D. NOBLE.

WIRE COVERING MACHINE.

APPLICATION FILED OCT. 27, 1919

1,367,709. Patented Feb. 8, 1921.

Fig. 1

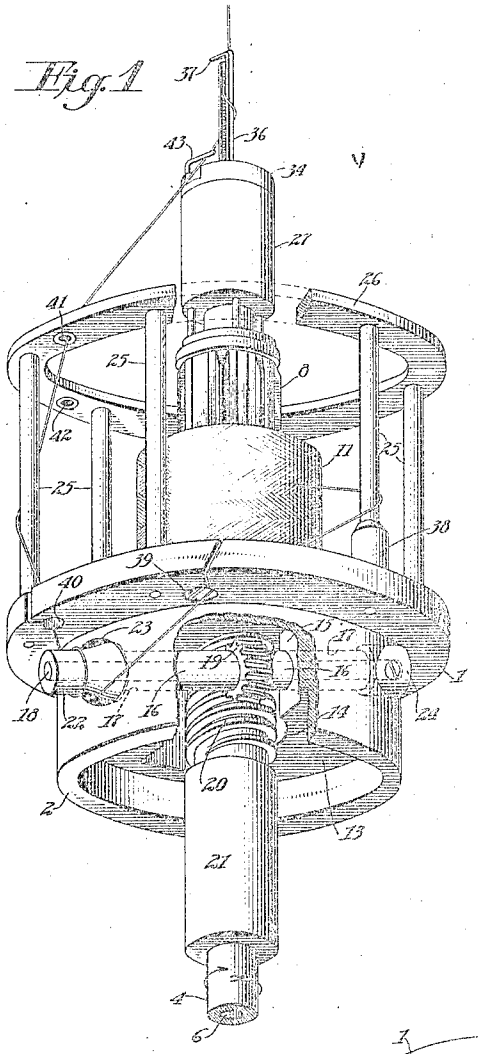


Fig. 2

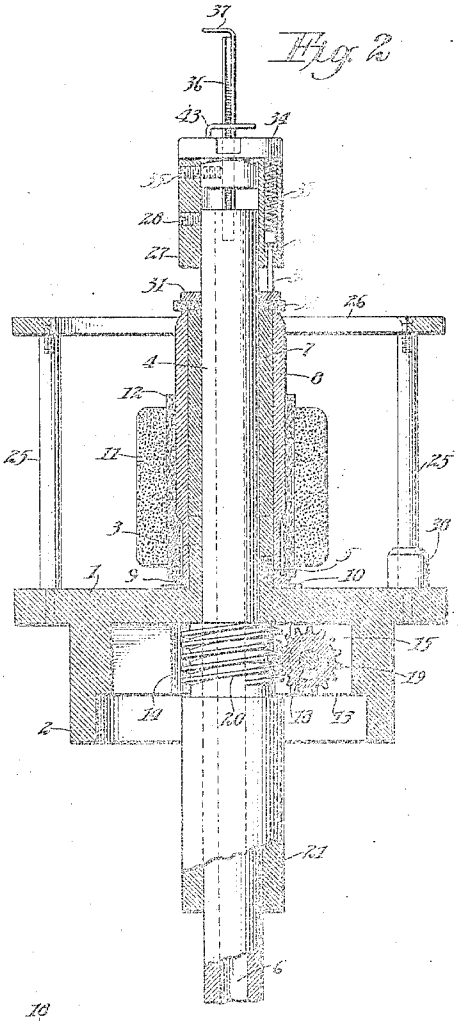
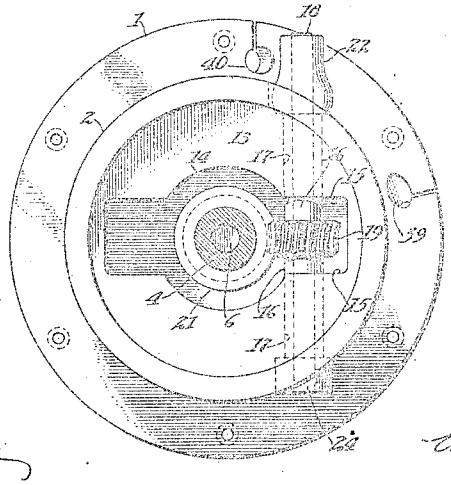


Fig. 3



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DONALD NOBLE, OF BRIDGEPORT, CONNECTICUT.

## WIRE-COVERING MACHINE.

1,367,709. Specification of Letters Patent. Patented Feb. 8, 1921.

Application filed October 27, 1919. Serial No. 333,564.

