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METHOD OF HANDLING STRAND MATERIAL

Filed April 6, 1929

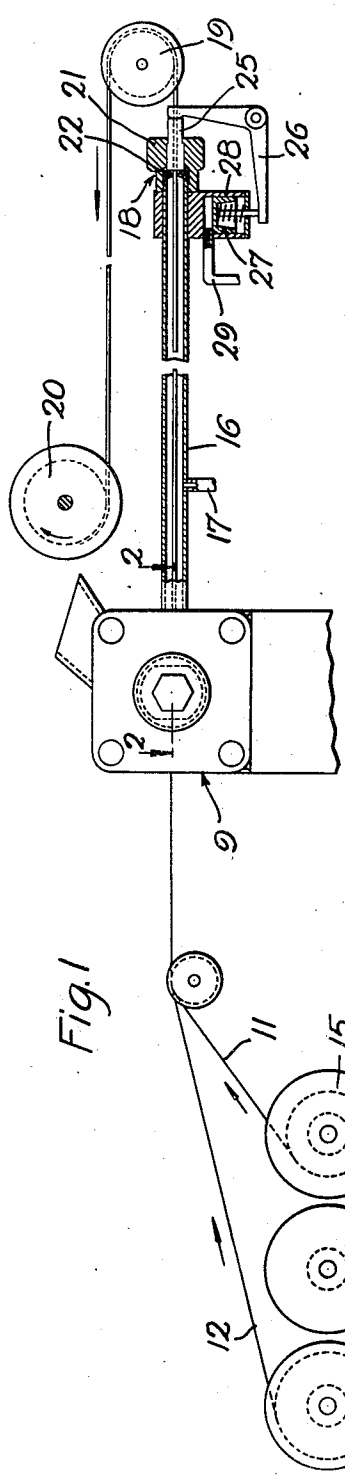


Fig. 1

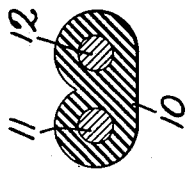


Fig. 3

Fig. 2

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UNITED STATES PATENT OFFICE

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METHOD OF HANDLING STRAND MATERIAL

Application filed April 6, 1929. Serial No. 353,043.

This invention relates to a method of handling strand material, and more particularly to a method of handling a plurality of moving wires during the process of applying a continuous coating thereto.

The invention is particularly applicable to the handling of moving wires which are in the process of being provided with a common covering of rubber or other insulating substance and are also being vulcanized or otherwise treated in a closed chamber. In such processes a plurality of wires are moved in parallel relation through an extrusion machine where a common insulating covering is applied to them, and are then passed through an elongated chamber where they are subjected to the action of steam or other heating medium to effect a heat treatment of the covering. For example, two parallel wires may be simultaneously passed through the extrusion machine where a coating of rubber compound or other insulating material is applied to them, and then passed in parallel relation through a closed steam chamber to effect vulcanization of the rubber, the steam chamber, at the point where the moving wires emerge being provided with a suitable seal to prevent leakage of the steam from the chamber.

An object of this invention is to provide an improved method for expeditiously handling moving strands.

In accordance with the present invention, when a reel becomes exhausted of wire the apparatus need not be stopped, but the forward end of the wire from a succeeding reel may be fed into the extrusion machine and drawn through the steam chamber and seal, said forward end being held in fixed position relative to the other (continuous) wire by means of a guiding strand of relatively limp material attached to said forward end.

The invention will be more fully understood from the following description taken in connection with the appended drawings, in which

Fig. 1 is a side elevation, partly in section, diagrammatically illustrating a form of apparatus whereby the invention may be practiced;

Fig. 2 is an enlarged sectional view taken on line 2—2 of Fig. 1; and

Fig. 3 is an enlarged sectional view of a pair of conductors provided with a common covering.

In the drawings, the reference numeral 9 designates the insulating head of an extrusion machine adapted to apply a common coating of rubber compound or other material 10 to wires 11 and 12. The insulating head may be of any suitable construction, the particular form illustrated herein being more fully described in the application of G. L. Cherry, Serial No. 353,042, filed April 6, 1929.

The wires 11 and 12 are led to the insulating head from supply reels 13, 14 and 15, the supply reels being so mounted with respect to the extrusion machine that when one reel becomes exhausted the wire from another reel may be threaded into the machine without removing the exhausted reel. From the extrusion machine, the newly coated wires are passed to a chamber 16, where steam or other heating medium is admitted thereto through an inlet 17, the heating medium being maintained under pressure in the chamber. From the chamber the coated and heat treated wires pass through a substantially steam-tight seal 18, and thence over a capstan 19 to a take-up reel 20. The capstan 19 is driven, by means not shown, at a predetermined speed which is coordinated with the extruding speed of the insulating head 9.

The seal 18 comprises a threaded cap 21 which holds apertured disks 22, of rubber or other resilient material, against the end of the steam chamber 16. A hollow cylindrical retaining member 25 holds the disks 22 in yielding contact with the coated wires 11 and 12 moving therethrough, to prevent leakage of the steam from the chamber. The retaining member 25 is held in position by a bell-crank lever 26 which is yieldingly urged against the retaining member by means of a piston 27 mounted in a cylinder 28 and actuated by compressed air or other pressure medium admitted through duct 29.

