

(3) H. R. Y. asks: 1. Is the dynamo electric machine described in SUPPLEMENT, No. 600, suitable for electroplating? If not, what change should be made? A. The dynamo referred to is not suitable for electroplating, but, by winding the armature with No. 12 wire, one layer in each coil, and the field magnet with No. 9, it may be made to answer the purpose. 2. Will cast iron do for the field magnet and armature core of the simple electric motor, described in No. 11, current volume of the SCIENTIFIC AMERICAN? A. Cast iron will do for the field magnet, but the armature core should be made of iron wire.

(4) E. C. asks (1) if a piece of wrought iron of the required dimensions would not answer for the armature core instead of one made of wire. A. Wrought iron will answer, but not as well as iron wire. 2. And if a field magnet made of wrought iron would not answer for the one made of strips of Russia iron? A. Yes. 3. Also if a battery, used for an electric test, would develop sufficient power to run the motor itself, without using it to run anything else? The battery I have is a pile Leclanche. A. No.

(5) Old Subscriber.—SCIENTIFIC AMERICAN SUPPLEMENT, No. 384, contains directions for transferring and coloring photographs on glass.

(6) J. A. M. asks: 1. How can I find the required height of water in any steam boiler? A. In horizontal tubular boilers, the water line should be at one-third the distance from the top of the tubes to the top of the shell. In locomotive stationary boilers, the water line should be one-third the distance from the top of the crown sheet to the top of the shell. In vertical boilers of ordinary make three-fourths of the tubes should be in contact with solid water. 2. How to make flanges on boiler and dome heads. A. Put flanges on boilers with a putty made of white lead, iron borings, and Prince's metallic paint, equal parts, made up with boiled linseed oil. 3. How can I make a vertical steam boiler any size, at small cost? A. We cannot teach an easy way of boiler making. Make boiler in the regular way with good material and workmanship. 4. In making vertical boilers with the tubes extending up above the water, is there not danger of the tubes leaking? A. We do not approve of the use of vertical boilers, where a horizontal one can be made available. The exposure of the upper end of the tubes and tube sheet to undue heat is not desirable, and gives much trouble in that class of boilers, especially when made short, as for steam yachts and launches.

(7) F. W. P. asks: Is there any chemical which, added to melted glue, will keep it in a liquid state when cold? A. An excellent liquid glue is made by taking a wide mouthed bottle, and dissolving in it 8 ounces best glue in $\frac{1}{2}$ pint water by setting in a vessel of water and heating until dissolved. Then add slowly $\frac{1}{4}$ ounce strong nitric acid of 36° Baume, stirring all the while. Effervescence takes place with generation of fumes. When all the acid has been added, the liquid is allowed to cool. Keep it well corked and it will be ready for use at any moment.

(8) J. G. F. desires a good receipt for making root beer. A. Take 1 ounce each of saffron, allspice, yellow dock and wintergreen, $\frac{1}{2}$ ounce each wild cherry bark and coriander, $\frac{1}{2}$ ounce hops, and 3 quarts molasses. Pour sufficient boiling water on the ingredients, and let them stand 24 hours, filter the liquid and add $\frac{1}{2}$ pint yeast, and it is ready for use in 24 hours.

(9) C. J. W. asks: Can cast iron be soldered so as not to leak water, and how? A. Solder cannot be made to flow on cast iron. Pure tin may be wiped over a crack by cleaning the surface and using tinners' acid, with a soldering iron.

(10) R. R. J. asks: Could an 8 light dynamo be run by windmill to charge a storage battery for lighting, and what power would be required to run it? A. Yes; eight 16 candle power incandescent lights will require about $\frac{1}{2}$ horse power with an economical dynamo. A windmill of 2 horse power should be able to charge a storage battery for an evening during the 24 hours and accumulate a surplus.

(11) H. F. B. asks: Who was the patentee of the monkey wrench, and is the name spelled Monkey or Moncky? A. "Monkey" is the proper spelling. The name is largely used for mechanical and nautical appliances. The wrench is very old, and we do not know that it was originally patented.

(12) S. E. H. writes: I wish to make some hollow lead castings, about 4 pounds in weight, shell $\frac{1}{8}$ inch in thickness. The crooked shape of casting prevents digging the core from the center and clearing it from obstructions, although there is a hole or opening at each end. Can I cast them in iron mould (in halves), using a suitable shape core, and use a liquid that will soften the core, so that it can be washed out? A. Make the core with flour paste, as little as possible to hold the sand. Make it in halves, so that you can excavate a passage clear through the center when the halves are pasted together. Scratch out all the sand possible from the casting and make a connection with a water faucet or pump and wash out the central parts. If the sand does not all wash out, pour in sulphuric acid 1 part, water 2 parts, mixed. It will soon loosen the sand so that it will wash.

(13) M. B. asks (1) a good cement to fill in the cracks of a floor before painting or staining it. A. You had better use strips of wood driven in and planed off smooth and even with the floor. Cement will break up and look rough in a short time. 2. What preparation is used for lamp wicks to obviate the necessity of trimming them? A. Use asbestos wicking for incombustible lamp wick.

(14) F. G. B.—The common varieties of prepared mucklage are made by treating dextrine with sulphuric acid, which in time destroys the color of the stamp. Better use a mucklage made by dissolving gum arabic in water.

