

struction or management. The Minotto battery is practically the same as Daniell's. 2. Which is the positive pole—the earth or the cloud? A. The earth is always negative. The clouds are sometimes positive and sometimes negative. 3. Why is it that a 10 cell battery used in galvanic belt will not operate a sander? Although the positive pole when set on the forehead and the other on the tongue will burn the skin, the current is not felt in other, even if silver is laid between the skin and the pole. A galvanic belt generates a very weak current, which is insufficient for operating a sander. 4. Can I use old newspaper in dry battery instead of sawdust? A. We think old newspapers packed tightly would lack porosity. 5. Can you give me the address of any who could give me description of the writing telegraph now tried or used in Chicago? A. Write the inventor, Professor Elisha Gray, of Chicago.

(3195) C. L. asks (1) how to reverse a small electric motor? A. Reverse the current in the field magnet or armature, but not in both. 2. What is the formula for dry battery paste? A. Dr. Gassner's formula is as follows: Zinc oxide 1 part by weight, sal ammoniac 1 part, plaster of Paris 3 parts, zinc chloride 1 part, water 2 parts. 3. Is there anything that can be used instead of alum in the hypo bath in photography? Alum leaves a white sediment on the plate. A. You will have no trouble of the kind mentioned if you will use the alum in a separate solution by itself, after the hypo has been washed out. 4. Please give formula for bichromate of potash solution for batteries. A. Make a saturated solution of bichromate of potash in water. Add slowly one-fifth its bulk commercial sulphuric acid. 5. Is there any way of preventing a Leclanche battery from running down when used on a motor? A. No. This battery is not adapted to running motors.

(3196) W. B. H. asks: I contend with a friend of mine that the changes going on in a cell of battery are by virtue of the current, that they are caused by the current, while he claims that the changes are causing the current. Which is correct? A. Chemical action starts the current, and the current increases the chemical action.

(3197) C. W. writes: 1. I have a cell of chromic acid battery with 2 carbons and 1 zinc plate, each 3x6 inches, separated 1/4 inch, and immersed in the solution to a height of 5 inches. Please let me know what is the resistance, the electromotive force, and the current of this battery at its terminals, the solution being kept in circulation? A. A working battery acts as an electrolytic conductor and is in practice of higher resistance than the measurement. The ohmic resistance would be but a small fraction of an ohm if measured when not in action. When in use it would quickly increase as the acid became exhausted. How great this increase would be may be estimated from the fact that zinc sulphate solutions have from 24 times and upward the resistance of sulphuric acid and water. Assuming the battery to be charged with sulphuric acid of 1.080 sp. gr., the resistance would be but 0.004 ohms. Polarization and exhaustion would quickly deteriorate this constant. The E. M. F. of such a battery is nearly 2 volts. 2. How many 25 volt 30 candle power lamps could be lighted with a battery of 12 such cells, the lamps being connected in parallel on a circuit having one ohm resistance? A. The resistance of the battery might be taken in practice at 0.05 ohm. For a single lamp 14 cells would be required, arranged in series. 3. What is the rule for computing the resistance and current of a battery cell of this description? A. Multiply the specific resistance of the solution to be used in the battery by the distance from zinc plate to carbon, and divide the product by the facing area of the plates. All dimensions must be reduced to centimeters. 4. In SCIENTIFIC AMERICAN SUPPLEMENT, No. 792, you state that the large plunge battery described furnishes 4 amperes of current, is this correct? A. Yes; under the limitations indicated in the first answer. 5. Please give numbers (if any) of SUPPLEMENTS containing articles on domestic electric lighting? A. See SCIENTIFIC AMERICAN, No. 18, vol. 61, No. 19, vol. 62, SUPPLEMENT, Nos. 603, 699. For general electrical calculations we refer you to "The Arithmetic of Electricity," which we can supply by mail for \$1. The general idea of supplying a lamp from a battery is this. The voltage of the battery must exceed to some extent that of the lamp. Its resistance should be equal to that of the lamp for the minimum number of cells. With this resistance it must deliver four times the watts required by the lamp. With less resistance less watts are required and a higher efficiency will be attained, but more cells will be required.

