Nov. 5, 1929. T. McD. YANCEY 1,734,705

METHOD OF AND APPARATUS FOR UNWINDING STRAND MATERIAL

Filed March 22, 1927

Fig. 1

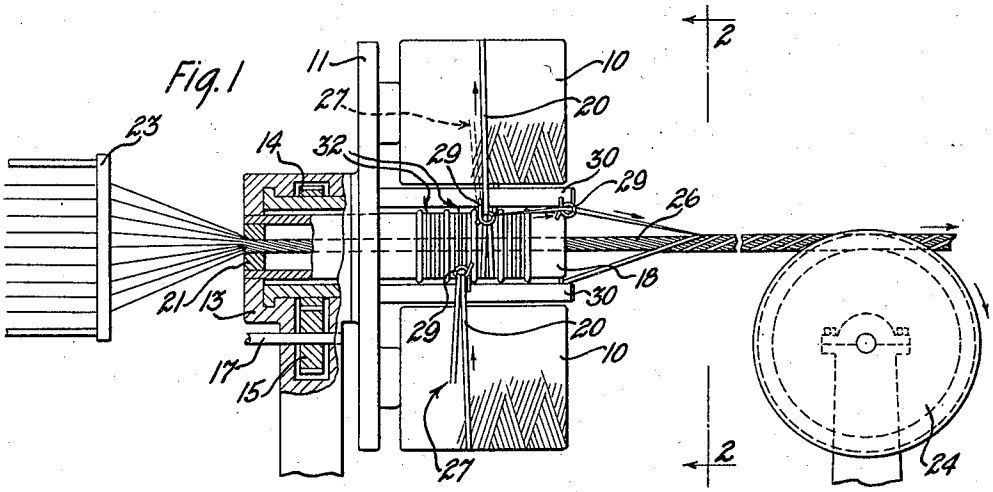


Fig. 2

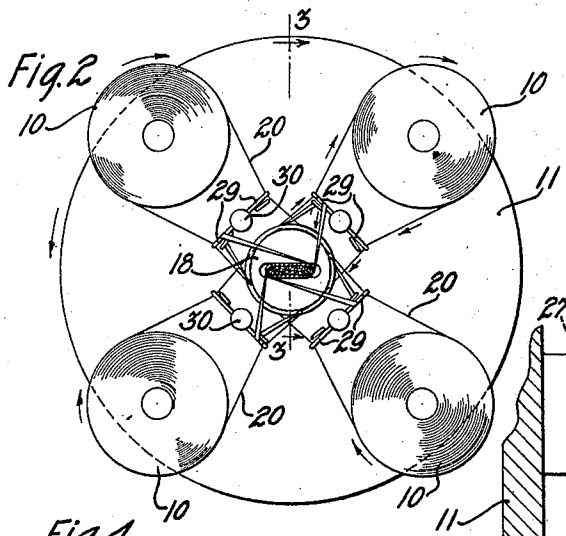


Fig. 3.

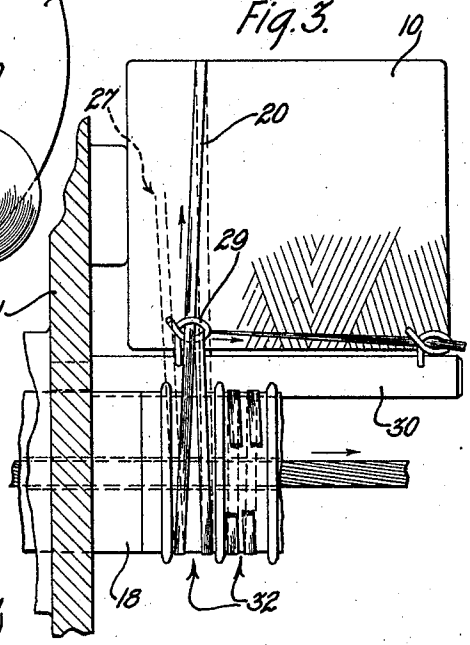
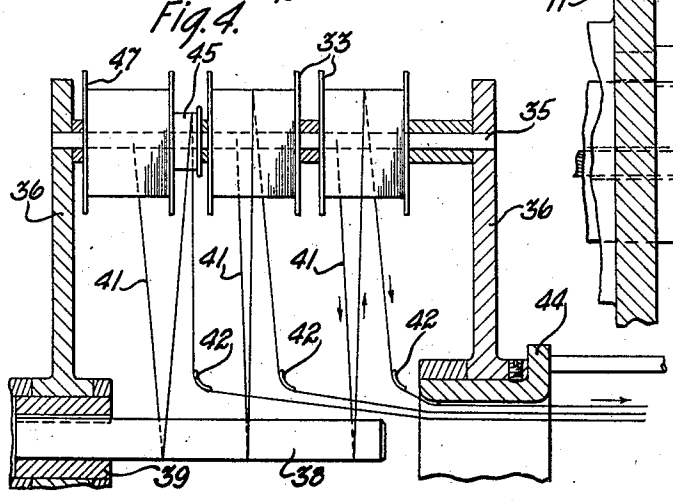


Fig. 4.



