

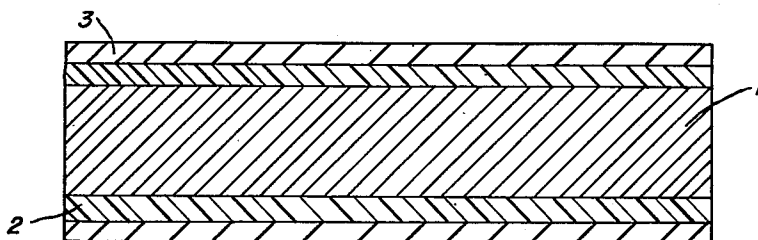
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ELECTRICAL CONDUCTORS AND METHOD OF MAKING THE SAME

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ELECTRICAL CONDUCTORS AND METHOD
OF MAKING THE SAME

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This invention relates to the insulation of electric conductors by means of extrusion of a polyvinylchloride mass.

It is known to use for this purpose polyvinylchloride mixtures which may contain filling substances and which have a content of from 20 to 70% softening agent, calculated according to the polyvinylchloride. Mixtures of this kind may be readily applied to a conductor by extrusion and exhibit, in addition to the good mechanical properties of a rubber insulation, also comparatively good electrical properties. This known insulation has, however, the drawback that it is highly thermoplastic. Besides, the insulation resistance and the dielectric losses leave to be desired, so that conductors thus insulated are less suitable for various applications.

Furthermore, it is known that thoroughly adhering and rather flexible insulation layers may be obtained by extruding a polyvinylchloride mass without softening agent to a conductor preheated at the extrusion temperature, which layers are thermoplastic to a smaller extent. The use of polyvinylchloride free from softening agent entails, however, the drawback that in this case the extrusion temperature lies so close to the disintegration temperature of the polyvinylchloride that a beginning disintegration, which is disadvantageous especially in electrical respect, can be avoided only with difficulty.

According to the invention, which aims at obviating the drawbacks inherent to the said known insulations, insulated electric conductors having excellent mechanical and electrical properties, more particularly having a high insulation resistance and low dielectric losses, even in moist surroundings, are obtained by extruding a polyvinylchloride mass containing less than 15% by weight of softening agent, calculated according to polyvinylchloride, to a conductor preheated to approximately the extrusion temperature and applying subsequently an insulating covering layer having a small permeability for water and water vapour. The polyvinylchloride mass may contain filling substances and colouring matter.

For the covering layer, which may be applied in the form of a lacquer, use may be made, for example, of chlorinated rubber mixtures and chlorinated polyvinylchloride masses having a chlorine content of 60 to 65%. In view of their electrical properties and high impermeability to moisture are also suitable copolymers of vinylhalogenides and vinylidenehalogenides, more particularly copolymers of the chlorides substantially containing constituents with deviations

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from the average halogene content of at most 2%. For example, use may be made of copolymers having a content of 5 to 15% of vinylidene chloride.

For further explaining the invention it is observed that any disintegration of the polyvinylchloride that may occur during the extrusion to the heated conductor is counteracted by the use of the polyvinylchloride mass according to the invention containing a softening agent and that by the choice of a low content of softening agent it is also achieved that the insulating layer does not become inconveniently thermoplastic. As compared with the said extrusion of polyvinylchloride free from softening agent somewhat improved electrical properties and approximately equivalent mechanical properties are thus already obtained.

Relatively to the polyvinylchloride masses having the usual high content of softening agent, the electrical properties, more particularly the insulation resistance and the dielectric losses of the mixtures poor in softening agents according to the invention are more advantageous at least in dry surroundings, just the same as is the case with the known extrusion of polyvinylchloride free from softening agent. It has been found, however, that with mixtures free from softening agent or poor in softening agent these properties are insufficient in moist surroundings. With a high relative humidity these properties may even be worse than those of the mixtures having the usual high content of softening agent. Now, according to the invention, this drawback is obviated by the application of a covering layer of low permeability for water and water vapour.

An insulation is thus obtained having equivalent mechanical properties and better electrical properties, more particularly in moist surroundings, as compared with what may be achieved by extruding of a polyvinylchloride mass free from softening agent to a heated conductor.