(3198) Reader asks: Can you tell me where I can find a description of the process of preparing canvas or cotton cloth so that it is soft and pliable, and after being decorated can be applied to the wall by means of paste or white lead? I have known of several ceilings which have been treated and decorated abroad, rolled up, and sent over here to be put up, but so far have been unable to find out by what process the canvas retains its flexibility after being decorated. A. According to one method the canvas is dyed in imitation of tapestry. This is accomplished by rubbing the dye into the fabric by means of brushes. Effects secured in this way are said to rival those of real tapestry. According to another method the work is done on canvas or some other fabric in oil colors thinned with turpentine. The painting is also done on the canvas by oil colors in the regular way, with the exception of the use of an oil that does not dry hard, such as poppy oil or some of the drying oils with a very slight admixture of fixed oil.

(3199) W. H. B. asks: What is the difference between a modified choke shot gun and a straight bored, also what is the difference between a modified and full choke, also what difference would there be in their shooting qualities? A. Straight bore is what its name means, a perfectly straight and cylindrical gauge in the bore. A modified choke bore has the muzzle slightly drawn in on a taper to prevent scattering of the shot. A full choke is only a little more so, or the extreme amount of choke that is allowable. Choke boring of any degree is made to control the scattering of the shot by impacting it at the moment of leaving the gun.

(3200) G. W. R. asks: 1. What can I mix with powdered black oxide of copper (commercial) to form it into cakes for battery purposes, and how is it solidified? A. Powdered black oxide of copper is usually solidified by heavy pressure. 2. How can I make a good conducting cement for electrical purposes? A. Electrical soldering. Lead, soft solder, and carbon are used as conducting electrical cements. 3. I saw a Bulinger receiver, and the helix on the outside was wound with bare copper wire. What advantage is this? A. The copper wire referred to is insulated by collodion or some kind of varnish. 4. What is the Gower-Bell telephone, and how constructed? How are receivers constructed to bring out sound for audiences on long distance? What is the Edison megaphone and how constructed? A. The loud-speaking and Gower-Bell telephones are described in Prescott's work on the telephone. Edison's megaphone is simply a combination of large speaking trumpets and ear trumpets.

(3201) F. C. M. asks: 1. Which is the best material with which to construct a 6 foot sewer 1 1/4 miles long, tunneled under a hill 200 feet from the surface, cement, concrete, or brick, and which is used the most? Cement is worth \$4 per barrel, here in Seattle, and sand and gravel in abundance. Sewer brick are worth \$10 per M delivered on the work. Which is considered by men of experience in that business to be the most practical, a cement or brick sewer? A. For a sewer of dimensions you state, brick set with cement mortar is best. 2. Can you refer me to any cities which have constructed cement sewers? A. New York, Brooklyn, and nearly all the large cities. If the tunnel you mention is to go through earth, the work might be easily executed by means of the Beach pneumatic shield.

(3202) N. N. asks: Will an auxiliary magneto-electric or extension bell work on a line 1 1/2 miles long, having perfect connections all around, without the aid of the regular magneto? I desire to use one if I can, on account of their less cost. What is difference in the winding of the cores of a 5 ohm and a 40 ohm? How can I tell them apart? A. By the use of a relay and battery you can ring your auxiliary bell. A 5 ohm magnet is wound with coarse wire, while a 40 ohm magnet is wound with fine wire. The safest way to distinguish the magnets is by the maker's mark or by actual measurement.

(3203) E. B. N. asks (1) if it will hurt geological specimens to wash them in soap and water to take off the dirt. I didn't know whether the soap would affect their color or not. A. As a rule it will not. 2. Will you tell me of some inexpensive but good solution to erase writing ink, and which will not hurt the paper? A. Equal parts oxalic and tartaric acids dissolved in water. Javelle water may be used also.

(3204) R. F. writes: I desire to ask a few questions relative to the tang, galvanometer and set of coils described in "Experimental Science." 1. Would it be at all advisable to use a 2 inch needle with a 5 inch pointer? A. The length of the needle depends upon the diameter of the galvanometer coil. It should not be longer than one-twelfth the diameter of the coil. 2. What sizes of German silver wire should be used for coils? I desire to make a set running from one-half to one thousand ohms. If you have not the data, where can I get it? A. German silver wire has a resistance ten times greater than that of copper. You can readily determine its approximate resistance by comparing it with copper.

