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INSULATION FOR ELECTRICAL CONDUCTORS

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FIG. 1

FIG. 2

INVENTOR
HENRIK BOVING
BY
Walter C. Kiesel
ATTORNEY

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HENRIK BOVING, OF NEW YORK, N. Y., ASSIGNOR TO BELL TELEPHONE LABORATORIES, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

INSULATION FOR ELECTRICAL CONDUCTORS

Original application filed September 16, 1927, Serial No. 219,908. Divided and this application filed September 25, 1929. Serial No. 395,171.

The invention relates to insulation for electrical conductors, and has for its object the forming of flexible insulating material in any desired form.

In accordance with this invention, which is a division of my copending application Serial No. 219,908, filed September 16, 1927, a method of producing flexible loose insulation consists in applying to a suitable core a priming coating of adhesive material, such as a varnish containing a phenolic condensation product, or a varnish composed of a metallic soap dissolved in a volatile solvent, baking the coating to form an adherent layer, applying to the priming coating a layer of insulating enamel, and baking the two layers at a higher temperature than the baking temperature of the priming coating, to cause the latter to become non-adherent to the core. This method forms an insulation having the necessary qualities of flexibility, inertness to solvents, and freedom from embrittling upon aging. The insulation may be easily removed from the core without longitudinal rupture thereof.

A more detailed description of the invention follows and is illustrated in the accompanying drawings in which

Fig. 1 illustrates partly in section the formation of a thin priming coating and an outer coating on a solid core.

Fig. 2 shows the flexible insulating tubing made in accordance with this invention after the core is removed.

Referring to the drawings, Fig. 1 shows a core 10 of some suitable material, preferably of metal, which may be in the form of a solid rod or wire as indicated, or of any other desired shape and material. A thin priming coating 11 is applied to the core 10 and is preferably of an adhesive material which may be baked to a hard non-adherent state at a temperature not greater than that used for producing the usual type of enamel coating in an adherent flexible state.

It has been found that varnishes containing a condensation product of the phenol group, such as "bakelite" varnish, or a varnish or enamel prepared by dissolving metallic soaps in boiled vegetable oils are suitable for the priming coating. By diluting the varnish or enamel with a suitable volatile solvent the thickness of the priming coating may be varied. A desirable varnish of the metallic soap type may be produced by dissolving aluminum linoleate in linseed oil which has been boiled to varnish consistency.

After the priming coating has dried sufficiently to form a hard adherent layer, a covering 12, preferably of insulating enamel, is applied thereto in any suitable manner and is treated to produce a coating of the desired flexibility and hardness. After this treatment, which is preferably accomplished by baking at a suitable temperature, the priming coating adheres more firmly to the insulating enamel than to the surface of the core.

The preferred method of producing an insulation material which may be easily removed from the core, comprises applying a coating or coatings of the priming varnish, and baking the coating or coatings at a temperature between 300° and 400° F. to form a sufficiently adherent layer which will not crack or break off during the subsequent steps of the process. When the priming coating consists of a varnish containing a phenol condensation product the baking temperature should be approximately 400° F. while the baking temperature of the metallic soap varnish should be approximately 500° F. This preliminary baking temperature can be changed however, depending upon the type of varnish used in the priming coating since the object of this baking is to dry the varnish and produce sufficient adherence to the core during subsequent operations. The coated core is passed through a bath containing an enamel in any suitable manner to form a layer or a plurality of layers of protective insulation over the priming coating and finally baked at a suitable temperature from approximately 500° to 600° F. The enameling and baking may be performed in a continuous operation in an oven such as is disclosed in Holmes and Harris Patent 1,101,281, dated June 23, 1914.

The final baking temperature, which is higher than the baking temperature of the

priming coating, changes the latter from a flexible adherent layer to a substantially non-adherent coating on the surface of the core 10. The priming coating is of a fragile character but due to its adherence to the enamel insulation the coatings may be easily removed from the core by slightly decreasing the cross section of the core. For example, if the core is a wire it may be stretched and the insulation removed in suitable lengths of hollow tubes as shown in cross-section in Fig. 2.

The invention is not limited to the specific materials mentioned for the priming coating since other materials may be employed which would become non-adherent priming layers after the insulating coating has been applied and treated as described above. Furthermore, the invention is not limited to the particular method of baking since the coatings may be treated by other media to cause the priming coating to become non-adherent to the core.

What is claimed is:

1. A flexible insulation in hollow form for an electrical conductor, comprising a continuous layer of fragile resinous material and a layer of flexible material surrounding said fragile material.

2. A flexible insulation in hollow form for an electrical conductor, comprising an inner layer of baked varnish insulation and a surrounding layer of baked enamel insulation.

3. The method of forming hollow flexible insulation which comprises applying to a suitable core a priming coating of insulating material which is adherent when dried and becomes non-adherent when heated a sufficient amount, applying a second coating of a different insulating material, heating the two coatings, and removing said insulation in hollow form.

4. The method of forming hollow flexible insulation for an electrical conductor which comprises applying a coating of adhesive material to a core, drying said coating, applying a coating of flexible insulating material to said coating, treating said coatings, reducing the cross-section of said core, and removing the insulation in hollow form.

5. The method of forming hollow flexible insulation which comprises applying a coating of varnish to a core, applying thereto a coating of insulation, treating the two coatings to render the inner coating non-adherent to said core, and withdrawing the core.

6. The method of forming hollow flexible insulation which comprises applying to a suitable core a coating of varnish containing a phenolic condensation product, baking the varnish at a temperature of approximately 400° F., applying an insulating enamel to said varnish, baking the varnish and enamel at a temperature of approximately 600° F., and removing the insulation in hollow form.

7. The method of forming a hollow flexible insulation for an electrical conductor which comprises applying a coating of material containing a resin to a core, baking the coating to dry it, applying a second coating of insulating material to said first coating, baking said coatings to render said first coating non-adherent to said core, stretching said core to reduce the cross-section thereof, and removing the insulation in hollow form.

In witness whereof, I hereunto subscribe my name this 25th day of September, 1929.

HENRIK BOVING.