, so that corresponding colored lights will only be seen through in the desired direction up and down the track, the device being intended especially for use with three-way switches, or those by which trains may be directed from a main line to tracks on opposite sides.

SWITCH STAND.—Frank C. Baker, Blue Island, Ill. This invention covers a device in which the lever is thrown parallel with the rails of the track, instead of at a right angle thereto, the improvement being especially designed for use in crowded railroad yards.

AUTOMATIC SWITCH.—Adelbert G. Lawrence, Motley, Minn. This device consists of two revolving shafts placed beneath and at right angles to the main track and side track, and connected by means of levers, links, and pitmen to a throw bar underneath, and attached to the movable track, the switch being operated automatically by the flange of the car wheel.

CABLE GRIP.—Charles S. Chapman, Kansas City, Mo. This is a double socket grip designed for use on roads having duplicate cables, or on single-track roads having passing switches and cables running in both directions in the same tunnel, the main object of the invention being to so construct the grip that the parts subject to the most wear may be readily removed and replaced.

Agricultural.

PLOW.—William W. Leak, Montgomery, Ala. This invention covers a novel construction of the plow point, designed to obviate the necessity of resharpening by providing plates thin enough to form an edge for the plow, and adapted to be adjusted down on the body of the plow point as the plate is worn away.

CULTIVATOR.—Theodore Meyer, Amity, Iowa. This device is intended as an attachment which may be applied to an ordinary two-wheeled straddle row cultivator, providing a harrow wherein a single group or a series of groups of rotary teeth may be readily adjusted vertically and also laterally to avoid contact with the plants not in line, while the teeth may be rotated while being so adjusted.

Mechanical.

PULLEY SUPPORT.—Adelbert G. Lawrence, Motley, Minn. This device relates to pulleys for shifting belts, a yoke being turned to fit on the ends of the boxes, and capable of being adjusted to any angle, supporting at its center an arm terminating in a box between the pulleys, which supports the ends of the shafts, on which are journaled working and idle pulleys, doing away with wear and jumping of the idle pulley in machinery run at high speed.

BRICK LAYER'S PLUMB LEVEL.—James Smith, Centerville, Md. It consists of a frame to which is applied angle castings or guides, the frame also having graduated plates, while at each side of the frame is a plumb level or bob, and also a spirit level, making a convenient and accurate instrument, which can be expeditiously handled.

BUTTON MACHINE.—Anton Scholz, Brooklyn, N. Y. In this machine a yielding plate is employed having a sharp edge surrounding one of the dies and abutting against the other when the dies are pressed together, the machine being specially adapted for pressing glass or jet buttons into perfect shape, obviating additional trimming, and saving material.

COTTON SEED CRUSHER.—John J. Woodward and Peyton B. Bibb, Montgomery, Ala. Crushing rolls are arranged below the hopper, with a clearing distributor immediately above the meeting faces of the rolls, and a cut-off operating between the distributor and the discharge opening of the hopper, whereby if the rolls become clogged the supply may be cut off, the clearing distributor meanwhile operating to clear the rolls.

COFFEE CLEANER.—Augusto Gallardo, San Jose, Costa Rica. This is a machine for peeling, polishing, and cleaning coffee, the coffee being passed through cones in such way that the pressure of the mass will contribute to the rubbing off of the several coatings and the polishing of the grains, whatever may be their varying sizes.

Miscellaneous.

VEHICLE SPRING.—Albert E. Cook, Knowlton, Quebec, Canada. The spring has its lower leaf formed in two parts with their inner ends connected by a spring, in combination with a rocker-shaped bearing, whereby in the working of the spring its slack will be automatically regulated and an extended bearing for the spring is provided.

SHOE OR SLIPPER.—James Hanan, Jr., New York City. In this shoe or slipper the counter is bare upon its inner surface and split at its lower edge to form a narrow inner flap and a narrow lower flap secured to the heel of the shoe, whereby the shoe is

made firmer at less expense, and there is no need of a lining at this point, where the lining most commonly wears through.