(3205) D. M. D. writes: Will you tell me if there is any such serpent as a hoop snake? We have had quite an argument about it, but I can find no such snake in my dictionary. Also please tell me the motion it has in propelling itself forward. A. The hoop snake is a myth. The common milk snake progresses by forming a series of long loops which sometimes bear some resemblance to a hoop. It never takes its tail in its mouth and rolls, as some believe. See Col. Pike's article on "Hoop Snakes," SCIENTIFIC AMERICAN, vol. 61, page 344.

(3206) H. D. A. writes: I have constructed an electric motor as described in SUPPLEMENT, No. 767, but find instructions do not say how wires should be connected, and I am unable on that account to complete. How should the connections be made between poles of field magnet and to armature and commutator? A. Connect one terminal of the field magnet with the battery, connect the other with one of the commutator brushes, and connect the remaining commutator brush with the battery. If the field magnet is wound with fine wire it may be placed in a shunt, i. e., its terminals may be connected with the brushes and the brushes with the battery.

(3207) E. B. H. asks: How are bricks enameled, and what kind of enameling is used? What coloring matter is used to variegate the colors? A. Enamel for bricks is composed of powdered flint glass 260 parts, carbonate of soda 41 parts, boracic acid 12 parts. The face of the brick is sized with glue size, the enamel is then applied in solution, and fused in an oven. The enamel is colored with the metallic oxides. We refer you for further information to "Bricks, Tiles, and Terra Cotta," by C. T. Davis, which we can mail you for \$5.

(3208) F. B. asks: I would like to build a vehicle of some kind, and I would like to put some power to it. Can a motor about one horse power or a little more be run by a storage battery? If so, how much room would it take up, and what would it cost to run? A. It requires about 8 cells of storage battery for a horse power, and this power is hardly sufficient for running a vehicle on an ordinary road. Such vehicles have been used experimentally, but none, so far as we know, have been in practical use. Better use steam. It is cheaper and better in every way.

(3209) W. M. writes: I would like very much to know if there is a way of finding the voltage and amperage of a battery, without using the expensive instrument called the voltmeter, etc.? A. You can ascertain the voltage by comparing one of your cells with a cell of gravity or Daniell using a high resistance galvanometer. The amperage is determined by dividing the electro motive force by the resistance.

(3210) H. M. S. writes: In your number of July 11, 1891, in Notes and Queries, No. 3135, M. S. S. wants to know what will prevent the trouble of lime being deposited in a copper tea kettle, when lime water is used. Tell him to put an oyster or a mussel shell into the clean kettle, and the lime will prefer the shell to the copper. When the shell is loaded, take it out and break off the lime, or put in a fresh one. That is an easy way.

NEW BOOKS AND PUBLICATIONS.

Hay Fever and Rose Colds.—The July number of "Wood's Medical and Surgical Monographs," price \$1 a number, published by William Wood & Co., of New York city, has an interesting treatise of eighty pages by Sir Morell Mackenzie on hay fever and its treatment, with a chapter on rose colds, from which it appears that the cause of this disease is the entrance into the eyes and air channels of those predisposed to the ailment of minute particles of vegetable matter from grasses and plants in flower. Some of the grasses the pollen of which is most productive of hay fever are illustrated in the article. Although, it is said, hay fever too often excites ridicule rather than sympathy, the distress it occasions is declared to be very real, although the sufferers are "almost exclusively persons of cultivation, the male sex being more liable than the female, in the ratio of about three to one." Two other elaborate papers are included in this number of the Monographs, one on "Tuberculosis of the Bones and Joints," by Dr. Fedor Krause, of the University of Halle, and "A Study of Malignant Disease of the Upper Air Tract," by Dr. F. H. Bosworth, of the New York Bellevue Hospital Medical College.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

July 21, 1891,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions and their patent numbers, including items like Adding machine, Air brake, Air cooling apparatus, and various mechanical devices.

Table listing inventions and their patent numbers, including items like Collar fastener, Colors, manufacture of, Crane, hydraulic, and various electrical and mechanical devices.