Nov. 5, 1929. T. McD. YANCEY 1,734,704

METHOD OF AND APPARATUS FOR UNWINDING STRAND MATERIAL

Filed March 22, 1927

Fig. 1.

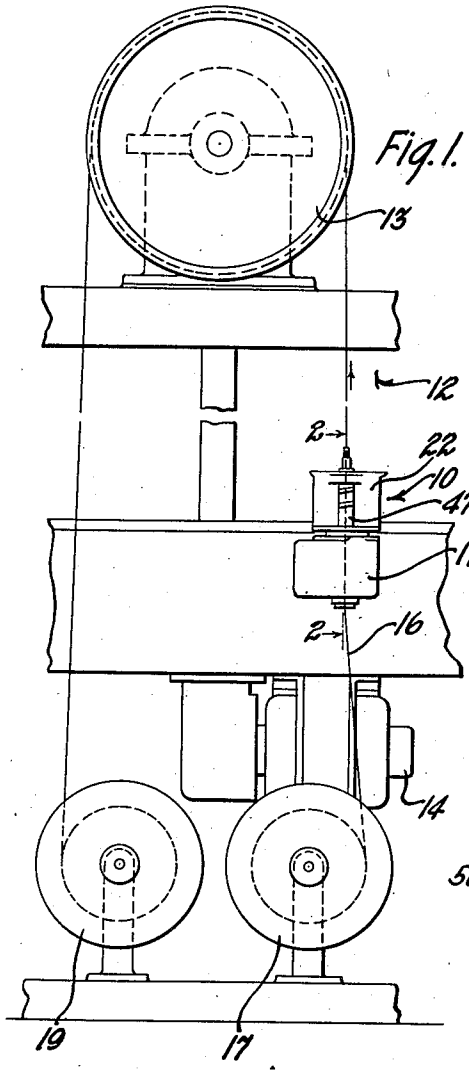


Fig. 3.

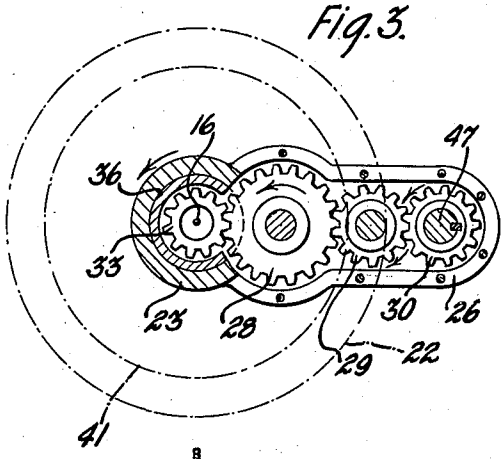
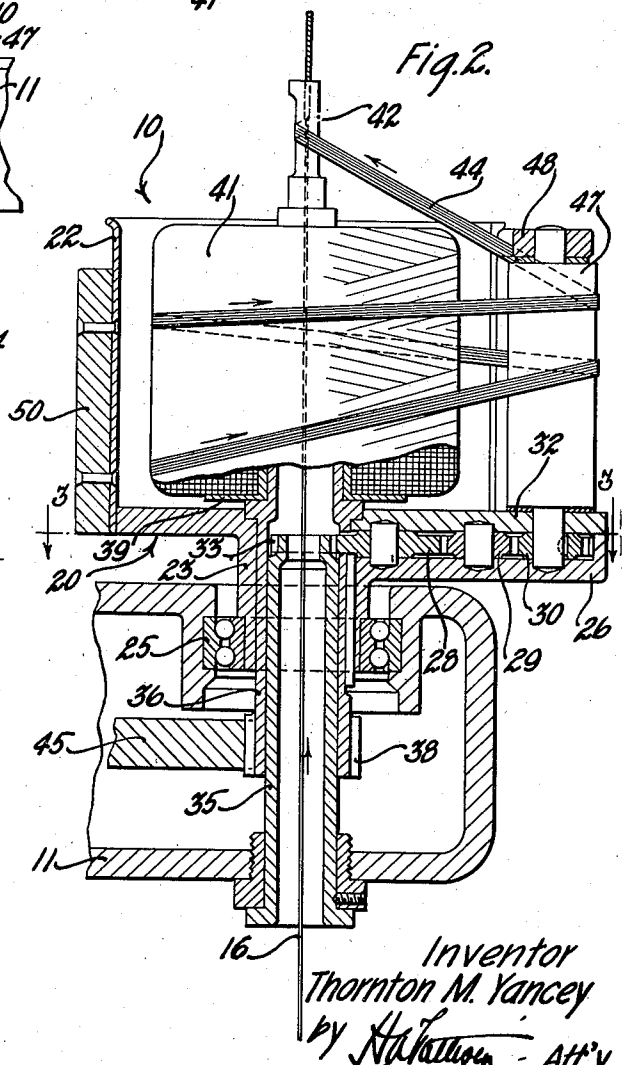


Fig. 2.



