

293 (17), vol. xlv. Resin oil can be used in connection with the bitumen, but a diluent, such as turpentine or naphtha, will be necessary. 2. After painting a roof, say with asphalt or coal tar, what wash (cheap white preferred) could I use over the asphalt, etc., to absorb the sun's rays? Wish some article in powdered form (so to be handily transported) which can be mixed with water as needed for use. A. As we understand you, fine chalk or potter's clay could be used. 3. I also inclose sample of saturated felt or paper. Would like to know, if possible, with what substance the felt is saturated. A. The felt is saturated with crude coal tar from gas distillation.

(13) N. L. writes: I made the induction coil described in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 160, and it gives very satisfactory. Now I want to know if it will give satisfaction to produce electric light? What kind of regulator can I use? Can I use the Brush electric light regulator, described in SUPPLEMENT, No. 162? How many of the copper and zinc batteries must I use? A. You cannot produce an electric light of any power with an induction coil. Use a dynamo machine or battery. For a description of these and of the best kinds of lamps for regulators, see SUPPLEMENTS, Nos. 157, 158, 159, 162, 232, 234, and 235. Also "Simple Electric Light Apparatus," in No. 149.

(14) F. H. N. asks: 1. Where will I find complete directions for making a simple electric machine for electro plating and for electric light? A. See SUPPLEMENT, No. 161. 2. I have a gravity battery, the cells of which are 5x7 inches. What kind of a solution should I put in them? A. Put in 1 1/2 lb. of sulphate of copper and fill the cell with water. 3. Could a tank be made of any very close grained hard wood for silver solution? A. No; wood of any kind gradually reacts on silver solutions and reduces them. See "Silver Plating," in SUPPLEMENT, No. 310.

(15) J. T. G. writes: My trouble is that my files rust after lying wrapped up in papers for some time. My method of putting them through after hardening is as follows: They are first put in dilute muriatic acid, then scrubbed with sand and water, then rinsed in clean running water and put in strong lime water, rinsed well in this and put before a fire to dry; the drying takes one minute to the one pound weight. After being dried the lime is brushed out of the teeth and they are oiled with castor oil, sometimes extra lard oil, but they will rust no matter which oil we use, and they turn brown after coming out of the lime, or before getting to the lime, although they are put through as quick as possible. What I want to know: is muriatic acid the best for cleaning files, and is there anything I can put in the lime that will destroy the acid and keep them clean and not liable to rust after being put through. Or can you give a better method of putting them through than the way I describe? Any information you can give, through your valuable paper, the SCIENTIFIC AMERICAN, will be thankfully received by me. A. Rinse off the acid (muriatic) quickly in running water before putting in the lime water. Have the lime water boiling. The heated metal will dry spontaneously on removing it from this dip. Use lard, paraffine, or mineral sperm oils, or a mixture of these. If the oil is put on hot it will cover and keep the metal clean longer.

(16) G. B. writes: Is ozone made cheap enough to sell as an article of merchandise, and in what form is it best adapted to arrest all forms of decay? A. No; ozone or allotropic oxygen has only been observed as a gas. It has never been obtained in a concentrated form. The substance sold in the market as ozone appears to be sulphurous acid, or rather a preparation readily yielding that substance under favorable conditions.

(17) J. G. D. asks for a receipt for making a glue joint for wood work that is insoluble in water. A. You will find several good receipts for waterproof glue or cements under "Cements," in SUPPLEMENT, No. 158. See also "Cements," in SUPPLEMENT, No. 133.

(18) R. S. asks: 1. Is it as hard to fire on some ocean steamers as on a locomotive? What is the difference? A. Yes; and in hot weather, worse. 2. In large passenger steamers and merchant steamers what are the hours? A. When running, the hours are, generally, for long voyages, four hours on duty and eight hours off. On shorter routes, the "watch" is generally the length of the run. 3. What pay and are they in the same standing as the crew or sailors? A. From \$30 to \$40 per month. Firemen generally rate above deck hands.

(19) J. B. R. asks: Which is right: to blow the whistle, then start the machinery, in a manufactory, or start the engine first and then blow the whistle? A. Blow your whistle after your engine is in full operation. 2. A says that the diameter of a worm being larger or smaller increases or diminishes the speed of the worm gear the same as in spur gears or pulleys. B says it is not so. Which is correct? A. B is correct.