In the operation of the mechanism thus far described, two wires are drawn from

reels 14 and 15 through the insulating head 9 and steam chamber 16 in parallel relation, passing over capstan 19 to the take-up reel 20, the distance between capstan 19 and reel 20 being sufficiently great to permit the covering to cool and harden. When the wire on any given reel 14 is exhausted, its rear end 30 will be drawn through the apparatus and the extrusion machine will thereafter produce a tube or section of insulation 31 having no wire therein and frequently having insufficient tensile strength to bind the forward end 32 of the wire 12 from the next reel 13 to the other (continuous) wire 11 so as to permit the forward end to pass through the steam chamber and the seal 18 without being stripped from wire 11. This difficulty is accentuated where the wire 12 is springy, in which case the forward end 32 tends to return to the helical shape it had when wound upon the reel. This tendency causes it to draw away from the other wire 11 and break the section 31 during the first part of its passage through the chamber 16, when the heat of the steam softens the rubber and vulcanization has not yet progressed sufficiently to impart toughness to the rubber. The forward end 32 will in such a case be obstructed by the seal 18, which will strip the wire 12 from wire 11. In order to prevent such occurrence, therefore, each reel of wire to be fed to the apparatus has attached to its forward end a length of soft wire or other strand material 34 of less rigidity than the wire being handled, constituting a limp guiding strand which binds the forward end 32 to the other wire 11 and prevents it from drawing away from said other wire. The length 34 may be attached to the wire of the reel 13 by brazing or any other suitable means, such attachment being performed in advance of the time when the forward end 32 is fed into the insulating head 9. Such length 34 should be sufficiently long that the coating material at its forward end will be fairly well vulcanized by the time its rear end, attached to end 32, enters the steam chamber.

In the practice of the method constituting this invention, a plurality of wires or other strands are advanced through the apparatus in parallel relation, the insulating head 9 applying a common covering to the strands during such advancement. When the wire on any given reel 14 becomes exhausted a new strand 12, having attached thereto a length of less rigid strand material 34, is fed into the insulating head 9, following as closely as possible the rear end 30 of the preceding wire. The length 34 is thereupon drawn through the apparatus, and its forward end is bound securely to the other wire 11 by the time the forward end 32 of the new strand enters the steam chamber. The wires 11 and 12 may therefore be passed through the machine and wound and reeled in the usual manner. As an alternative, the length 34 may be secured not only to the forward end 32 but also to the rear end 30. In the finished product, the relative limpness of the length 34 is such that it marks the point at which the new wire has been introduced, thereby facilitating the later removal of the section 31 and length 34 preparatory to splicing.

While the invention has been described with particular reference to a pair of rubber covered wires and a steam vulcanization process, it will be readily understood that the method, with suitable modifications, may be applied in various other relations. The scope of the invention is therefore to be limited only by the terms of the following claims.

What is claimed is:

1. A method of handling strand material, comprising continuously advancing a pair of strands in parallel relation, applying a common covering to the strands during such advancement, advancing a third strand in longitudinally spaced relation to one of said pair of strands, connecting to the forward end of said third strand a length of strand material of less rigidity than the third strand, and connecting said length of strand material to one of said pair of strands by means of the covering material.

2. A method of handling strand material, comprising advancing a strand along a predetermined path, advancing a length of flexible material in parallelism with said strand, applying a common covering of plastic material to the strand and the length, vulcanizing the covering during such advancement to bind the length to the strand, and drawing the forward end of a strand of relatively rigid material along said path by means of the length.

3. A method of handling strand material, comprising continuously advancing a strand along a predetermined path, applying a covering to the strand during such advancement, attaching to one end of a second strand a length of strand material of less rigidity than the second strand, and connecting the length of strand material to the first strand solely by means of the covering material.

4. A method of handling strand material, comprising continuously advancing a strand along a predetermined path, applying a covering to the strand during such advancement, attaching to one end of a second strand a length of strand material of less rigidity than the second strand, connecting the length of strand material to the first strand by means of the covering material, and advancing the second strand along the predetermined path by means of the length of strand material.

5. A method of handling strand material,

comprising continuously advancing a strand along a predetermined path, applying a covering to the strand during such advancement, attaching to a second strand a length of strand material of less rigidity than the second strand, connecting the length of strand material to the first strand by means of the covering material, and advancing the length of strand material and thereby the second strand along the predetermined path.

6. A method of handling strand material, comprising continuously advancing a plurality of strands in parallel relation along a predetermined path, applying a common covering to the strands during such advancement, connecting to the forward end of a succeeding strand a length of strand material of less rigidity than the succeeding strand, and attaching the length of strand material to one of the first mentioned strands solely by means of the covering material.

7. A method of handling strand material, comprising continuously advancing a pair of strands in parallel relation, applying a common covering to the strands during such advancement, heat treating the applied covering, connecting to the forward end of a succeeding strand a length of strand material of less rigidity than the succeeding strand, attaching the length of strand material to one of the first mentioned strands by means of the covering material, and advancing the length of strand material and thereby the succeeding strand along the predetermined path.

8. A method of handling strand material, comprising advancing a strand along a predetermined path, advancing a length of flexible material along a path parallel to the path of the strand, applying a common covering to the strand and the length to bind the length to the strand, and drawing the forward end of a second strand of relatively rigid material along the path of the length by means of the length.

9. A method of handling strand material, comprising advancing a strand along a predetermined path, attaching a length of flexible material to one end of a second strand, advancing the length along the path in longitudinally spaced relation to the first strand, applying a common covering to the first strand and the length, and advancing the length and thereby the second strand along the path by means of the covering material and the first strand.

In witness whereof, I hereunto subscribe my name this 26 day of March, A. D. 1929.

LESLIE FAWCETT LAMPLOUGH.