

(30) W. H. asks: What is the process of making solid emery wheels, and if there is more than one process, and if they are patented? A. Many of the best wheels are cemented with vulcanized rubber, borax, or zinc chloride (or oxychloride), and barium carbonate; other materials, such as feldspar and clay, alkaline silicates, litharge and japan, shellac, and other resinous and gummy matters, albumen and lime, etc.

(31) G. A. W. writes: I am working at electroplating and gold plating, and as it has been some years since I worked at it, my memory has failed me in some things. 1. My solutions (silver) striking and plating are composed of the following: namely, striking to 1 gallon of water, 3/4 ounce silver (chloride), 1 lb. cyanide potassium (fused), 4 ounces of sal soda. Plating to 1 gallon water, 1 ounce silver, 3/4 lb. of cyanide potassium, 4 ounces of sal soda, and a little white caustic potash in each. Now I would like to know if these are all the necessary ingredients; if not, please enlighten me. A. Yes, the soda and potash are not essential. 2. If bisulphide carbon will make silver solution plate bright, will it answer for gold; if not, what will, and how used? How are the various colors obtained? A. No. See article on page 2540, No. 160, of SCIENTIFIC AMERICAN SUPPLEMENT. 3. What preparation is used for coating work to be sectional or spot gilt, and how prepared and removed? I have been using asphaltum, but in removing it with turpentine it has a tendency to stain the work and will not work well in the solution either hot or cold. A. Asphaltum varnish or paraffine. 4. I am using Smee's batteries for plating. I see some account of carbon sheets being substituted for the platinized silver: are they immersed in the same liquid (diluted SO2), if so are they cheaper and less trouble? A. Yes. 5. What acids, and the proportions, used to dissolve platinum, and can a sheet of silver be coated by being merely passed through the hot solution? How is the best and most permanent way of platinizing silver sheets? A. Hydrochloric acid, 3 parts; nitric acid, 1 part; heat to about 160° Fah. Attach the clean plate to the zinc pole of a weak battery and immerse in the cold solution somewhat diluted. 6. In my Bunsen batteries I use nitric acid in the porous cups with the carbons, am I right? A. Yes. Solution of potassium bichromate and moderately strong sulphuric acid solution may be advantageously substituted.

(32) H. F. G. asks: 1. What is the weight of a bushel of bituminous coal? A. 76 to 80 lb. 2. How much water will a bushel of such coal evaporate burned in an ordinary locomotive furnace? A. Ordinarily from 6 to 7 1/2 lb. per pound of coal.

(33) E. J. O. asks: What will remove coal tar from hair cloth, such as chair bottoms, without injuring it? A. Naphtha, benzole, or carbon disulphide. Use a stiff brush if necessary.

(34) A. U. L. asks: 1. Would the rail of a railroad track make a good conductor for a telephone for reasonable distances? A. No. 2. Must the wires leading into the house be insulated? A. Yes. 3. What kind of a battery is the best, say for a distance of three or four miles, and how many cells of same? A. No battery is requisite. 4. I have recently seen such articles as glass and porcelain cemented together so as to sustain a weight of several hundred pounds, by a cement sold under the name of stratina, or London cement. Can you tell what its composition is? It seems to be very effective. A. Dissolve glue in warm strong acetic acid to form a sirupy solution.

(35) H. H. W. asks (1) if brick is ever used in covering locomotive boilers? A. No. 2. If not, please give the name of some cheap covering that would do. A. Asbestos covering; a mixture of clay and cow hair; or hair felt, or even old carpets or blankets.

(36) W. H. W. asks: Will sound travel faster in a dense than in a rare atmosphere, and why? A. The velocity of sound is not materially affected by the density of the air. Its intensity is diminished by increased atmospheric density. It has been determined that the velocity of sound decreases with the temperature about 1 1/2 feet for every degree.

(37) G. C. asks: 1. Please give me a rule for compounding gear for a lathe.

A. $\frac{TS}{I} = N$; $\frac{t}{I} = S$. T representing the number of teeth in traverse screw wheel; S, number in stud wheel gearing in mandrel; t, number in wheel upon mandrel, and I, number in gearing upon stud pinion, gearing in T; I, number of threads per inch upon traverse screw; N, number to be cut. 2. Please tell me how to make a cheap telephone. A. See full directions for making telephones in SUPPLEMENT, 142.

(38) J. H. W. asks: Can you inform me why a hazel switch will turn in the hands of some persons, who claim to be able to discover water or mineral by this means? A great many declare that it will not turn. I used to think so myself until I tried it last summer, and found that there were certain places in which the rod would turn in spite of me. I held it so tight that the bark peeled off. I cannot account for it myself, and have been laughed at for asserting that there is some truth in the claims of men who call themselves diviners until I am tired of it. Have never seen the matter explained. A. The rod is moved by the voluntary or involuntary muscular action of the hands of the operator, and not by any mysterious external influence, as many suppose.