(15) J. C. B. asks the best way to cover steam pipes laid in very damp, moist soil. Cold spring water around them condenses the steam as fast as it flows in. A. You cannot protect the pipes when water has free access to the covering. Make a drain beneath

the pipe, then box the pipe with an air space of 2 inches all around the pipe. Pipe can lay in chocks in the box to keep it in place. Cover the ends of the box to prevent circulation of air.

(16) J. S. G. asks how to straighten out pieces of zinc (which are cut for shoe patterns) so as to make perfectly flat. The number of zinc is 14. A. This work requires as much care as to flatten a saw blade. Gently hammer on a flat iron upon the parts that draw up or bulge, not on the bulge itself. A little practice is necessary.

(17) V. L. C. asks: 1. How to make a strong cement to mend china. A. See the article on "Cements" in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158. 2. How to make a preparation that will clean marble figures that are greasy and very dirty. A. Make a paste with fuller's earth and hot water, cover the spots therewith, let it dry on, and the next day scour it off with soft yellow soap.

(18) M. asks for a recipe for a yellow dye or stain, to stain sap pine or cypress. A. Either brush over the work with a tincture of turmeric or warm the work, and brush it over with weak nitric acid, varnish or oil as usual, a very small bit of aloes put into the varnish will give a rich yellow color to the wood.

(19) A. H. T. asks a receipt for a strong percussion cap, one that explodes easily. A. Use 100 grains of fulminating mercury triturated with a wooden muller on marble, with 30 grains of water and 60 grains of gunpowder. A solution of gum mastic in turpentine is used as a medium to attach the mixture to the metal.

(20) J. L. P. asks how to make common glue dissolved mix with linseed oil and remains so. A. We know of no means by which this can be accomplished. An alkali such as soda or potash would probably make them mix, but its effect would be to spoil the inherent qualities of the linseed oil.

(21) C. J. S.—You will find full directions for pressing plants and forming a herbarium in SCIENTIFIC AMERICAN SUPPLEMENT, No. 501.

(22) J. E. C. asks: What articles combined will produce spontaneous combustion in the shortest time? A. Water and potassium.

(23) T. B.—Ampere's theory states that currents of electricity travel around a magnet in planes at right angle to its axis, as if a fine wire were wrapped around it. No theory of any note holds that longitudinal currents exist in them. It is all theory and little more than a framework to organize facts. If the observer looks toward the north pole of a magnet, the current is assumed to move in the direction opposite to the hands of a watch.

(24) S. W. writes: I wish to use a low fusing solder of lead, tin, bismuth, and cadmium, and find difficulty in making a strong joint. What should I use as a flux to obtain a clean solid joint, and not raise the melting point of the alloy, which is 150° Fah? A. Use Venice turpentine or Canada balsam.

(25) J. S. asks: What kind of woods are the best to resist the action of steam, with the least amount of warping? A. Yellow pine and oak.

(26) G. W. H. asks: What kind of oil should be used in oiling base ball bats after they are turned out, and how should the oil be rubbed in? A. Use boiled linseed oil on a rag.

(27) C. E. H. asks the best way of cleaning a bronze chandelier, soiled with fly specks, etc. A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 39, process for refinishing by dip and lacquer.

(28) E. C. H. asks: 1. Will you kindly answer through your paper, whether the body of field magnet, or armature core of electric motor described in your paper of March 17, 1888, could be made of soft cast iron without injury to the working or the power of motor? A. Yes. It has been described and illustrated in our columns. 2. Is there any way or process to melt or dissolve small pieces of carbon, such as thrown out of electric street lamps, so as to make it into sheets of $\frac{1}{8}$ inch and upward in thickness? A. No. You may grind them to powder, and mix into a paste with sugar and water, and after moulding may heat them in a covered receptacle to full redness. This will give an inferior product, unless a retreatment with the slurp, followed by a second baking, is given.

(29) J. P. F. asks: 1. Can you inform me how long the battery recommended will run the "Simple Electric Motor," described on page 165, of the March 17, 1888, number, before becoming exhausted? A. Three or four hours. 2. Can the battery described on page 390 of the December 17, 1887, number be used to run this motor? A. The battery is too small for the purpose.

(30) W. E. asks: 1. Could I not double the dimensions of the one described? A. Yes. 2. Would I need a larger size of magnet wire? A. The magnet wire may remain the same, and you can adapt its resistance to your battery by connecting the coils 2 inches parallel. 3. How many cells of bichromate battery would be required? A. About 12. 4. What power would it develop? A. Probably $\frac{1}{2}$ horse power.

(31) O. M. W. asks: 1. What is the best and cheapest battery to run simple electric motor described in SCIENTIFIC AMERICAN (vol. lviii., No. 2), that will generate current enough to run two sewing machines? A. The plunging bichromate battery is best for the purpose. It will require about 8 cells. We expect soon to describe a battery adapted to the motor. 2. Could motor be run with an open circuit battery (Leclanche or Bunsen). If so, how many cells of either would be required? A. The Leclanche battery is not adapted for running motors, as it polarizes in a very short time. 18 or 20 cells of Bunsen connected up in parallel will probably run the motor.

(32) W. P. K. asks: Is there anything with which paper may be saturated, so that the blank

portions of the paper will be a conductor, while the portions covered by printing will be a non-conductor of electricity? A. Use bronzed paper and write on it with thick India ink. The surface of the paper will then be a conductor, except where protected by the ink.

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