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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. 177,270.

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 predetermined position under minimum tension from a plurality of rotatable strand supplies.

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

In accordance with the general features thereof, the invention contemplates the withdrawal of strands from rotatable supplies revoluble about the axis of an advancing cable. Strands withdrawn from each supply engage a stationary friction member and are then redirected into association with their respective supplies so as to distribute the total force required to rotate the supplies during the withdrawal of strands therefrom between a plurality of portions of each strand.

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

Fig. 1 discloses a strand serving mechanism representing one embodiment of the invention by means of which the improved method may be effectively practiced;

Fig. 2 is an end elevational view of the strand serving mechanism as viewed on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged, fragmentary, vertical, sectional view taken on the line 3—3 of Fig. 2, and

Fig. 4 discloses an alternative embodiment of the invention in connection with supply reels for a cable stranding apparatus.

Referring now to the drawing wherein like numerals have been employed to designate similar parts throughout the various figures, it will be observed that a plurality or series of strand supplies 10 are rotatably mounted and equally spaced in a circular path on the face of a rotary head 11. This head 11 is rotatably supported by a bearing 13, rotation being imparted to the head through a gear 14 secured thereto and a companion gear 15 meshing therewith mounted upon a shaft 17 which is driven from a suitable source of power supply (not shown). A hollow shaft or friction member 18 is secured in a fixed position at one end thereof within the bearing 13 and is coaxial with respect to the rotary head 11. It will be understood that the strand supplies 10 are adapted to be revolved about the stationary friction member 18, the member 18 being designed to frictionally engage and receive individual strands 20 directed from the supplies.

Mounted within the friction member 18 at the fixed end thereof is a conventional cable forming die 21 for receiving cable strands from a rotary forming plate 23 also of conventional design. A capstan 24 serves to draw a cable 26 through the die and this capstan is driven by any suitable driving mechanism (not shown). The strands 20 which may comprise a plurality of individual strands of cotton material or the like are passed from a position, as indicated by the numeral 27 in Fig. 3, on their respective supplies to the peripheral surface of the friction member 18 and are then passed around the peripheral surface of their strand supplies. From this position the strands are again passed around the surface of the friction member 18 and thence through guiding loops 29 which are carried by horizontally disposed pins 30 secured to the rotary head 11. Upon passing through the loops 29 the strands are guided through a similar loop at the outer extremity of the pins 30 and are then passed into covering relation with the surface of the cable 26. It will be observed that the guiding loops 29 which receive the strands extending between the supplies and the friction member serve to direct the strand from each supply into association with a predetermined portion of the peripheral surface of the friction member. These portions upon the surface of the friction member are indicated by the numeral 32, and it will be clear that as the strand supplies 10 are rotated about the member 18, the strands 20 withdrawn from each supply will engage one of the surface areas included within these surface portions 32.

From the foregoing it will be understood that upon the rotation of the head 11 and the

simultaneous rotation of the capstan 24, the strands 20 will be unwound or withdrawn from their respective supplies and served in a helical formation upon the surface of the cable 26. As the supplies 10 are revolved about the cable 26 in the direction shown by the arrows in Fig. 2, the total force required to rotate the supplies for the withdrawal of strand therefrom will be distributed between several portions of each individual strand, as distinguished from the effect produced upon a strand which is withdrawn from one of the supplies and passed directly into covering relation with the cable without first wrapping the strand around a friction member and the supply from which it is withdrawn. The relative movement between each supply and the friction member 18 serves to distribute the pulling force to which the strand from each supply is subjected between the portions of the strand passing between the supply and the friction member and hence the tension imposed upon the strand is correspondingly reduced. In Fig. 3 it will be observed that one of the above mentioned portions of the strand extends from the point indicated by the numeral 27 on the supply to the point of engagement with the member 18 and another portion continues from the member 18 to the supply and still a third portion reaches between the supply and the member 18. A fourth portion of the strand extends from the member 18 to the point where said strand passes through the loop 29. Thus it is to be understood that the frictional engagement of the strand with the member 18 and its respective supply during the revolving of the supply about the member 18 serves to distribute the pulling force required to rotate the supply between several of the strand portions. By practicing this method of withdrawing strands from rotatable supplies, the strands may be expeditiously served to a moving cable with a minimum possibility of strand breakage.

