

from one trolley wire to the other, supposing the wires to be cut, and how far would the electricity jump, supposing I extended an additional wire from the trolley wire toward the ground or rail? A. The current on a trolley will not jump across a space until the wires are first placed in contact and then separated so as to form an arc. When the wires are touched and separated, an arc of probably two or three inches might be produced.

(4780) G. T. W. asks: Are there two kinds of electricity? How are the batteries made they use on railroads for telegraphy? They are not gravity batteries. They look white, as if made of some kind of salt. A. The idea of two kinds of electricity was exploded long since, although they are sometimes spoken of now as positive and negative electricity. The batteries to which you refer are probably the Edison Lalande batteries. You will find a description of this battery in SUPPLEMENT, No. 792.

(4781) C. M. asks: 1. Regarding the speed of electricity, how fast does it travel through or over a cable? A. The speed of electricity varies greatly under different circumstances. In the Atlantic cable it is very much retarded, so that it requires two or three seconds to send a signal. The speed of electricity under the most favorable circumstances is about the same as that of light, viz., 185,000 miles per second. 2. Can water be compressed? A. Water can be slightly compressed.

(4782) J. B. asks: What pressure of steam is carried on the boilers of passenger steamers on the ocean, using triple and quadruple expansion condensing engines? A. Steam pressures on boilers of large ocean steamers is 125 to 180 pounds per square inch.

(4783) P. & M. ask: What link in a moving train of 20 cars has the most weight on it? Please answer in order to settle a wager. A. The first link.

(4784) A. W. B. asks the method used in adjusting the cork used in making the joints of certain wood wind instruments, as the clarinet, flute, and others. A. The corks for flutes, clarinets, and other instruments are cut by means of thin tubular cutters. They are secured to the joint of the instrument by means of bichromatized glue or marine glue.

(4785) H. W. R. asks: 1. For recipe for the most durable whitewash for trees. Also for wood fences, if different. A. For a durable whitewash for trees and fences, 1 bushel best white lime, slaked in boiling water. Add to the cream 4 pounds sulphate of zinc and 2 pounds common salt dissolved in water. Make the mixture thin enough to use with the brush. If a light brown color is required, add a little hydraulic cement, ochre for yellow and Venetian red for pink or red. 2. How can we best make cinders from our boilers available for durable walks? If to be mixed with cement, what kind of cement and in what proportion? A. For walks of cinders and ashes use one part of hydraulic cement to equal parts of sifted cinders and fine ashes or sand. Lay coarse cinders on the bottom, roll or ram hard and finish with the cement mixture from one to two inches thick, as you can afford.

(4786) W. J. M. asks: What government holds the fastest cruiser and the highest speed attained by the same for certain length of time? A. The Argentine government, 22 knots, six hours.

Replies to Enquiries.

The following replies relate to enquiries published in the SCIENTIFIC AMERICAN, and to the numbers therein given.

(4687) Answering No. 4687, the method of winding Thomson-Houston spherical armatures is as follows: Two shells of cast iron form heads, iron bridges are put from one head to the other and these wound with iron wire, forming an oblate spheroid. An insulating covering is put on and the surface divided into six sections by wooden pegs. Beginning at end of shaft opposite from the armature, one half of No. 1 coil is wound in sections opposite one another. Armature is turned next 120° and 1/2 of No. 2 coil wound. Turn 120° and wind whole of No. 3 coil. Turn 120° and wind remainder of No. 1. Turn 120° and wind remainder of No. 2. Connect all of inside ends together and carry outside ends to commutator segments. A 9 1/2 A. 1250 V. dynamo of this make has 10 ohms No. 7 B. and S. wire on field magnets and 12,075 feet No. 12 B. and S. on armature, the resistance of the coils averaging about 13-25 ohms, two always being in series. Such an armature weighs about 520 pounds. J. G. (4693) will, I think, find that article he refers to in the Electrical World. It was published in 1889 or thereabout, in the early part of the year.—C. M. D.

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted March 14, 1893, AND EACH BEARING THAT DATE.

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