PUBLISHED
APRIL 27, 1943.
BY A. P. C.

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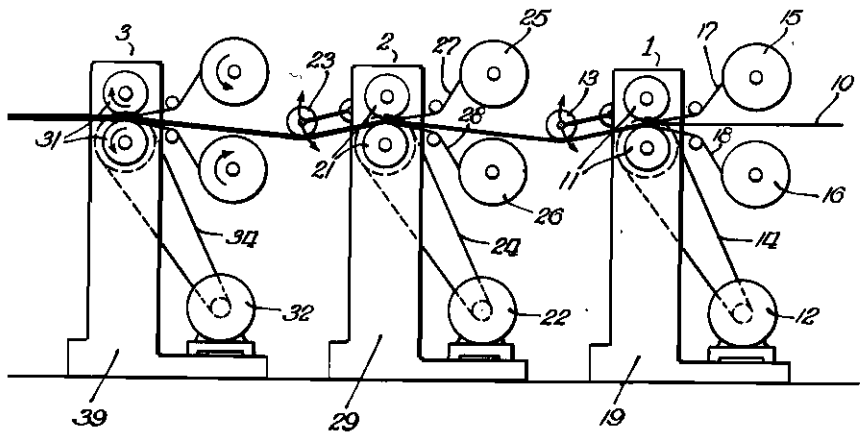
Filed Nov. 1, 1940

Serial No.
363,920



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MULTISTAGE LONGITUDINAL COVERING MACHINE

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Application filed November 1, 1940

This invention relates to a multistage longitudinal covering machine.

For the insulation of electric conductors with rubber or rubber-like materials and for the production of coverings of insulated electric conductors of such materials the longitudinal covering method is employed to a large extent. This method consists in the fact that the wires or conductors to be covered are arranged between two bands of the insulating material and are caused to pass through a pair of grooved rolls which are provided with grooves in such a manner that the insulating material is pressed by the rolls around the wire or the conductor and cut at the sides. Generally the rolls are provided with a number of grooves, i. e., the covering may be applied simultaneously to a plurality of wires or leads running parallel to one another.

The invention relates to such longitudinal covering machines which are designed with several stages, i. e., have two or more series connected pairs of grooved rolls for the purpose of arranging several coverings one upon the other. The usual multistage longitudinal covering machines are provided with a common drive for all pairs of rolls. This has several great disadvantages. Firstly, all pairs of rolls have to run simultaneously even if not all stages are required, i. e., a covering or insulation should be produced with fewer layers than may be produced by the machine. Above all it is necessary that all pairs of rolls are running with exactly the same peripheral speed in order to attain a proper insulation or covering. For this purpose all grooved rolls must have exactly the same diameter which cannot be very well realized for the reason that naturally the pairs of rolls of the various stages must have different profiles in view of the different diameters of the passing covered leads. The rolls are, however, also subject to a certain wear in operation and have therefore to be subsequently machined from time to time. In such a case all pairs of rolls must be ground to exactly the same diameter even if the wear of only one pair of rolls has exceeded the permissible amount. These disadvantages will be avoided according to the invention.

The invention consists in the fact that in multistage longitudinal covering machines each pair of grooved rolls has its own driving motor with a controllable speed and that control devices are provided for the automatic adjustment of the same peripheral speeds of the rolls.

It is hereby realized that the individual stages of the longitudinal covering machine are perfectly independent of each other so that differences in diameter of the individual pairs of rolls cannot exercise any disturbing influence, since the same peripheral speed of the individual stages is obtained by the control of the speed of the individual driving motors.

Besides it is possible according to the invention not to mount the individual stages of the whole machine in a common frame but to provide a bearing block for each stage so that the individual stages form self-contained units. In this manner the machine can be easily adapted to the available space and, furthermore, the number of stages may be at any time increased or decreased.

An embodiment of a three-stage longitudinal covering machine is shown in the accompanying drawing by way of example. Each of the grooved rolls 11, 21 and 31 of the individual stages 1, 2, 3 is provided with a driving motor 12, 22 and 32 which drive the rolls through attached gears and chain drives 14, 14, 34 and is mounted in a bearing block 19, 29 and 39 respectively. The wires or conductors 10 to be covered are supplied to the grooved rolls of the first stage simultaneously with the rubber bands 17 and 19 unrolling from the supply coils 15 and 16 and leave the grooved rolls provided with a covering consisting of one layer formed of these rubber bands 17 and 18. Thereafter they are supplied to stage 2 where the second layer of the covering is formed of the bands 27 and 28 coming from the coils 25 and 26, whereupon the third insulating layer is applied in the same manner in stage 3.

Each of the driving motors 12, 22, 32 can be individually controlled so that differences in the diameters of the individual pairs of rolls are equalized and the peripheral speed of all pairs of rolls is maintained at the same height. Under circumstances, it might be even preferable to cause the pairs of rolls of the individual stages to run with a peripheral speed increasing to a low value so that a certain lengthing of the insulating material is brought about and an improvement of the mechanical properties of certain materials may be attained. The motors may be controlled, for instance, either in dependency upon the peripheral speed of the rolls directly or the interior stress of the wires or conductors between the individual stages. To this end, known devices may be employed, for instance, small equalizing rolls 13 and 23, over which the conductors are guided and which cause an adjustment of the driving motors according to the degree of their deflection.

Besides the individual control it is advisable to provide the possibility of a common control of

all driving motors in order to be able to adapt in a simple manner the operating speed to the prevailing conditions, particularly to the properties of the materials to be used.

In order to obtain a simultaneous starting and stopping of all pairs of rolls and to avoid unnecessary waste at the beginning and the end of the operation it is advisable to instal for each driving motor slow-acting relays and brakes acting when the machine is started or stopped, which relays and brakes are exactly adjustable and by which the same starting and stopping times of all motors may be attained.

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