(39) C. C. A. asks how to make a compound with which to insulate wire. A. Shellac varnish will do very well, providing the wire is wound before the varnish becomes thoroughly dry.

(40) J. A. W. writes: I would inquire through your paper of the M.D.s if a connection between the aorta and pulmonary artery where they cross is common. I found in examining the heart of a calf that was sold in market for veal a phenomenon of this kind; if it occurred in one instance might it not in another, and what would be the physical results of such a case? The opening was as large as the carotid artery; no appearance of any valves, but the tissue was very thick and firm.

(41) Y. & O. ask: 1. How ought a cheap ice house to be built on top of ground? A. See SUPPLEMENTS 55, 59, and 116. 2. How can I construct a lightning rod which will answer all the purposes, and cost less

than those sold by dealers? A. See p. 348, (10), current volume of the SCIENTIFIC AMERICAN.

(42) W. B. W. writes: Seeing an article in SCIENTIFIC AMERICAN by Dr. Rollin R. Grigg, of Buffalo, N. Y., I ask for information ("The Cause of Consumption"): What will heal the mucous membranes and the stopping of the waste of albumen? A. The author of the article referred to has kindly given us the following: There is no one medicine that can cure all cases of irritated and abraded mucous membranes and stop the waste of albumen. A variety of remedies is required to do this, in the different cases, and the treatment must be governed to a great extent by the peculiarities of constitution, and by the condition and the symptoms of each patient at the time the case is taken in hand. Furthermore, this is a diseased condition, where every case should be under the care of an educated, judicious physician, as much as severe cases of typhoid fever, diphtheria, or any of the other most intricate diseases. I will say, however, for the encouragement of all, on this now almost hopeless subject, that there is a series of most reliable physiological facts bearing directly upon the curability of all cases in the first stages, and which shows that of all tissues the mucous membranes are the most quickly and easily healed of any by proper treatment.

(43) E. W. C. writes: The screws in our cheese presses are 1 1/4 of an inch in diameter. From the center of the screw to the end of the lever it is 2 feet and 5 inches. Five turns of the screw move it 1 inch. How many pounds pressure will 150 pounds weight applied to the end of the lever produce? What is the rule for finding it? A. Theoretically, 136,800 pounds, but there should be a large deduction for friction. The weight (150 pounds) x distance moved through (76 feet = 912 inches) divided by distance through which the screw moves (1 inch) $\frac{150 \times 912}{1} = 136,800$ pounds.

(44) H. H. asks: 1. Would it be possible or practical to run a small light boat, say 2 1/2 feet wide, 12 feet long, with a spring motor similar to those used for small toys? A. Yes, but the power required to wind up the springs had better be applied direct to oars. 2. Could an electric engine be used instead of the above, how would the cost compare with steam engine? A. Yes. The cost of the electric engine would be greater than that of a steam engine, and the cost of running it would be about fifty times as much.

(45) J. T. asks (1) how saw blades are tempered. A. They are usually heated in a reverberatory furnace and hardened and tempered in oil. 2. Can temper be taken out by heating a saw in the fire? A. Yes, but the saw will be ruined. 3. Where an iron mandrel runs in wooden bearings, what kind of wood is best for bearings? A. Hard birch or maple. 4. Which is best, pine or hickory? A. Hickory.

(46) O. L. P. asks: Will it require more power to work an elevator perpendicularly than it will to operate a similar one on an inclined plane at 45 degrees? If so, what is the rule to find difference of power required? A. The power will be the same, not taking friction into consideration.

(47) V. A. N. asks for the size of steam ports in a cylinder 2 by 3 inches. Is 3-16 by 1 1/4 inch too large? A. 3-16 by 1 inch is sufficient.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

J. N. J.—The sample of ore is quite rich in copper (copper glance) and contains also traces of silver. A chemical analysis or assay will be necessary to ascertain the proportions of these and the value of the ore. The property is valuable.—H. J. P.—1. A serpentine rock—it contains no copper. 2. Talcose slate.—C. H. M.—It is quartzite.

COMMUNICATIONS RECEIVED.

- On Boiler Explosions. By S. P.
On the Collared Peccary. By J. R. G.
On the Movement of Light in Space. By A. S.
On Theory of Creation. By W. P. T.

[OFFICIAL.]

INDEX OF INVENTIONS

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AND EACH BEARING THAT DATE.

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Burnishing machinery, C. D. Rogers, Providence, R. I.
Clasp, B. Greig, New York city.
Printer's galleys, T. T. McNish, Allegheny, Pa.
Shrapnels and fuses, H. Beran, ————
Skates, G. McCord, New York city.
Wire machinery, C. D. Rogers, Providence, R. I.