IRONING BOARD.—Albert T. Scanland, Dunn Loring, Va. This improved form of board has devices for clamping and supporting the board proper in position on top of a table, be clamped to one end of and extended from a table, or be supported upon and between two chairs.

POULTRY CARRIER.—George M. Beer-bower, Cherry Vale, Kansas. There are eyes or staples in the coop or carrier, and a wire, cord, or rod, for securing the legs of the fowls, without injuring their joints, while the carrier is provided with facilities whereby the fowls may be conveniently provided with food and water while in store or transit.

SELF-WAITING TABLE.—Andrew Dahlstrom, Ashton, Mich. Combined with a main table is a supplemental or revolving table, and a suitable spring-operating gearing disposed within the main table, arranged to operate the revolving table, the table being easy to operate, and when in operative condition presenting a neat and ornamental appearance.

CHIMNEY.—Joseph A. Hodel, Cumberland, Md. This invention is an improvement on a former patented invention of the same inventor, and provides a novel construction and combination of parts whereby the chimney may be simplified, rendered easy of connection with the chimney wall, firm in position, and efficient in use.

TRUSS.—Alexander Dallas, Bayonne, N. J. This is a truss for retaining and curing abdominal ruptures, and is made to allow for connection with battery wires for establishing an electric current to the parts subjected to pressure by the pads, to prevent atrophy of the parts.

SUPPOSITORY FORMER.—Wayne J. Hull, Alexandria, Dakota Ter. This is a machine of simple construction wherein suppositories may be expeditiously formed without the aid of heat, and wherein suppositories of different sizes may be shaped.

BOTTLE STAND.—Charles K. Hall, New Orleans, La. This is a stand provided with a support for bottles and a retaining plate, and the stand also has a rim to prevent removal of the bottles from the stand except through a door in the rim, which door may be kept locked, so that only the person holding the key can remove the bottles from the stand.

SCIENTIFIC AMERICAN
BUILDING EDITION.

MAY NUMBER.—(No. 43.)

TABLE OF CONTENTS.

1. Elegant plate in colors, showing elevation in perspective and floor plans for a dwelling costing four thousand dollars. Page of details, etc.
2. Plate in colors of a summer cottage for one thousand two hundred dollars. Floor plans and page of details.
3. Design for a bank building, with plan and view of interior.
4. Perspectives and floor plans of an elegant residence at Bell Haven Park, in Greenwich, Conn. S. Edwin Tobey, Boston, Mass., architect.
5. A mountain cottage lately erected at St. Cloud, Orange, N. J. Elevation and floor plans. Architect Mr. Arthur D. Pickering, New York.
6. A dwelling at Springfield, Mass. Plans and perspective elevation. Cost eight thousand five hundred dollars.
7. Engraving showing perspective elevation of a cottage erected at Roseville, N. J., at a cost of six thousand seven hundred and fifty dollars. Floor plans. F. W. Ward, architect, New York.
8. Illustration and floor plans of a combined school house and country cottage erected at St. Cloud, Orange, N. J. Arthur D. Pickering, New York, architect.
9. A residence at Springfield, Mass. Perspective elevation and floor plans. Cost three thousand five hundred dollars. J. D. & W. H. McKnight, architects.
10. A cottage built at Roseville, N. J., for six thousand seven hundred and fifty dollars. Elevation and floor plans.
11. A cottage at Holyoke, Mass., lately erected for Howard A. Crafts, at a cost of three thousand one hundred dollars.
12. View of Auburndale Station, Boston and Albany Railroad, with plan of station grounds. H. H. Richardson, architect.
13. Miscellaneous Contents: The final payment clause in building contracts.—The plan.—Bending wood.—The Stanford tomb.—Experiments with cement mortar.—The railroad in horticulture.—The improved "Economy" furnace, illustrated.—The Academy at Mount St. Vincent on the Hudson, N. Y.—Wrought iron and cement lined pipes, illustrated.—Sheathing and lath combined, illustrated.—Artistic wood mantels.—A new ventilating furnace, illustrated.—Creosote wood preserving stains.—Large trees.—Rotary cutting tools for working wood, illustrated.

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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.