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UNITED STATES PATENT OFFICE

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METHOD OF AND APPARATUS FOR UNWINDING STRAND MATERIAL

Application filed March 22, 1927. Serial No. 177,269.

This invention relates to methods of and apparatus for unwinding strand material, and more particularly to methods of and apparatus for serving strand material to a moving core under minimum tension from a strand supply positioned coaxial with the core.

The primary objects of this invention are to provide improved methods of and apparatus for unwinding strand material under minimum tension.

In accordance with the general features of the invention, one embodiment thereof consists in the withdrawal of strand from a rotatable supply within a serving head into covering relation with respect to a vertically movable wire positioned coaxially therewith. The strand passes from the supply around a friction member rotatable in response to the rotation of the serving head and is then associated with the supply in such a manner that the total force required to rotate the supply in withdrawing the strand therefrom will be distributed between several portions of the withdrawn strand.

These and other objects will be apparent from the following detailed description taken in connection with the accompanying drawings, wherein

Fig. 1 is a fragmentary, elevational view of a serving or insulating apparatus equipped with a serving head representing one embodiment of the invention by means of which the improved method may be efficiently practiced;

Fig. 2 is a vertical, sectional view of the serving head taken on the line 2—2 of Fig. 1, and

Fig. 3 is a horizontal, transverse, sectional view taken on the line 3—3 of Fig. 2.

Referring now to the drawings wherein like numerals have been employed to designate similar parts throughout the various figures, it will be observed that a serving head denoted generally by the numeral 10 in Fig. 1 is disclosed in operative association with a frame 11 of a conventional wire insulating machine 12. A capstan 13 positioned at the upper portion of the machine is operatively connected with a motor 14 and is designed to withdraw a wire 16 from a supply reel 17 upwardly through the serving head 10 and thence the wire is directed to a suitable take-up spool 19.

The serving head 10 comprises a base 20 which supports a cylindrical casing 22, the base being provided with a depending shank 23 which is rotatably supported by a roller bearing 25 secured within the machine frame 11. Formed integral with the depending shank 23 and extending laterally therefrom is a frame arm 26 which is designed to support a plurality of meshing gears 28, 29, and 30. A cover member 32 companion to the frame arm 26 cooperates therewith and is secured thereto so as to present a complete housing for the gears 28, 29, and 30.

The gear 28 meshes with a stationary gear 33 formed at the upper extremity of a vertical sleeve 35 which is fixed to and supported by the frame 11 at its lower extremity. The sleeve 35 extends upwardly within a rotatable hollow shaft 36, this shaft 36 being provided at its lower extremity with a gear 38 and keyed to the shank 23 of the serving head base 20. The portion of the hollow shaft 36 extending upwardly from the base 20 provides a bearing for a spindle 39 which is freely rotatable thereon and adapted to support a strand supply 41. The upper extremity of the hollow shaft 36 terminates in a strand guiding fixture 42 which is designed to properly direct a strand 44 from the strand supply 41 into proper covering relation with respect to the wire 16. Rotation is imparted to the hollow shaft 36 by means of a gear 45 which meshes with the gear 38 and which is operatively connected with the driving motor 14.

A cylindrical friction member 47 is vertically positioned adjacent the serving head casing 22. The lower reduced end of the friction member 47 extends through the frame cover 32 and is keyed to the gear 30, while the upper extremity thereof is rotatable within a bracket arm 48 carried by the casing 22. From the foregoing it will be clear that upon rotation of the serving head 10 the gear 28 meshing with the stationary gear 33 will be caused to rotate and the rotation expe-

rienced by the gear 28 will be transmitted to the gear 30 which is connected to the friction member 47, through the medium of the idler gear 29. In this manner the friction member 47 will rotate in response to the rotation of the serving head and the direction of rotation of the cooperating parts may readily be determined by observing the directional arrows disclosed in Fig. 3. To balance the serving head 10 during its rotation, a counterweight 50 is secured to the side of the casing 22 in a position oppositely disposed from the friction members 47 and the parts associated therewith.

