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ELECTRICAL CONNECTION AND METHOD
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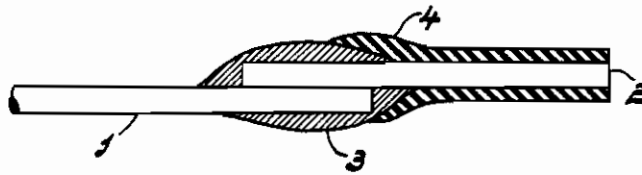


Fig. 1

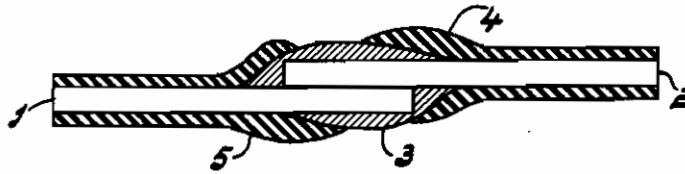


Fig. 2

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ELECTRICAL CONNECTION AND METHOD OF MAKING SAME

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Our invention relates to an electrical connection made by soft-soldering together a plurality of electric conductors at least one of which has an insulating covering, and to a method of making such a connection.

The term "soft-soldering" as used herein and in the claims is to be understood to mean soldering at moderate temperatures, for instance the temperatures occurring when soldering with lead-thin mixtures.

In the usual methods of making an electrical connection between two insulated conductors, the insulating covering is removed from portions of the conductors, and these bare portions, after being thoroughly cleaned, are soldered together. Such methods are complicated and time consuming because of the necessity of removing the insulation and cleaning the conductor, and are particularly difficult to carry into effect when it is desired to connect a conductor to an insulated conductor which is so located in an electrical apparatus that it is difficult to remove the insulation and clean the same.

The main object of our invention is to overcome the above difficulties and to provide a simple method of making a soft-soldered connection between a plurality of conductors of which at least one is provided with an insulating covering.

A further object is to provide a method which is particularly adapted for connecting a conductor to a second conductor which has an insulating covering and is located in an inaccessible place.

Further objects and advantages of our invention will appear as the description progresses.

In accordance with the invention we make an electrical connection by soft-soldering together conductors at least one of which has a coating comprising an electrically-insulating organic material which melts during the soft soldering, congeals during the subsequent cooling, and remains in the vicinity of the connection prior and subsequent to the soldering operation. Thus we do not remove the insulating coating or clean the conductors, but merely place the conductors together and carry out the soldering.

As parts of the mixture forming the coating, we may employ organic substances of high molecular weight such as cellulosic ethers or mixed cellulosic esters; chlorinated rubber may also be used. This coating must have a melting point not exceeding the melting point of the soft solder used in making the connections and must not decompose appreciably at the melting point

of the soft solder. The material used for the coating may also comprise a substance which acts as a flux, such as dammar resin or colophonium, and particularly good results are obtained when such fluxes are used with the organic substances of the type mentioned above.

In order that the invention may be clearly understood and readily carried into effect, we shall describe the same in connection with the accompanying drawing in which:

Figure 1 is a sectionized side-view on an enlarged scale of a connection made between a bare conductor and a conductor having an insulating covering, and

Fig. 2 is a sectionized side-view on an enlarged scale of a connection made between two insulated conductors.

In Figure 1 a bare conductor 1 is joined by soft solder 3 to a second conductor 2 which is provided with an insulating coating 4 of the type described above. Prior to the soldering operation the coating 4 extended to the end of conductor 2, but the portion in the vicinity of the connection melts during the soldering and subsequently assumes the position shown.

The conductor 2 may be a tinned copper wire provided with the coating 4 in the following manner. A lacquer is obtained by mixing 160 grams of benzol cellulose with 125 c. c. of ethyl alcohol and then adding 500 c. c. of benzol. To the solution so obtained 20 c. c. of tricresyl phosphate are added. The conductor 2 is then dipped several times into this solution with intermediate drying to produce the coating 4.

Another suitable solution is obtained by dissolving 16 grams of cellulose aceto-butyrate in a mixture of 60 c. c. of benzol, 30 c. c. of acetone, and 20 c. c. of ethyl alcohol. To this solution is added 6 c. c. of a solution which is clarified by setting and which comprises 50 grams of dammar resin in 12.5 c. c. of toluol and 37.5 c. c. of ethyl alcohol.

A connection such as shown in Figure 1 is made in the following manner: The wires are placed together so that the coating on the end of conductor 2 is in contact with the conductor 1. The solder is then applied to the connection, for instance by a soldering iron, and the heat produced melts the coating 4 to allow the conductors to come in contact and to allow the solder to cover the ends of both conductors. After the soldering iron is removed, the joint cools and the coating material solidifies in approximately the position shown.

The connection shown in Figure 2 is the same

as that of Figure 1 except that the conductor 1 is provided with a coating 5 which is similar to coating 4, and is made in a similar manner.

Instead of using a coating of one material, it is also possible to use several coatings of different materials.

From the above it will appear that the present invention is particularly useful where a large number of connections must be made, for instance in radio sets, telephone apparatus and the like. In cases in which it is desired to solder conductors to a bare conductor located in some electric apparatus, the latter conductor may be

provided with an insulating coating of the above type and the connections may be effected without removing portions of the coating.

We wish it to be understood that we do not desire to be limited to the exact details of construction and procedure described, because obvious modifications will occur to one skilled in the art.

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