(795) F. M. asks: 1. Is the simple electric motor described in your SUPPLEMENT suitable for running a propeller in a 12 or 13 foot canoe? A. It would answer. 2. What size propeller should be used for such a boat? A. Use a two-bladed eight inch screw, ten inches pitch. 3. Are four one-gallon cells of Fuller battery sufficient to run the motor, and about what power would be developed? A. They would give about 1-10 horse power. 4. How long will one solution last, that is, how long can the propeller be run by one charge without stopping? A. It depends on the work. One charge might last six hours. 5. How should the battery be connected—in series or parallel? What is the difference in effect between the two ways? A. In series. Even then the voltage would be rather low. Series arrangement increases voltage, and diminishes amperage, and vice versa.

(796) D. S. M. writes: 1. For information in regard to the process used in air brazing or soldering light sheet brass for making tubing. A. File the parts to be joined to an accurate fit, bring them together, and secure with iron wire. Place a mixture of pulverized borax and fusible brass (spelter) in small fragments along the seam and heat in a forge or with

a blow pipe. The fusible brass will melt and run into the joint and secure it. Allow it to cool before removing the wire. Also see article in SCIENTIFIC AMERICAN of May 4. 2. Also the amount of sulphuric acid used to the gallon for making water gas. The materials used are old scraps of iron or zinc, sulphuric acid, and water. A. One hundred pounds of sulphuric acid will give about two pounds of hydrogen gas, occupying a volume, under ordinary conditions, of 652,336 cubic inches or 377 cubic feet. For a description of the processes of making hydrogen gas on the large scale, we refer you to our SUPPLEMENT, Nos. 656 and 657, in which various processes are described.

(797) H. W. asks: 1. Weight of one cubic inch of pure platinum. A. About 5300 grains, varying according to the processes it has gone through, rolling, wire drawing, etc. 2. Value of same? A. \$120.

(798) F. S. M. asks: I have just completed a simple electric motor according to the plans published by you in SUPPLEMENT, No. 641, only that I reduced the plans one-third, which I figured would give me a little less than one-half the power. I wound both the field magnet and armature with No. 20 single cotton covered wire and made the armature core out of No. 20 iron wire. It runs finely with a battery of four cells with zincs and carbons 5 by 6, but does not give much power. Did I use the right size of wire in winding? I made it carefully to scale and the parts fitted together all right. The battery cells I made out of mill board according to the instructions in last week's SUPPLEMENT, and had excellent success. In addition to a thorough soaking in hot paraffine, I allowed a coating 1/4 in. thick to cool on the bottom inside and then brushed the hot wax all over the inside. They hold two quarts of fluid and are 6 by 7 by 3 1/4 in. in size. The series consists of four cells of the size. How large a candle power lamp would it light? The zincs and carbons are as stated, 5 by 6 inches. A. We think, if you were to connect your field magnets and your armature in parallel, the motor would work better. It will also be well to use two additional battery cells. Such a battery as you now have would light a five-candle power lamp.

(799) J. L. S. asks what thin liquid wood preservative to use on exposed pine trusses that have become slightly checked. Oil paint is almost too thick to flow into the openings. Shall protect them by covering after treatment. A. The best and cheapest preservative for such work is a coat of thin coal tar (thinned with benzine), if there is no objection from its odor. As you say the truss is to be covered, the appearance should not be objectionable. If a water solution is required, we recommend a solution of 20 pounds sulphate of iron to 100 pounds water as the cheapest, and if it can be thoroughly applied by soaking, it makes a very durable preservative. Or you may saturate with corrosive sublimate solution, one pound of chloride of mercury to four gallons of water, although this is very poisonous and dangerous to persons making the application.

(800) C. H. B.—The "median power" of Oliver Evans is the center of percussion of revolving bodies, or "center of gyration" of the later books. Its distance from the center of a true disk is called the radius of gyration. In a millstone which is supposed to be nearly a perfect disk, the distance of the center of gyration from the center of motion is 7071 of the radius from the center or radius $\times 0.7071$. See Haswell's Engineers' Pocketbook, which we can mail for \$4. The center of gravity in a trapezium and trapezoid are also illustrated with rules and formulas in Haswell.