In order that the invention may be more clearly understood and readily carried into effect it will now be described with reference to the accompanying drawing in which the sole figure illustrates an insulated conductor according to the invention.

In the figure, 1 is a conductor covered with a first coating 2 of polyvinylchloride which contains a softening agent in an amount less than 15% by weight of the polyvinylchloride to improve the mechanical and electrical properties of the polyvinylchloride and to aid in extruding the coating on the conductor. A moisture and

water resistant lacquer coating 3 of chlorinated rubber surrounds the polyvinylchloride coating to prevent ingress of moisture into the insulation and to improve the insulating qualities of the covering.

While I have thus described my invention with specific examples and applications other obvious modifications thereof will be readily apparent to those skilled in the art without departing from the spirit and scope of the invention.

What I claim is:

1. An insulated electrical conductor comprising an electrically conductive core, a first coating on said core consisting of polyvinylchloride and a softening agent in an amount which is less than about 15% by weight of the polyvinylchloride on said conductive core, and a second coating of a water and moisture resistant lacquer over said first coating.

2. An insulated electrical conductor comprising an electrically conductive core, a first coating on said core consisting of polyvinylchloride and a softening agent in an amount which is less than about 15% by weight of the polyvinylchloride, and a second coating of chlorinated rubber over said first coating.

3. An insulated electrical conductor comprising an electrically conductive core, a first coating on said core consisting of polyvinylchloride and a softening agent in an amount which is less than about 15% by weight of the polyvinylchloride, and a second coating of chlorinated polyvinylchloride over said first coating.

4. An insulated electrical conductor comprising an electrically conductive core, a first coating on said core consisting of polyvinylchloride and a softening agent in an amount which is less than about 15% by weight of the polyvinylchloride, and a second coating of chlorinated polyvinylchloride having a chlorine content of approximately 60 to 65% over said first coating.

5. An insulated electrical conductor comprising an electrically conductive core, a first coating on said core consisting of polyvinylchloride and a softening agent in an amount which is less than about 15% by weight of the polyvinylchloride, and a second coating of a copolymer of a vinylhalide over said first coating.

6. An insulated electrical conductor comprising an electrically conductive core, a first coating on said core consisting of polyvinylchloride and a softening agent in an amount which is less than about 15% by weight of the polyvinylchloride, and a second coating of a copolymer of a vinylidenehalide over said first coating.

7. A method of insulating an electrical conductor comprising the steps of extruding a coating of polyvinylchloride containing a softening agent in an amount which is less than about 15% by weight of the polyvinylchloride around said conductor while heating said conductor to a temperature of which the polyvinylchloride is softened for extrusion, and applying a moisture and water resistant covering over said polyvinylchloride coating.

8. A method of insulating an electrical conductor comprising the steps of extruding a coating

of polyvinylchloride containing a softening agent in an amount which is less than about 15% by weight of the polyvinylchloride around said conductor while heating said conductor to a temperature at which the polyvinylchloride is softened for extrusion, and applying a coating of chlorinated rubber over said polyvinylchloride.

9. A method of insulating an electrical conductor comprising the steps of extruding a coating of polyvinylchloride containing a softening agent in an amount which is less than about 15% by weight of the polyvinylchloride around said conductor while heating said conductor to a temperature of which the polyvinylchloride is softened for extrusion, and applying a chlorinated polyvinylchloride over said polyvinylchloride coating.

10. A method of insulating an electrical conductor comprising the steps of extruding a coating of polyvinylchloride containing a softening agent in an amount which is less than about 15% by weight of polyvinylchloride around said conductor while heating said conductor to a temperature at which the polyvinylchloride is softened for extrusion, and applying a coating of a copolymer of a vinylhalogenide over said polyvinylchloride coating.

11. A method of insulating an electrical conductor comprising the steps of extruding a coating of polyvinylchloride containing a softening agent in an amount which is less than about 15% by weight of polyvinylchloride around said conductor while heating said conductor to a temperature at which the polyvinylchloride is softened for extrusion, and applying a coating of copolymer of a vinylidenehalogenide over said polyvinylchloride coating.

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