(20) J. H. F. asks: Has any substitute been used with advantage for the zinc cylinders in the oxyhydrogen light? How would magnesite answer? A. See answer to J. A. L. (2), No. 1, current volume. Magnesite ground, pressed, into form and calcined, can be employed instead of lime, but the cylinder so prepared would not stand the mechanical action of the flame as well as clear hard burned lime.

(21) A. P. S. asks: Will you let me know if there is any way to mend a crack in the face of a radiator? A. Try the iron cement recommended on page 2510, SUPPLEMENT No. 158.

(22) C. P. K. asks for the best method of drying and sifting gravel for polishing sand. A. If large quantities are to be operated upon, a revolving cylinder over a fire, like a coffee roaster, would be good for the drying process. To this cylinder, laid at an angle and to its lowest end, attach wire gauze or grating, with sections of different size mesh—the finest mesh next the drying cylinder—and under these sections place pans to catch what falls through.

(23) H. A. S. asks: 1. At what speed should a No. 4 blower be driven for a twenty-six inch cupola? A. 1,800 to 2,000 revolutions per minute. 2. How far should it be placed from the cupola, and why? A. You may place it any convenient distance, say from

15 to 60 feet. 3. Does it make any difference if the blower is on the floor above the cupola and run the fines down? A. The blower should not be above the cupola, but rather below it, so that in case of stopping for any cause, the gas shall not collect in the blower.

(24) C. F. D. asks: 1. Is there any difference between one hundred pounds to square inch steam pressure and one hundred pounds cold water pressure? A. No. 2. If any difference, which tries the strength of boiler most? A. There is no difference, but it is generally admitted that the boiler is stronger at the temperature of the steam than when cold. 3. What is the difference, and why is there a difference? What cold water pressure should a boiler stand to be safe at 100 pounds steam? A. By government rule it should be tested to 150 pounds.

(25) J. B. P. asks: What is the average net profit on tanning a hide, the hemlock bark costing about \$6 per cord? Of course, I know that sole, harness, kip, and calf require different amounts of bark. A. It is impossible to give definite information on this point, covering so great a business, extending all over the country. During the war, \$1 a hide was made in some instances on sole leather tanning, but for the last year or two the business of tanning all kinds of upper leather has been a very close one, many of houses claiming that it has been done at a loss; while latterly, owing to the high price of hides, the best conducted sole-leather tanneries are making but the smallest margin of profit. The business is not one to embark in at any time with a view to speculative profits, in any locality, any more than is that of farming, and \$6 is above the average cost of hemlock bark, unless delivered in cities.

(26) W. D. S. asks: 1. What is the highest working pressure it would be safe to carry on a boiler constructed of mercury flasks, as described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 182. A. If properly connected, we think 200 pounds safely; but when complete they should be tested by water pressure to 50 per cent more than the greatest steam pressure you intend to use. 2. Could salt water be used in such a boiler? A. Not well. 3. Would I have to pay twenty-five dollars for a license if I used it in a boat sixteen or eighteen feet long? A. Yes; you would have to undergo the regular inspection.

(27) J. A. asks: Will you please inform me how to repair a bell that is cracked? Can I saw down the crack and fill with copper or brass, and make it hold and ring all right? It is a large bell, and is cracked about eight inches long. Please inform me what I can do with it. A. You cannot mend it as you propose. The only thing to be done is to drill a hole at the end of the crack, and cut down the crack to the hole with a saw, so that the edges of the crack will not touch each other in vibrating. This will enable the bell to ring, but it will not restore its original sound.

(28) C. H. asks: How much pressure will a boiler stand, 20 inches long by 8 inches diameter, made out of galvanized iron one-thirty-second of an inch thick, without any flues? A. By government rule 115 pounds per square inch; but as galvanized iron of this thickness is generally inferior quality, would not advise more than 80 to 90 pounds.

