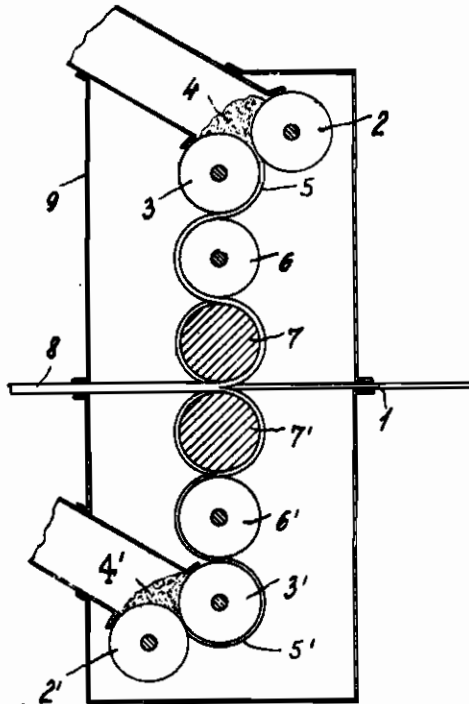


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METHOD AND AN ARRANGEMENT FOR THE LONGITUDINAL  
COVERING OF ELECTRIC WIRES  
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# ALIEN PROPERTY CUSTODIAN

## METHOD AND AN ARRANGEMENT FOR THE LONGITUDINAL COVERING OF ELECTRIC WIRES

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This invention relates to a method and an arrangement for the longitudinal covering of electric wires.

The so-called longitudinal covering of electric wires permits as is well known the covering of a plurality of electric wires with insulating material in one operation and consists in the fact that a plurality of electric wires running side by side in one plane are caused to pass through corresponding grooved rolls together with bands consisting of insulating material and supplied from above and below. The longitudinal covering is particularly employed in the manufacture of rubber insulated conductors.

The application of the longitudinal covering in connection with the employment of artificial materials available for some time past on the market presents considerable difficulties. Endeavors had already been made to overcome these difficulties by adding a higher percentage of softening agents, which, however, was not successful. Also the heating of the bands before passing through the grooved rolls could not remove the difficulties owing to the greater tenacity of the artificial substances as compared to rubber. Consequently, it has recently been proposed to dispense with the longitudinal covering in the case of artificial substances and to employ the squirting method, for which purpose a plurality of squirting dies lying in one plane were employed in order to render the squirting method more economical.

The object of the invention is to provide a method, whereby electric wires may be insulated with artificial substances by the longitudinal covering. According to the invention the manufacture of bands of insulating material by means of calenders is combined with the manufacture of sheathings for the conductors by means of grooved rolls to one operation by supplying the bands produced on the calenders directly to the grooved rolls together with the conductors to be covered. By the combination of the two operations hitherto unknown it has been surprisingly possible to manufacture proper longitudinal coverings also from very tenacious artificial substances.

A particularly convenient arrangement for carrying the invention into practice consists in a multistage rolling mill whose initial stages consist of heated calender rolls and whose end stage consists of grooved rolls also heated. It may be preferable to employ a four- or multistage rolling mill in order to heat up the artificial material in a particularly uniform manner, in which

case the rolls for the initial stages may also be provided with more or less deep grooves so as to attain a proper meshing of the different rolls with one another.

It is true that the invention may be employed for thermoplastic insulating materials of any description which are suitable for the manufacture of electric wire coverings, i. e., also for the natural insulating materials hitherto employed in the manufacture of longitudinal coverings. However, the particular advantage of the invention consists in the possibility of employing tenacious artificial substances for the manufacture of longitudinal coverings. Such artificial substances are, for instance, the polyvinyl halides with or without re-halogenation, the vinyl mixed polymers and finally also the synthetic rubber hydrocarbons. These artificial materials may be treated according to the invention even without softening agents or by adding small quantities of softeners thereto, which is of particular importance, since the electric properties of the softening agents are inferior to those of the artificial materials. Consequently, coverings made by the squirting method and consisting of mixtures containing 25 to 80% softening agents are less favorable from an electrical point of view than the longitudinal coverings manufactured according to the invention. Furthermore, these longitudinal coverings are more economical owing to the saving in softeners.

An arrangement for carrying the invention into practice is shown by way of example in the accompanying drawing. This arrangement consists of a rolling mill having, for instance, four stages, in which two bands of artificial material are manufactured and supplied from above and below to the conductor 1 to be covered. The rolling mill is designed in as symmetrical a manner as possible and presents the same number of rolls for both bands which are produced above and below the conductors 1 inserted in the central portion of the rolling mill. The rolls 2 and 3 arranged above the conductors 1 form the first stage of the rolling mill on which a band 5 is produced consisting of the material 4 supplied, for instance, in the form of powder. This band is homogenized in the second stage consisting of the rolls 3 and 6 and so prepared in the third stage consisting of the rolls 6 and 7 as to be applied to the conductors 1. The rolls 2, 3 and 6 are plain, whereas the roll 7 is grooved as is the case with the longitudinal machines hitherto employed. The rolls 2', 3', 6' and 7' which produce the band 5' consisting of the material 4' are

correspondingly arranged below the conductors 1. Under the pressure of the rolls 7 and 7' which form the fourth stage the bands 5 and 5' are integrally combined to the covering 8 on the conductor 1.

The width of the rolling mill depends upon the number of the conductors 1 to be simultaneously covered and arranged side by side in a plane. As a rule, the rolling mill is therefore not so wide as the usual calenders. If it is not possible to produce sufficiently homogeneous bands from the material 4, 4' owing to the smaller width of the roll it is advisable either to arrange one or more pair of rolls than is otherwise necessary or to give the bands such a width that they project beyond the row of conductors a greater amount than is the case with the methods hitherto known for manufacturing longitudinal coverings.

Some artificial substances containing particularly polyvinyl chloride have the peculiarity that their good properties as to their strength and elongation, can only be attained if the material is given its final shape at a high temperature, for instance, at 160 degrees centigrade and more. When heating the material to the temperature required an overheating, for instance, even a local overheating may easily occur and cause a thermic decomposition. The invention avoids this disadvantage by the fact that the rolling mill is provided with devices for maintaining a uniform temperature of the material on the rolls. This may be accomplished, for instance, by electrically heating the rolls, for which purpose control devices may be employed, particularly automatic control devices. When heating the rolling mill by steam such control devices may also be employed. Particularly advantageous is the housing

of the entire rolling mill so that a strictly uniform temperature prevails therein. A housing 9 is shown schematically in the drawing. The housing is provided at the upper and lower part thereof with hoppers for the material 4 and 4' and the rolls may be inspected by sight glasses or apertures capable of being easily closed. The enclosure 9 may, for instance, consist of a sheet iron housing. However, it may also be provided with walls consisting of material particularly impermeable to heat. Furthermore, heating devices may be arranged in the walls or on their inner side and they may under circumstances be so designed that the rolls need not be heated. The bearings of the rolls may, if necessary, be cooled in order to enable an operation of the rolling mill at a high temperature and pressure of the rolls.

The arrangement of the rolls may be different from that shown in the drawing. The rolls may also be arranged perpendicularly one above the other. In this case the supply of the artificial substance may be effected by the use of guides on the rolls and also by the use of shaking troughs. It is not necessary that the calender rolls be arranged perpendicularly above or below the grooved rolls. It is even possible to arrange the calender rolls obliquely in front of the grooved rolls and under circumstances at such a distance from the grooved rolls that the bands do not run between the rolls for a certain distance.

The bands manufactured on the rolls may be produced of different or at least variegated materials if this is convenient for the manufacture and use of the wires.

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