

UNITED STATES PATENT OFFICE

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ELECTRICAL INSULATION

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4 Claims. (Cl. 204—1)

The present invention relates to electrical insulation and more particularly to inorganically insulated electrical conductors.

It is often desirable to insulate copper conductors with coatings which withstand temperatures up to 200° or 300° C. Organic varnish coatings are not sufficient for this purpose. The well known insulations with aluminum oxide or zinc combinations offer great difficulty in their production on copper conductors. Further they are ordinarily porous and therefore usually guarantee no protection against moisture.

According to the invention these difficulties can be avoided if the insulating coating on the copper conductor is produced directly from copper combinations. It has been shown that copper halide and its complex combinations, e. g. cuprous chloride or cuprous bromide are suitable for this purpose. They are produced either on the copper conductor or are placed on it as combinations and then fused, or are applied on the conductor in a fused state.

The production can be carried out in a known manner by electrolysis. The copper conductor is wired as anode in an aqueous bath which contains the halogen ion. It may be convenient to add acids, e. g. phosphoric acid, or salts of acids, of which the decomposition voltage lies above the decomposition voltage of the corresponding halogen combinations, in order to keep the hydrogen ion concentration during the reaction within the limits necessary for undisturbed procedure of the reaction.

When the fused simple or complex copper halide is used, a little copper is added to the melt, to prevent oxidation. To this end the melt container may be manufactured of copper or other copper plated material.

The layer manufactured in accordance with the invention forms a glassy coating which is absolutely impervious. It is also possible to add filling materials such as asbestos to the insulating layer, and, for example, the deposited material which is at first porous can be mixed with asbestos and fused to a homogeneous substance at a higher temperature. Siliceous filling materials such as quartz meal, mica powder and so on can be scattered on the porous layer of insulation before heat treatment and then fusing can be done. Further, there is the possibility of placing asbestos covered wires in an electrolysis bath, producing the insulating precipitates between the covering and the conductor and fusing to a sub-

stance with the asbestos by means of suitable temperature treatment. The conductor can also be exposed to the action of free halogen, e. g. in a heated gas containing halogen or by drawing the heated conductor through a cold halogen atmosphere.

This application is a division of my copending application, Serial No. 650,382 filed January 6, 1933.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In the art of producing electrically insulated conductors, the improvement which consists in subjecting to electrolysis a copper conductor as anode in an aqueous bath containing halogen ions and phosphoric acid.

2. A method of making electrically insulated conductors which comprises subjecting to electrolysis a copper conductor as anode in an aqueous bath containing halogen ions to deposit thereon a porous coating consisting essentially of copper halide, bringing a siliceous mineral filler into contact with said coating and fusing in place said coating, with said mineral filler adhering thereto and dispersed therethrough, at a temperature sufficient to form on said conductor an impervious, homogeneous, glass-like coating consisting substantially of a fused association of copper halide and siliceous mineral filler.

3. In the art of producing electrically insulated conductors, the process which comprises placing asbestos-covered copper conductor in an aqueous electrolysis bath containing halogen ions and therein anodically treating said copper conductor thereby to form a deposit consisting essentially of copper halide between the asbestos covering and the conductor, and thereafter fusing in place the material deposited on and adjacent to said copper conductor by means of a suitable temperature treatment to form thereby an impervious coating consisting of an intimate association of said electrolytically deposited and subsequently fused material and asbestos.

4. A method of providing a copper conductor with an impervious insulating coating which comprises anodically producing in an aqueous solution a porous coating consisting essentially of copper halide on a bare conductor, applying a powdered siliceous mineral filler to said coating to form a mixture of copper halide and said mineral filler, and heating said mixture to form an impervious homogeneous mass thereof.

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