An alternative form or embodiment of the invention is disclosed in Fig. 4 wherein a fragmentary, sectional view of certain portions of the cable stranding apparatus are disclosed. A plurality of wire or strand supply reels 33 are rotatably mounted upon the shaft 35 horizontally disposed between rotary heads 36. For purposes of illustration, one group of these supply reels are shown, but it is to be understood that in practice a plurality of such groups are rotatably mounted on shafts arranged in a circular series around the axis of the heads 36. Disposed in parallelism with the shaft 35 and coaxial with the heads 36 is a stationary cylindrical friction member 38 which is secured at one end thereof in a fixed bearing 39. A strand of wire 41 from each of the supplies supported by the reels 33 is passed around the peripheral surface of the friction member 38 and is then redirected into association with the peripheral surface of the strand supply on said reels. From this point the strand is directed by suitable guides 42 through a conventional hollow strander trunnion 44 and thence to a forming plate (not shown) similar to the forming plate 23 disclosed in Fig. 1. In the event that it is not desirable to redirect the wire strand 41 into direct association or contact with the supply carried by the reels, an auxiliary reel 45 may be employed which is secured to a supply reel 47 similar in design to the supply reel 33. By using the auxiliary reel 45 the strand 41 may be directed from the friction member 38 to the peripheral surface of the auxiliary reel 45 instead of being passed into direct contact with the peripheral surface of the wire supply. From what has been stated in connection with the description of the apparatus disclosed in Figs. 1 to 3 inclusive, it will be clear that the force required to rotate the reels 33 and 47 for the purpose of withdrawing wire strand 41 therefrom will be distributed between several portions of the wire and hence the tension to which the wire is subjected will be materially reduced.

From the foregoing it will be understood that the invention is particularly applicable for use in connection with withdrawing or unwinding strands from supplies under minimum tension and therefore is readily capable of being used in the unwinding of strand material which will not withstand the tension imposed by the 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. The invention as herein disclosed provides a simple and very efficient method of and apparatus for the expeditious unwinding of strands with a minimum amount of breakage which is incident to such unwinding operations.

Although the invention has herein been disclosed in connection with particular types of strand serving apparatus, it is to be understood that the invention is capable of many other applications without departing from the spirit thereof 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 with a surface during the withdrawal thereof from a supply, directing the strand from the point of engagement into association with the sup-

ply, and causing a relative movement between the supply and the surface so as to distribute the force required to withdraw the strand from the supply between a plurality of portions of the strand.

2. The method of unwinding strand material from a rotatable supply thereof, which consists in frictionally engaging a strand with a surface during the withdrawal thereof from the supply, directing the strand from the point of engagement into association with the supply, and revolving the supply about the surface 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.

3. The method of unwinding strand material from a series of rotatable supplies thereof spaced around a common axis, which consists in frictionally engaging strands during the withdrawal thereof from the supplies at a point approximating the common axis, wrapping the strands thus withdrawn around their respective supplies, and then revolving the supplies around the common axis so as distribute the force required to rotate the supplies during the withdrawal of the strands therefrom between a plurality of portions of the strand.

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 a plurality of turns associated with the strand supply, and means for causing a relative movement between the supply and the engaging means to distribute the force required to withdraw the strand from the supply between the aforementioned plurality of turns of the strand.

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, a cylindrical friction means for engaging the strand, and means for moving the supply around the friction means to distribute the force required to withdraw the strand from the supply between a plurality of portions of the strand.

6. 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, a stationary friction member for receiving a strand from the supply, and means for moving the supply around the friction member to distribute the force required to withdraw the strand from the supply between a plurality of portions of the strand.

7. In apparatus for unwinding strand material from a plurality of rotatable supplies thereof, a rotary means for rotatably supporting a plurality of strand supplies, a cylindrical, stationary friction member for engaging the strand positioned coaxially with the rotary support, means for applying a withdrawing force to the strands, and means for actuating the rotary support to cause the revolution of the supplies about the friction member.

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

THORNTON McDUFFEY YANCEY.