(801) S. C.—For clock and musical bells no other metals than copper and tin should be used. Copper 1 pound, tin 5 1/4 ounces is as hard a composition as can be used to advantage. It is used for clock bells and gongs. In casting the gongs should be gated at several points along the edge from a side runner. Stand the flask on end as usual with brass founders for pouring, partially dry the gong prints by holding a red hot iron over it for a few minutes, for thin gongs. If they are found to crack by leaving in the mould, remove from the mould as soon as poured and anneal in hot ashes. For other information asked see "Gas Engine," by D. Clerk, for \$2.50, which we can send by mail.

(802) J. R. H. writes: 1. How is oxygen and hydrogen gas made. Also is it more compressible than air? A. Oxygen is made by heating chlorate of potash mixed with binoxide of manganese in a retort. The gas comes off quickly below a red heat. Hydrogen is made by dissolving zinc or iron scrap in sulphuric or hydrochloric acid. They differ but slightly in compressibility from air. 2. If you have a cylinder one-half full of water and the rest full of air, pressure 100 pounds per square inch, in the top of the cylinder a hole less than an inch in diameter, in that hole put a funnel, insert the small end of it in the hole in top of cylinder, if that funnel is full of water, will it run into the cylinder? A. No. Air would bubble out through it until the pressure was reduced, when it would run in. Some water, however, might work its way in along the sides of the funnel tube while the air was escaping. 3. If in that cylinder you make two openings, one into the air and one into the water, each 1 square inch, the opening into the air will have a pressure of 100 pounds, what pressure will the one leading into the water have? A. In the water opening there will be a little more than 100 pounds outward pressure, owing to the weight of the liquid column above it. 4. Is it possible to temper copper to the hardness of steel? If so, how is it done? A. No way of doing this is known.

(803) E. A. D. writes: 1. I have several fonts of job type and a first class dental vulcanizer. Can I use the latter for making rubber stamps, and, if so, how? Please give full directions. A. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 83 and 569. 2. Where can I get the rubber for the above purpose? A. Apply to any rubber belting, packing, or supply house. Consult our advertising columns. 3. I have noticed that, in some of the so-called induction machines now on the market, the coils are not induction coils at all, but simple coils wound with very fine wire. Does this coil in any way increase the intensity of the current passing through it? A. Such a coil gives an intensified extra current on making or breaking the connection. 4. A receipt for a nickel solution for plating. A. Consult

the files of this paper. In our SUPPLEMENT, Nos. 192 and 425 and in others also, processes are given. 5. In plating articles of iron, tin, etc., with copper, the copper scales off and will not adhere firmly. How can I remedy this? A. You should use an alkaline copper bath, until the metal is covered, then you can finish in the ordinary bath. A cyanide bath will answer. You should have some good treatise on the subject, such as is contained in our SUPPLEMENT, No. 310. 6. In what number of the SCIENTIFIC AMERICAN can I find the article on the isolation of fluorine? A. SCIENTIFIC AMERICAN SUPPLEMENT, No. 577, contains a full descriptive and illustrated article. 7. What is the true height of the Eiffel tower, 984 or 1,178 feet? A. 300 meters or 984 1/4 feet. 8. In what way does the Geissler differ from the Sprengel air pump? A. See our SUPPLEMENT, Nos. 629, 630, and 631, for full description and diagrams of all leading mercurial air pumps. 9. How can I purify mercury for use in a barometer? A. Distill it from an iron retort. 10. Will I be permitted by the Bell Telephone Company to make and use the telephone described in SUPPLEMENT, No. 142? A. You will be open to suit for infringement. They can only stop you by procuring an injunction in a federal court. 11. From what is beer yeast obtained? A. From fermenting malt infusion. 12. What work on electricity can you recommend? A. There are a very large number of excellent works devoted to the different branches of the subject, any of which we can supply. We suggest Ayrton's Practical Electricity, \$2.50; Electricity in the Service of Man, by Wormell, \$6; Larden's Electricity, \$1.75.

