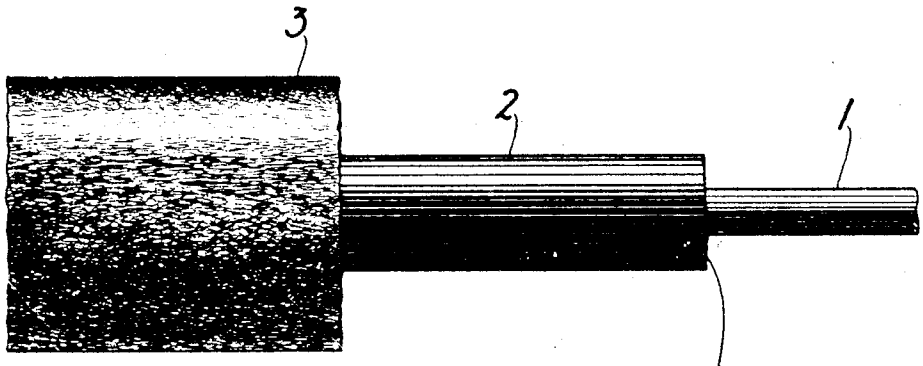
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SUBMARINE CABLE INSULATION

Filed Dec. 8, 1921



RUBBER WITH HARD RUBBER FILLER

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UNITED STATES PATENT OFFICE.

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SUBMARINE-CABLE INSULATION.

Application filed December 8, 1921. Serial No. 521,032.

This invention relates to cable insulation, and particularly to the use of powdered vulcanized rubber as a filler for rubber compositions in submarine cable insulation.

An object of the invention is to provide an insulating material, which will have a low specific inductive capacity, and which can be readily applied to the electrical conductors of submarine cables.

In insulating submarine cables it is desirable that the dielectric have a low specific inductive capacity, because the possible rate of signaling increases as the electrostatic capacity of the cable decreases.

Unfilled soft vulcanized rubber has a relatively low specific inductive capacity. Its use in cable insulation, however, is prevented by its great resiliency which makes it unsuitable for application to a conductor. To remedy this defect, it is customary to add to the rubber an inorganic filler, such as talc, zinc oxide, whiting, or the like. However, on account of the higher specific inductive capacities of such fillers, the specific inductive capacities of the resulting compositions are materially higher than that of unfilled rubber.

In accordance with this invention, powdered vulcanized rubber is used as a filler for rubber compositions. An insulating material is thus produced which is well adapted for application to a conductor on account of its lack of resiliency, and which also has a low specific inductive capacity, making it superior to cable insulating compositions now in use.

The preferred proportions of various ingredients comprising such a rubber composition for submarine insulation are as follows:

	Pounds.
Crude rubber	65
Powdered vulcanized rubber	30
Zinc oxide	5
Sulphur	3
Litharge	6
Paraffin	1

These ingredients are mixed together, spread upon the conductor, and vulcanized thereon.

In the accompanying drawing is shown a diagrammatical view of a submarine cable insulated in accordance with this invention. In the figure, the conductor 1 is surrounded by a heavy continuous layer of insulation 2 composed of ingredients in accordance with the above formula. This layer may be vulcanized after it has been placed upon the conductor. A protecting layer 3 is placed around the insulation 2 and may be constructed in different manners which are well known in the art and which depend upon whether the cable is to be used as a shore cable or a deep sea cable.

While the above formula represents the preferred composition, the proportions therein stated may be varied widely, and substitutions in whole or in part may be made in the minor ingredients. Although the lowest specific inductive capacity would be obtained if no mineral ingredient were used, small amounts of such substances may be employed without materially affecting the electric properties of the cable.

The term "powdered vulcanized rubber" is used herein to designate any vulcanized rubber reduced to a more or less finely divided condition. The amount of combined sulphur in the vulcanized rubber may be varied widely; but a rubber, which is vulcanized sufficiently to permit easily grinding to a dust, is preferable.

If a powdered vulcanized rubber containing free sulphur is used, the proportion of sulphur subsequently added to the composition may be correspondingly reduced.

While only rubber compositions have been referred to in this description, the use in submarine cable insulation of powdered vulcanized rubber as a filler for compositions comprising gutta percha, balata, and other gums is included within the scope of this invention. In this case the vulcanizing action may be dispensed with.

The invention claimed is:

1. The combination with a submarine cable conductor, of insulation therefor comprising rubber and a filler of powdered vulcanized rubber.

2. The combination with a submarine cable conductor, of insulation therefor comprising a plastic and vulcanized rubber dust incorporated therein as a filler, said plastic having a value of specific inductive capacity about the same as that of vulcanized rubber.

In witness whereof, I hereunto subscribe my name this 6th day of December, A. D., 1921.

ARCHIE REED KEMP.