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PRODUCT FOR THE PROTECTION OF CONTACTS IN ELECTRIC CIRCUITS

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The conductors which constitute electric lines are subject to two effects of corrosion, firstly, the action of the surroundings in which the electric line is situated, upon the metal or metals forming the said line, and secondly, a particular action which takes place at the contacts and the points of connection of the conductors, this action being due to the electrolysis of foreign substances situated between the surfaces of contact. The current is obliged to pass through the thin film which is formed by such substances, and if these are subject to electrolysis, the products of their decomposition will be deposited upon the ends of the conductors and will strongly attack them, due to the great amount of electro-chemical energy with which they are associated.

This second action is much more important than the first, in the case of electric connections, and it takes place for instance, on the terminals of lead storage batteries on account of the moist and acid atmosphere by which they are surrounded. The copper conductor which is ordinarily connected with the storage battery terminal is not only attacked by the chemical reaction due to atmospheric conditions, but also near said terminal by a strong chemical reaction by the acid near the terminal on said terminal and said copper conductor, which will soon eat away the copper and render the terminal much less efficient.

Methods are in use which consist in employing a suitable coating substance such as fatty material, wax, vaseline, paraffin, hydrocarbons, oil, paint or varnish, in order to prevent such corrosion.

The use of any of such substances upon the contact surfaces in an electric circuit is attended with the drawback consisting in the fact that the substance is of an insulating nature and thus the current will be reduced, while on the other hand the ohmic resistance will further the electrolytic passage of the current when such is produced, and in this manner the resistance will further the second action of corrosion.

The present invention relates to improvements in the known coatings, by which the electrolytic action occurring at electric contacts and connections will be obviated or reduced to a minimum. It has for its object to incorporate in the form of powder, strips or flakes, a conducting substance having a metallic conductivity and which is chemically stable in the surroundings in which the electric circuit is located, such as graphite in powder or flakes, or powdered retort carbon, into a suitable protecting substance which is free from electrolytic conductivity.

The conducting carbon may be replaced by a like substance which is stable in the surroundings in which the electric circuit is located, and thus if the circuit is situated in a sulphuric acid atmosphere, I may incorporate into the protecting coating, a suitable substance or alloy which conducts the current by ohmic conductivity and is not effected by sulphuric acid, such as illmenite or ferro-silicon in powder, containing 30 per cent of silicon and 70 per cent iron or if the impurities subject to electrolysis are neutral salts, as in the case of certain underground electric lines, the carbon may be replaced by a suitable metal in powder such as copper.

The following are examples of the use of the present invention:

1.—A mixture of 20 per cent of graphite or retort carbon with 80 per cent of neutral lanoline containing no impurities subject to electrolysis.

2.—A mixture of 30 per cent graphite or petroleum coke with 70 per cent of neutral vaseline containing no impurities subject to electrolysis.

3.—A mixture of 55 percent graphite with 45 per cent of neutral paraffine oil containing no impurities subject to electrolysis.

By increasing the amount of carbon or of metallic conducting substance I render the product a better conductor of current, and hence more effective. By increasing the amount of the organic coating substance, the product is more readily handled. In each case, the minimum quantity of the coating substance to be used will be the quantity sufficient to properly impregnate the whole amount of the conducting substance in powder or flakes with the said coating substance without leaving empty spaces or interstices. It is even possible to preliminarily expel all air or other volatile impurity such as moisture which the conducting substance may contain, by a vacuum, by heating or the like.

For a more ready application, I may add, without change in the principle of the invention, a suitable organic solvent, in order to render the product more fluid and more readily handled. This organic solvent is preferably an anhydrous and non-hygroscopic substance, thus avoiding the chemical action of water upon the conductors.

Thus for instance I may add to the formulæ above mentioned, and chiefly to the first and second formulæ, 10–12 per cent of solvent naphtha or ethane tetrachloride ($C_2H_2Cl_4$) or of toluene.

To assure the protection of the electric contacts

and connections such as storage battery terminals, such contacts or terminals will be periodically coated upon their above surface, preliminarily cleaned, with a coating prepared according to the present invention.

The said product according to the invention has the advantage of being a conductor, and furthermore, its conductivity is metallic and not electrolytic, so that the two electrodes formed by the ends of the conductors will be short-circuited by a body having a metallic conductivity, and this action tends to destroy the electrolytic conductivity.

I claim:

1. A product of the class described comprising a composition composed of three parts of pulverized graphite mixed with seven parts of petrolatum, said petrolatum being adapted to coat the meeting ends of the electrically connected elements whereby electrolytic reaction between said meeting ends will be prevented and said graphite providing a low resistance connection between the elements beneath the coating.

2. A product of the class described comprising a composition composed of two parts of pulverized graphite mixed with eight parts of lanolin, said lanolin being adapted to coat the meeting ends of the electrically connected elements whereby electrolytic reaction between said meeting ends will be prevented and said graphite providing a low resistance connection between the elements beneath the coating.

3. A product of the class described, comprising a composition composed of one part of pulverized graphite mixed with one part of lanolin and one part of petrolatum, said lanolin and petrolatum being adapted to coat the meeting ends of the electrically connected elements whereby electrolytic reaction between said meeting ends will be prevented and said graphite providing a low resistance connection between the elements beneath the coating.

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