(804) J. P. wants to know how to oxidize brass by a dip so as to give it a cherry color. A. For brass dip changing the color through brown to a full red. Solution of 1 pint water, 16 drachms nitrate of iron, 16 drachms hyposulphite of soda. Another solution is 1 pint water, 16 drachms hyposulphite of soda, 1 drachm nitric acid.

(805) C. A. K. S. writes: Can you furnish me with the receipt for making Worcestershire sauce? A. Mix together 1 1/2 gallons white wine vinegar, 1 gallon walnut catsup, 1 gallon mushroom catsup, 1/2 gallon of Madeira wine, 1/2 gallon Canton soy, 2 1/2 pounds moist sugar, 19 ounces salt, 3 ounces powdered capsicum, 1 1/2 ounces each of pimento and coriander, 1 1/2 ounces chutney, 3/4 ounce each of cloves, mace, and cinnamon, and 6 1/2 drachms asafetida dissolved in 1 pint brandy 20 above proof. Boil 2 pounds hog's liver for 12 hours in 1 gallon of water, adding water as required to keep up the quantity, then mix the boiled liver thoroughly with the water, strain it through a coarse sieve. Add this to the sauce.

(806) R. & V. H. (Neb.) ask: Can there not be some use made of the hundreds and thousands of plow shares and mould boards of plows that now lie around our blacksmith shops in the great West? A. A new lay or share costs from \$3 to \$4, and a mould board from \$6 to \$8. It seems that the steel in the old and partly worn ones ought to bring something. A. Iron and steel in any form has a market value in the Eastern and Middle States. First quality cast iron scrap is worth \$12 per ton. Second quality, such as chilled plow points, \$8 to \$10 per ton. Cast steel scrap, first quality, \$18 per ton. Second quality, such as steel mould boards, \$16 to \$17 per ton. You should be able to find a ready market for steel scrap in Chicago.

(807) A. H. T. asks: 1. What is the relative manufacturing cost of pressed and blown glassware? A. Pressed glass is the cheapest for plain goods. A comparison cannot be fairly made in general terms for pressing is a necessity in cheap figured goods, which cannot be made by blowing alone. 2. Can thin ware like thin tumblers be made by the former process? A. The thin goods so much in vogue now cannot be pressed and retain the fine, clear qualities of the blown goods. 3. Can pressed ware be accurately enough made to form close joints in articles made in sections, or is grinding necessary? A. There is a possibility of making jointed articles that are to be closed with rubber, but a tight glass to glass joint without packing cannot be thus made.

(808) P. B. M. asks: What velocity has air driven out of a 4 inch by 4 inch square pipe, two feet from end of it? Running at velocity of 130 feet per second from out of the pipe. A. There are no data for the decreasing velocity of air projecting from a nozzle. The vortex produced by contact with the outside air of the same specific gravity commences at the nozzle, so that at two feet distance the central portion of the blast would retain most of the initial velocity, while the outer portion would be greatly retarded by admixture with and putting into motion the surrounding air. The velocity is no doubt inversely in proportion to the distance that the blast is felt, so that if the blast produces a perceptible movement at 50 feet distance, then 127 feet would be the approximate velocity at 2 feet from the nozzle for the central portion.

(809) A. H. M. asks for a recipe for staining pine, ebony or black, a black that acids will not discolor. A. Boil 40 parts gall nuts, 4 parts rasped logwood, 5 parts sulphate of iron and 5 parts verdigris with water. Strain through linen and apply the warm fluid to the wood, and then give it three coats of a warm solution of 10 parts of iron filings in 75 parts of vinegar. Toprevent discoloration of the stained wood by acids, polish the surface with paraffine.

(810) G. E. C. communicates the following: This formula has given perfect satisfaction as a flour paste for all purposes. Mix 1 pound rye flour in lukewarm water to which has been added one teaspoonful of pulverized alum; stir until free of lumps. Boil in the regular way or slowly pour on boiling water, stirring all the time until the paste becomes stiff. When cold add a full quarter pound of common strained honey, mix well (regular bee honey, no patent mixture). In labeling I always paste my tin (or my work) and apply my label except where I have a narrow label, and pasting the tin would mar the other work, but where the paste is put on tin we find it to hold perfectly.

