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G. R. LANGLEY

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METHOD OF MAKING ELECTRICAL INSULATORS

Original Filed Oct. 21, 1932

Fig. 1.

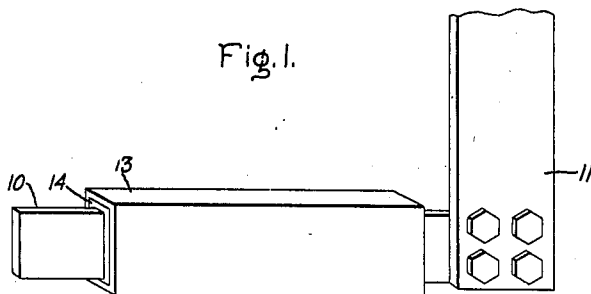


Fig. 2.

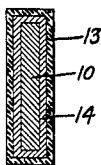
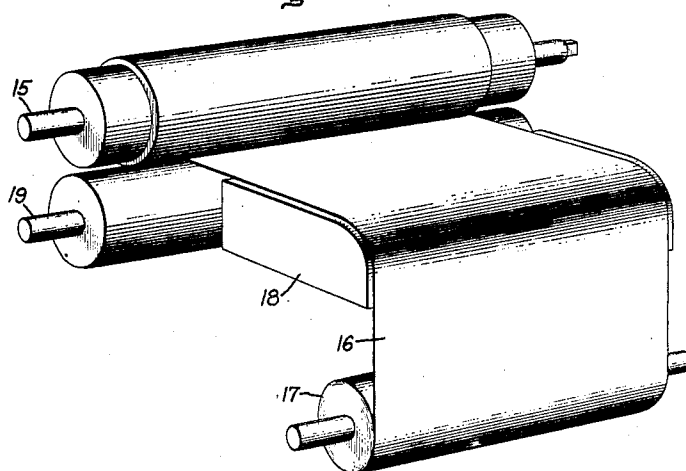


Fig. 3.



Inventor:
Gordon R. Langley,
by *Harry E. Dunkham*
His Attorney.

UNITED STATES PATENT OFFICE

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METHOD OF MAKING ELECTRICAL INSULATORS

Gordon R. Langley, Peterborough, Ontario, Canada, assignor to General Electric Company, a corporation of New York

Original application October 21, 1932, Serial No. 638,938. Divided and this application February 27, 1934, Serial No. 713,152. In Canada October 31, 1931

1 Claim. (Cl. 154—2.6)

This application is a division of my copending application Serial No. 638,938, filed October 21, 1932.

My invention relates to electrical insulators and the method of making the same and particularly to insulation adapted to be applied to conductors subjected to a relatively high voltage.

In the application of insulating material to a conductor subject to high voltage it is imperative that the insulation closely adhere to the conductor at all points. If any small air space exists between the conductor and the insulation this air gap will be stressed beyond the breakdown value and therefore produce corona, the destructive effects of which are well known. To avoid the possibility of such air spaces it is a known practice to mold the insulation directly on the conductor. However, in many cases such for example as the construction of switching stations it would result in a considerable saving if the insulation was available in such a form that it could be applied in sections as required to the conductors of the station during assembly. The objection to this practice is that due to irregularities in the conductor or in the insulation it is extremely difficult if not impossible to obtain such a close fit between them that there are no air spaces which would result in the formation of corona with its destructive effects.

My invention provides an insulation in a form which may be applied to the conductor in sections as required and give the manufacturing advantage indicated above but which offers complete assurance that air spaces subject to electrical stress and possible breakdown and formation of corona do not exist. Insulation provided in accordance with my invention offers the further advantage that it need not be of the same size or shape as the conductor to be insulated. My invention also relates to a method of applying a conducting layer to an insulator.

For an understanding of my invention reference is made to the following description taken in connection with the drawing in which, Fig. 1 is a perspective view of a conductor having my insulator applied, Fig. 2 is a cross section and Fig. 3 is a perspective view illustrative of a method of manufacturing insulators according to my invention.

Referring to the drawing 10 represents a conductor for example a bus bar of a switching station having a conductor 11 secured thereto. 13 represents a tube of insulating material, the inner surface of which has united thereto a layer 14 of conducting material. The tube 13 with its

layer 14 has been applied to the bar by slipping it on endwise. It will be seen that bars can be joined together as required and tubes of insulation material applied on the desired parts as the fabrication proceeds.

The tube has been illustrated as of the correct size to make a snug fit and the layer 14 will therefore contact the bar at various points throughout its length and is maintained therefore at the same potential as the bar. Any air space which may exist due to the loose fit of the tube is therefore between the layer 14 and the conductor and as these are at the same potential there will be no electrical stress across this air space. While I have illustrated the insulating tube as snugly fitting the bar which may in some cases be desirable it is obvious that so long as the inner metallic coating contacts the conductor at some point the advantages of my invention are attained. This makes it possible to reduce costs in that a minimum number of sizes and shapes of tube may be stocked.

The insulating material may be of any usual type and the inner conducting layer may be applied to it in any known manner which will provide a suitable bond without leaving air spaces between it and the insulation. In the drawings for purposes of clearness the layer 14 appears of considerable thickness. It will be understood however, that the metal layer may be and preferably is quite thin.

I will now describe in connection with Fig. 3 a preferred method of manufacturing insulating tubes in accordance with my invention. Fig. 3 illustrates a known method of forming sleeves or tubes of insulating material which may be adapted to forming insulation having a conducting layer in accordance with my invention. 15 illustrates a mandrel arranged to be rotated. The end of a strip of paper 16 is secured to the mandrel and is pulled from a roll 17 across a hot plate 18. A phenolic condensation product in powdered form is dusted on the paper over the hot plate where it fuses. The mandrel which is also heated is rotated until a desired thickness of paper impregnated with the fused condensation product is formed. A roller is indicated at 19 for applying pressure. The formed roll is heat cured. The formed roll in this case is shown as cylindrical. If other shapes of tube are required for example the rectangular shape illustrated in Fig. 1 the roll may be removed from the mandrel and shaped as desired before the heat curing which converts the body into a stiff hard form.

In accordance with the method of my inven-

tion the first turn about the mandrel consists of metallized paper, that is paper having a metal surface, the metal surface being next to the mandrel. The regular paper then follows carrying
5 its charge of fused phenolic condensation product and forms a bond with the metallized paper which is free from air spaces. The rotation of the mandrel continues as before till the desired thickness of insulation is built up and the product
10 is then shaped if desired and finally heat cured as before described.

While I have described a specific form of my invention in detail and described a particular method by which insulation sleeves or tubes in

accordance with my invention may be made I do not wish to be limited thereto except as defined in the appended claim.

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

The method of forming a unitary insulating
5 tube having an inner metallic layer which comprises winding a first layer of paper having an inner metallic coating thereon on a mandrel and then winding further layers of paper coated with
10 fused phenolic condensation product on the first layer and heat curing the whole.

GORDON R. LANGLEY.