The strand 44 in the present instance comprises a plurality of individual cotton strands, suitable for insulating electrical conductors. This strand 44 is directed from the supply 41 thereof to the peripheral surface of the friction member 47 and is then redirected and wrapped around the supply 41 as clearly shown in Fig. 2. From the supply this strand is again passed around the surface of the friction member and thence inclined upwardly to the guiding fixture 42 and obviously upon rotation of the serving head 10 together with a contemporaneous upward movement of the wire 16, the strand 44 will be wrapped in helical formation around the wire 16. It has been the practice, in some instances, to pass the strand, such as strand 44, from a supply thereof directly into association with a wire to be covered without first passing portions of the strand over a friction member similar to the member 47. Under such circumstances the strand is subjected to a tension which results from the total force which is necessary to rotate the strand supply in order to withdraw the strand therefrom. By directing the strand from the supply into association with a friction member in the manner hereinbefore set forth, it will be understood that the force required to rotate the supply 41 will be distributed between a plurality of portions of the strand. Hence, it will be clear that the tension imposed upon the strand will be considerably less than the tension imposed upon a strand which is passed directly from the supply to the wire without the use of the friction member 47. Unwinding or withdrawing strands under minimum tension greatly reduces the probability of strand breakage incident to the unwinding operation. The embodiment of the invention disclosed is particularly well adapted for use in connection with unwinding strands from relatively large reels or supplies wherein it is desirable to effectively unwind strand material which will not withstand a tension imposed by a pulling force which is required to rotate the supply from which the strand is withdrawn. By employing the described apparatus, any tendency of the strand supplies to overrun and cause a momentary slackness in the strand during the withdrawing operation is positively precluded. Hence, the strands may be withdrawn at a uniform, constant speed without experiencing any sudden or momentary increases in tension which would necessarily result if any slackness were present. Thus it is to be understood that this invention provides a simple and efficient method and apparatus whereby strands may be withdrawn from a serving head rotating at a relatively high speed under minimum tension and consequently with a minimum amount of strand breakage during such operation.

Although the invention has herein been described in connection with a particular type of serving apparatus, it is to be understood that the invention is capable of other applications and should be limited only by the scope of the appended claims.

What is claimed is:

1. The method of unwinding strand material from a supply thereof, which consists in frictionally engaging a strand during the withdrawal thereof from a supply, directing the strand from the point of engagement into association with the supply so as to distribute the force required to withdraw the strand from the supply between a plurality of portions of the strand, and causing a relative movement between the point of frictional engagement and an axis of the supply.

2. The method of unwinding strand material from a rotatable supply thereof, which consists in frictionally engaging a strand withdrawn from the supply at a point spaced from the supply, associating the strand with the supply so as to distribute the total force required to rotate the supply upon the withdrawal of strand therefrom between a plurality of portions of the strand, and causing a relative movement between the point of engagement and an axis of the supply.

3. The method of unwinding strand material from a rotatable supply thereof, which consists in frictionally engaging a strand at a point spaced from the supply, wrapping the strand around the peripheral surface of the supply so as to distribute the total force required to rotate the supply upon the withdrawal of strand therefrom between a plurality of portions of the strand, and revolving the point of engagement of the strand about an axis of the supply.

4. In apparatus for unwinding strand material from a supply thereof, means for supporting a strand supply, means for applying a withdrawing force to a strand from a supported supply, means for engaging the strand and associating it with the supply to cause a distribution of the force required to withdraw the strand from the supply between a plurality of portions of the strand to minimize the tension in the strand portion withdrawn directly from the supply, and means

for causing a relative movement between the engaging means and an axis of the strand supply.

5. In apparatus for unwinding strand material from a supply thereof, means for supporting a strand supply, means for applying a withdrawing force to a strand from a supported supply, means including a cylindrical member for frictionally engaging the strand and associating it with the supply to cause a distribution of the total force required to withdraw the strand from the supply between a plurality of strand portions to minimize the tension in the strand portion withdrawn directly from the supply, and means for causing a relative movement between the cylindrical member and an axis of the supply.

6. In apparatus for unwinding strand material from a supply thereof, means for supporting a strand supply, means for supplying a withdrawing force to a strand from a supported supply, a cylindrical friction member for receiving a strand from a supported supply and directing the strand into engagement with the supply to distribute the force required to withdraw the strand from the supply between a plurality of portions of the strands to minimize the tension in the strand portion withdrawn directly from the supply, and means for revolving the cylindrical member about an axis of the strand supply.

7. An apparatus for unwinding strand material from a rotatable supply thereof, a rotary means for rotatably supporting a strand supply, means for applying a withdrawing force to a strand from a supported supply, means for actuating the rotary support, and a cylindrical friction member for receiving a strand from a supported supply and directing the strand into engagement with the supply to distribute the force required to withdraw the strand from the supply between a plurality of portions of the strand to minimize the tension in the strand portion withdrawn directly from the supply, said cylindrical member being rotatable in response to the movement of the rotary support and revoluble about the axis of the supported supply.

8. In apparatus for unwinding strand material from a rotatable supply thereof, a rotary means for rotating and concentrically supporting the strand supply, means for applying a withdrawing force to a strand from a supported supply, means for actuating the rotary support, a cylindrical friction member for engaging a strand from the supply and directing it into engagement with the supply to distribute the force required to withdraw the strand from the supply between a plurality of portions of the strand to minimize the tension in the strand portion withdrawn directly from the supply, said cylindrical friction member being carried by the rotary support and positioned concentrically thereof, and means operable in response to the operation of the rotary support for imparting rotation to the friction member.

In witness whereof, I hereunto subscribe my name this 12th day of March A. D., 1927.

THORNTON McDUFFEY YANCEY.