(811) J. O. B. asks for the best composition of bell metal for tone for musical bells. A. Nothing but copper and tin should be used for such bells. The composition varies for tone from 16 ounces copper and

4 ounces tin to 16 ounces copper and 3 1/4 ounces tin. The first gives the finer tone. See Query No. 801.

(812) T. O. D. asks how long compressed air (300 pounds pressure) would remain in an iron tank provided there was no leakage through valves. A. The air at that pressure will remain for an indefinite time without leakage. The tank should be tested by placing a little ether in the suction of the compressor, when, if there are any leaks, they can be found by the smell, in the same manner as gas fitters find leaks in gas pipes.

(813) H. M. E. asks: What is the principle of the Ericsson calorific engine? A. See description of Ericsson's calorific engine, illustrated in SCIENTIFIC AMERICAN SUPPLEMENT, No. 70.

(814) M. L. Co. — Mica of fine, clear quality and large size is much used in the stove trade and for miners' lanterns. Refuse mica is used for paint body by grinding.

(815) S. I. asks: What is phenol-phthalic acid, and where could it be obtained, as I wish to procure some for analytical purposes? A. It is an organic compound based on phenol, two hydrogens of the original benzol group being displaced by 2C₆H₄O₂. It is sold by dealers in chemical supplies.

(816) S. S. writes: A piece of metal composed of gold and silver weighs 22 ounces in air and 20 1/2 ounces in water. What proportion of said metal is gold, and what proportion silver, assuming the specific gravity of gold to be 1934, and silver 1050. A. 22-20 1/2 = 1 1/2 = the weight of water displaced by 22 ounces of the alloy. Its specific gravity therefore is $\frac{22}{1\frac{1}{2}} = 1466$.

Taking one hundred parts as the basis, and denoting parts of silver by x and of gold by y, we have the following equations:

$$\begin{aligned} (1) \quad x+y &= 100 \\ \text{and } 105x+1934y &= 100 \times 1466 = 146600. \end{aligned}$$

Solving these we find
 $x = 55.23$ parts in 100
 $y = 44.77$ " " "

(817) J. A. D. writes: Are there any means by which a man might efface marks that have been tattooed on his hands by means of dye stuff? A. We refer you to our SUPPLEMENT, No. 695, for an article on the above subject.

(818) E. V. writes: 1. Can you tell me a good remedy for pimples? A. Lead a perfectly healthy life and eat moderately of simple food. Bathe the face with a solution of Rochelle salts. 2. A receipt to whiten hands? A. Wear gloves, wash the hands frequently with best quality soap, and occasionally with javelle water.

(819) H. H. asks for a recipe for an effective gargle. A. For a very mild one use salt and water; for a more effective one use about 1 drachm chlorate of potash in 2 ounces of water, or 1/2 to 1 ounce alum in 1 pint of water sweetened with honey. The chlorate of potash gargle must be used with care, as it is poisonous.

(820) A. E. M. — The sample is magnetic iron ore. We can take charge of the assay. It will cost \$5 for determination of iron, determinations of sulphur and phosphorus will cost \$5 apiece. We should be glad in any case to have you send four or five pounds by express to our address for our further examination.

(821) W. P. H. asks (1) how to clean carpets on the floor to make them look bright. A. To a painful of water add three pints of oxgall, wash the carpet with this until a lather is produced, which is washed off with clean water. 2. How to take out varnish spots from cloth? A. Use chloroform or benzene, and as a last resource spirits of turpentine, followed after drying by benzene.

(822) W. H. P. asks for a good carbon or manifold paper, such as used in operating type writers. A. Melt together 1 part beeswax and 6 parts of lard oil, and mix in lamp black and a little Prussian blue. As regards proportions of coloring matter, use judgment. It should be done in a warm mortar. In place of above coloring matter you may use logwood carmine or any good form of dry pigment.

(823) J. M. F. — Iron pyrites, no value, composed of sulphur and iron.