*To all whom it may concern:*

Be it known that I, DONALD NOBLE, a subject of the King of Great Britain, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Wire-Covering Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in machines for covering or insulating wire with yarn or equivalent material and more particularly to improvements in the wire-covering machine in part disclosed in my prior United States Patent No. 1,000,109, dated August 8, 1911.

In the construction shown and described in my patent referred to, there was employed a plurality of yarn delivery- or feed-rolls carried by spindles journaled in bearing-sleeves projecting from a casing suitably secured to the rear of the spinning head. While these rolls performed their function satisfactorily in operation, it was found to be extremely difficult to manufacture and assemble the parts in commercial quantities.

The primary object of the present invention is to provide a spinning-head having a wire-covering material feed-roll or rolls supported and actuated in a manner greatly facilitating manufacture and assembly of the parts, thereby procuring a finished product at less cost and with greater accuracy than was heretofore possible.

Another object of this invention is to provide simplified supporting and actuating means for the feed-roll or rolls whereby lubricant is prevented from reaching the feed-roll from the actuating mechanism, and marring of the product in this manner is obviated.

The invention has for a further object to provide improved tensioning means for controlling the relative rotation of the yarn-cop with respect to the rotation of the spinning-head.

A still further object of this invention is to provide proper tensioning means for controlling the yarn intermediate the feed-roll or rolls and the spinning nozzle of the head, in keeping with the quality of yarn employed.

Other objects of this invention will be apparent from the following description and claims.

In its preferred form my invention is embodied in a spinning head comprising a disk, suitably secured upon a rotating shaft and from which project a plurality of forwardly extending posts sustaining a ring in spaced relation with respect to the disk. Projecting rearwardly from the disk is a flange having a casing provided with oppositely disposed apertured seats in which are snugly fitted spaced bushings affording bearings for a feed-roll carrying spindle arranged substantially at right angles with respect to the axis of rotation of the spinning head. Secured upon the spindle intermediate the bushings is a worm-wheel constantly in engagement with a stationary worm provided on a sleeve suitably fixed upon the framework of the machine and affording a bearing for the spinning-head actuating shaft. It will be obvious that upon rotation of the spinning-head, the spindle will be simultaneously rotated. At its outer end the spindle carries a feed-roll extending beyond the periphery of the flange from a suitable recess in the latter.

A cop of wire-covering material is journaled upon the spinning-head carrying shaft intermediate the ring and the disk and the relative rotation of the cop is controlled by a plurality of spring-pressed tension-pins carried by an adjustable supporting element in a manner affording a centrifugally balanced device properly controlling the rotation of the cop. In a device of the present character revolving at a very high speed, it is essential that the parts be properly balanced, and it will be observed throughout the following description that in the construction of the present improvement this feature was constantly borne in mind. The yarn is led from the cop over one of the posts, through an aperture in the disk and is then wound around the feed-roll a number of convolutions corresponding to the work in hand. The feed-roll as formerly tends

to draw off a quantity of yarn in excess of the quantity needed, which excess as before is equalized by the slippage of the yarn upon the feed-roll. In fact, the action of the feed-roll itself upon the yarn is the same as in the construction of my patent before referred to.

It has been found desirable in the type of machines to better control the yarn intermediate the feed-roll and the yarn-delivery nozzle and to this end the yarn after it leaves the feed-roll is wound in whole or fractional convolutions around one of the posts as may be necessary and is led through one of the guides provided in the ring upon opposite sides of the post. From this point the yarn is directed to its delivery nozzle for winding upon a wire passing axially through the nozzle.

In the accompanying drawings, Figure 1 is a perspective view, partly in section, of my present improved spinning-head. Fig. 2 is a longitudinal sectional view of the same, and Fig. 3 is a rear end view in elevation of the head.

Referring to the several figures of the drawings in which like parts are similarly designated, the present improved spinning-head comprises a disk 1 provided with a rearwardly projecting flange 2 and a short, forwardly-extending hub 3. The disk 1 is secured upon a rotating shaft 4 by means of a set-screw 5 threaded through the hub 3. As usual, the shaft 4 is hollow to provide an opening 6 through which the wire to be covered is led to the spinning nozzle later referred to. Surrounding the shaft 4 in advance of and of equal diameter as the hub 3 is a sleeve or bushing 7 preferably of fiber or like material presenting a smooth inner surface whereby the bushing may rotate freely upon the shaft. Fitting tightly over the bushing 7 so as to rotate in unison therewith is a peripherally ribbed cop-carrying bushing 8, embracing the hub 3 and formed at its rearward end with a flange 9 held in spaced relation with respect to the disk 1 by means of a washer 10 preferably of felt or like material. A cop 11 of wire-covering material such as yarn is carried by the usual cop-tube 12 forced over the ribbed periphery of the bushing 8. From the described construction it will be understood that the cop 11, tube 12, and bushings 7 and 8 rotate as one upon and relatively to the shaft 4.