(29) J. E. K. asks: 1. What size screw propeller shall I use for steam launch 16 feet long, 5 1/2 beam, engine 2 1/2? A. 18 to 22 inches diameter. 2. Will I have to pay the twenty-five dollars for license if I run the boat for my own use? A. Your boat must be regularly inspected and the fees paid, same as any other steamboat.

(30) A. P. J. writes: I am speeding up a circular saw, 20 inches in diameter, to be run by hand power and to saw cleft wood. I have a flywheel, 18 inches in diameter, weighing 80 pounds, to go on saw mandrel 3 feet long. How many revolutions should the saw make, and what the size of mandrel? A. If driven by power the saw might make 1,600 to 1,800 revolutions per minute. If you drive at any such speed you want no flywheel on the saw mandrel. The size of the eye of the saw will give size of the mandrel.

(31) R. W. D. asks (1) what the scale on the zinc in a Calland battery is; how can it be got rid of; and how often it should be removed. A. It is commonly composed of zinc, iron, and copper oxides. 2. What is the resistance of No. 32 (American) copper magnet wire per 1,000 feet? A. About 210 ohms. 3. In your answer to S. S. Mfg. Co. (4), page 11, current volume, should not ferrocyanide of potas., read ferricyanide of potas., or does the former act as well as the latter? A. Either will answer, but the ferrocyanide is preferred by many.

(32) C. S. G. writes: I have a number of musk rat skins, and am desirous of finding a cheap and easy plan of tanning them with the fur on for making carriage robe. A. Wash the skins in water, and cleanse them thoroughly by scraping or rubbing. Then rub well into the flesh side of the skin the following mixture: Alum, powdered, 2 1/2 pounds; salt and coarse wheat meal, each one pound; sour milk, q. s. to form a thin paste. When the skin will absorb no more of this preparation, spread a layer of the latter over it (on the flesh side), and fold up the skin with the flesh surfaces together and put it away in a cool place for a day. Repeat this pasting and rubbing each day for a week, washing out and half drying the skin every third day. Finally, thoroughly wash the skin in running water, drain; brush over it (flesh side) a strong solution of alum in water, and hang it up to dry. The dry skin is softened by rolling and pounding it with mallet or rubbing and stretching it with a flexible tool. It is commonly finished by rubbing down the flesh side with pumice stone.

(33) A. B. writes: Please give me a recipe for coloring chip straw black. I have tried several receipts, but instead of the braid being a nice black it has a purple tint. What I want is jet black like the imported goods. This braid is used in the manufacture of ladies' hats. What good work on coloring and bleaching can I consult? A. Use a small quantity of water containing 2/4 pounds logwood extract, 1 pound iron sulphate, and two-fifths pound verdigris. Put the straw

into the boiling liquid for half an hour and then expose to the air for a like length of time, repeating this treatment for several hours, or until, on rising, the straw is found to have developed a suitable black. The color deepens considerably when the dyed straw is exposed moist for several hours to the air. See practical dyeing receipts in SUPPLEMENTS, Nos. 249, 207, 185, 228, 231, and 53.

(34) W. J. W. asks how to bronze zinc fret work. A. Coat the metal with very thin gold size, and when nearly dry rub on a sufficient quantity of red bronze (bronze powder) dry, and burnish. Bronze powders of almost any shade are procurable in the market.

(35) F. B. L. asks: 1. What is the cause of the snapping and cracking in steam pipes? A. Condensation of steam in the pipes. 2. What books are there published devoted wholly or principally to steam fitting? A. See "Roper's Engineer's Handbook." Also "Baldwin's Steam Heating."

(36) A. S. writes: The statement has been made that the piston speed of engines, large and small, is now, or has been until lately, practically the same; this has been disputed. Will you please give the facts in the case, giving limits of speed of engines, say 8 inches by 16 inches, and 48 inches, by 96 inches or larger, and also state whether or not the tendency is to increase the piston speed in all engines up to 36 inch stroke over former practice? A. The tendency of late years has been to increase speed. Formerly the average speed of piston was about 300 feet; it is now probably not less than 450 feet. Of course the speeds are generally suited to the work. Some run up to 700 feet and even more per minute.

COMMUNICATION RECEIVED.

On the Ocean Packet Line. By J. W. N.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending January 3, 1881,

AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for 25 cents. In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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