(824) J. B. C. asks whether a form of wood, flat or other shape, could be coated with a film of copper that could be separated from the wood without injury to either, so that the wood could be used again. A. Yes; dry the wood, immerse in hot paraffine, coat with plumbago, and plate with a battery. See our SUPPLEMENT, Nos. 157, 158, and 159, for batteries, and No. 310 for electro-plating.

(825) A. B. writes: 1. An electro-magnet of certain dimensions, with the wire wound on one piece, will sustain 145 lb. With the same wire cut into seven pieces it sustained 750 lb. Were the seven pieces wound side by side or did each piece form a layer? A. The seven pieces may have been wound side by side or in different layers. This of itself makes no difference. It is probable that the pieces were connected in parallel circuit, so as to enable the wire to take a heavy current. 2. Please describe a commutator. One suitable for a two inch Simmes armature. A. For description of commutator see SUPPLEMENT, No. 600.

(826) Student asks: 1. How are the red, blue, and black characters put on society pins? A. The colors referred to are put on by means of enamel, which is fused upon the surface of the metal. 2. What is the best battery for running an electric motor, and what are the materials used in making it? A. Use a plunging bichromate battery. 3. Is there any way to tell the amount of wire needed on the field magnets and armature of an electric motor, if you know the size of the magnets and wire? A. Consult Hering's "Dynamo-Electric Machinery."

(827) C. E. R. writes: I am interested in plating with gold. Can you inform me or tell me where I can get information as to the right solution to use and the manner of making and using such solution? A. For a brief and reliable treatise on electro-plating with gold and other metals we refer you to our

SUPPLEMENT, No. 310. We can also supply you with the standard works on the subject, such as Watts' Electro-Deposition of Metals, \$3.50.

(828) W. H. L. asks: If lily of the valley flowers (in quantity) are put into Atwood's alcohol, 95 per cent, will the alcohol absorb the perfume? A. To a very limited extent only. The perfume should be extracted by maceration in oil or grease or by simple absorption by grease, and then obtained as an alcoholic extract if desired. We can supply you with books on the subject of perfumes at regular price.

(829) W. J. P. writes: Is there any way to give brick the red color of those burned from clay rich in oxide of iron? Would it probably be too expensive to mix ground uncalcined oxide with the clay? Mixing ordinary black loam with clay affects the color to some extent, but is apt to injure the strength of the brick. Putting salt in the fire near the close of a burning to a limited extent gives a dark red to the brick, but this is apt to take place only where the brick are subjected to a great heat. What is the chemical action of this last? A. We doubt if you obtain any practical success by such mixture, owing to the expense and difficulty of securing a homogeneous mixture. As regards the chemistry of the salt process, it may operate as a flux, fusing with the light colored silicious portions into a colorless glass, and not affecting the iron oxide, or it may even volatilize some of the alumina as chloride. It is not easy to state its action without examination or analysis.

(830) H. F. K. — To mount prints on glass, follow the directions given by J. E. Dumont, that is, take four ounces of gelatine and soak half an hour in cold water; then place in glass jar, adding sixteen ounces of water; put the jar in a large dish of warm water and dissolve the gelatine. When dissolved, pour into a shallow tray. Have your prints rolled on a roller, albumen side out; take the print by the corners and pass rapidly through the gelatine, taking great care to avoid air bubbles. Hang up with clips to dry; when dry, squeeze carefully on to the glass. The better the quality of glass, the finer the effect. Also see page 120 of February 21, 1885, issue of the SCIENTIFIC AMERICAN. You can make transparencies on glass with photographic apparatus. See book called "The Amateur Photographer."

(831) A. R. asks (1) how to prepare a lacquer to keep brass tools from tarnish. A. The tools must be cleaned and polished so as to be absolutely free from grease. They are next slightly warmed and varnished with a solution of seed lac or shellac in alcohol. The success of the operation depends on the clearness of the surface. A finger touch before varnishing will affect the finish. 2. How can gold be tested as to its karat, besides the test stone process, and give more minute distinction than this latter? A. An analysis or assay is the only reliable method. Sometimes, the specific gravity is determined, and from this the composition is deduced by algebra, but the method is only approximate, and can only be used where the alloy or metal mixed with the gold is known. See next query

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