Within the flange 2 projecting rearwardly from the disk 1 is provided a casing 13 preferably cast as one with the disk and flange. This casing 13 is formed with a central segmental opening 14 leading into diametrically-opposite, rectangular recesses, of one of which the side walls, as 15, are apertured to afford seats for oppositely disposed spaced bearing-bushings 16. The bushings 16 fit snugly within the apertures 17 in the casing and serve as bearings for a feed-roll carrying spindle 18, upon which is suitably secured a worm-wheel 19 intermediate the spaced bushings 16. The worm-wheel 19 is constantly in mesh with a worm 20 provided on a sleeve 21 rigidly secured in a suitable manner upon the machine frame (not shown), whereby the worm is held stationary, as in the construction of my prior patent hereinbefore referred to.

Suitably secured upon one end of the spindle 18 is a feed-roll 22 extending within a recess 23, formed in the flange 2 and into but not through the casing 13. The feed-roll 22 is preferably of porcelain, while upon the opposite end of the spindle 18 is secured a collar 24 counter-balancing the feed-roll. It is obvious that another feed-roll may be substituted for the collar 24 and also that a feed-roll carrying spindle similar to spindle 18 could be supported and actuated upon the opposite side of shaft 4, if desired. It will be particularly observed that the feed-roll supporting and actuating parts are now of such a nature as to permit of their ready manufacture and assemblage, while the passage of lubricant is entirely prevented from the casing 13 to the feed-roll or to the outer periphery of the spinning-head. Projecting forwardly from the disk 1 are a plurality of posts, as 25, extending substantially parallel to the shaft 4 and sustaining a ring 26 in spaced relation with respect to the disk 1.

While as explained, the cop 11 is capable of revolution relatively to the rotation of the shaft 4 during the unwinding of the yarn, from the cop, it is necessary to properly control such relative revolution in order to prevent spilling of the yarn. To this end a tension-pin supporting element 27 is adapted to be adjustably secured by means of a set-screw 28 upon the forward end of shaft 4. Formed within said element 27 are recesses 29 open at their outer ends, within each of which recesses is slidingly mounted a tension-pin 30 adapted to bear upon a washer 31, between which and the bushings 7, 8 is preferably provided another washer 32 of felt or like material. Springs 33 are interposed between the heads of the tension-pins 30 and the flange of a cap 34, which latter is secured to the supporting element 27 by means of a screw 35. The pins 30 are substantially parallel to shaft 4, and serve to impose the proper tension upon the yarn-cop under the action of the springs 33, the force of which may be regulated by adjustment of the supporting element 27 upon the shaft 4. A spinning-nozzle is provided in the form of a quill 36 projecting centrally within the shaft 4 through a suitable aperture provided in the cap 34. The screw 35, which is employed

to secure the cap 34, also serves to hold the quill 36, which latter has a laterally extending guard-finger 37 under which the wire to be covered passes as it is led through the hollow shaft 4 and through the quill.

In the operation of the machine embodying the present improved spinning-head, the shaft 4 is caused to rotate, carrying with it the parts secured thereto as described. The covering material carried by the cop 11 is usually of yarn comprising a number of strands which when wound upon the wire must remain in parallelism, that is, the strands must not cross each other in perfect work. To accomplish the covering of the wire in this manner involves an extreme nicety of control of the yarn which is satisfactorily attained by the present spinning-head regardless of the yarn employed or the diametrical size of the wire.

The yarn is led from the cop 11 around one of the posts 25 which is preferably provided with a light roll 38, acting to prevent the yarn from sliding along the surface of the disk 1, thence through a self-threading inclined aperture 39 formed in the disk to the feed-roll 22. The yarn is wound around the feed-roll a number of times requisite to secure proper feeding action upon rotation of the roll, which feeding action as previously stated should provide yarn slightly in excess of the quantity needed, causing slippage of the yarn upon the feed-roll, whereby the tension upon the yarn is continuously equalized. From the feed-roll the yarn passes through an aperture 40 in the disk, similar to apreture 39, and thence around one of the posts 25 a number of times, *i. e.*, in either whole or fractional convolutions as may be necessary. This is rendered possible by the provision of apertures 41 and 42 in the ring 26 upon opposite sides of the post 25, through either of which apertures the yarn may be led. The yarn then passes underneath a guide-finger 43 on the cap 34 to the quill 36 as indicated, where it is wound upon the wire.

Having thus set forth the nature of the invention, what I claim herein is—

1. The combination in a wire-covering machine, of a rotating spinning-head, a cop of yarn or equivalent material carried by and rotatable relatively to the rotation of said spinning-head, means for controlling said relative rotation of the cop, a delivery-nozzle, equalizing feeding means for drawing the yarn off the cop, and yarn-tensioning means intermediate the feeding means and the delivery-nozzle.

2. The combination in a wire-covering machine, of a rotating spinning-head, a cop of yarn or equivalent material carried by and rotatable relatively to the rotation of said spinning-head, adjustable tensioning means for controlling said relative rotation of the cop, a delivery-nozzle, equalizing feeding means tending to draw the yarn off the cop in excess of the quantity needed, and yarn-tensioning means intermediate the feeding means and the delivery-nozzle.

3. The combination in a rotating spinning-head for wire-covering machines, of feeding means for the wire-covering material comprising a spindle arranged substantially in parellelism with a diameter of said spinning-head, yarn-engaging means carried by said spindle, a bushing seated in said head in which said spindle is journaled, and a driven element adjacent the inner end of said bushing adapted to transmit rotation to said spindle.

4. The combination in a rotating spinning-head for wire-covering machines, of feeding means for the wire-covering material comprising a spindle arranged substantially at right angles with respect to the axis of rotation of the spinning-head, an apertured seat provided in said head, a bushing fitting snugly in said seat affording a bearing for said spindle, and means for rotating said shaft to feed the wire-covering material.

5. The combination in a rotating spinning-head for wire-covering machines, of feeding means for the wire-covering material comprising a spindle arranged substantially at right angles with respect to the axis of rotation of the spinning head, an apertured seat provided in said head, a bushing fitting snugly in said seat affording a bearing for said spindle, yarn-engaging means carried by said spindle projecting beyond the periphery of the spinning-head, and means for rotating said spindle.

6. The combination in a rotating spinning-head for wire-covering machines, of feeding means for the wire-covering material comprising a spindle arranged substantially at right angles with respect to the axis of rotation of the spinning-head, oppositely disposed apertured seats provided in said head, spaced bushings fitting snugly in said seats affording bearings for said spindle, a gear-member carried by said spindle intermediate the bushings, and means for rotating said gear-member.

7. The combination in a rotary spinning-head for wire-covering machines, of feeding means for the wire-covering material including a rotating roll projecting beyond the periphery of said spinning head, means for rotating said roll, and a seat for said roll provided in said head whereby lubricant is prevented from reaching the roll from the interior of said spinning-head.

8. The combination in a rotating spinning-head for wire-covering machines, of feeding means for the wire-covering material comprising a spindle arranged substantially at right angles with respect to the axis of rotation of the spinning-head, oppo-

sitely disposed apertured seats provided in said head, spaced bushings fitting snugly in said seats affording bearings for said spindle, a gear-member carried by said spindle intermediate the bushings, means for rotating said gear member, a covering-material engaging roll carried by one end of said spindle, and a counter-balance for the opposite end of the spindle.

9. In a wire-covering machine, the combination in a spinning-head, of a covering-material supply carried by said head, feeding means for drawing off the covering-material from said supply, a spinning-nozzle, and means for directing the covering material from said feeding means to said nozzle including a tension-post around which the covering material is wound.

10. In a wire-covering machine, the combination in a spinning-head, of a covering-material supply carried by said head, feeding means for drawing off the covering-material from said supply, a spinning-nozzle, means for directing the covering-material from said feeding means to said nozzle including a tension-post around which the covering-material is wound, and means permitting the winding of the covering-material around said post in whole and fractional convolutions.

11. In a wire-covering machine, the combination in a rotating spinning-head, of a covering-material supply carried by said head, tensioning means for the covering-material supply, feeding means for drawing off the covering-material from said supply against the action of said tensioning means, a spinning-nozzle, means for directing the covering-material from said feeding means to said nozzle including a tension-post arranged substantially parallel with the axis of rotation of the spinning-head, and covering-material guides arranged upon opposite sides of the tension-post permitting the winding of the covering-material around said post in whole and fractional convolutions.

12. The combination with an actuating shaft of a wire-covering machine, of a rotating spinning-head, a cop of wire-covering material carried by and rotatable relatively to the rotation of said spinning-head, and means for controlling said relative rotation of the cop including a plurality of tension-pins, a tension-pin supporting element, springs for the tension-pins housed within said element, and means for adjustably securing said element upon said shaft.

13. The combination with an actuating shaft of a wire-covering machine, of a rotating spinning-head carried by said shaft including a disk, a flange projecting rearwardly from said disk, a ring, a plurality of posts arranged substantially parallel with said shaft sustaining said ring in spaced relation with respect to said disk, a wire-covering material feed-roll projecting beyond the periphery of said flange, means for rotating said feed-roll, and a delivery-nozzle for the covering material arranged forwardly of said ring.

14. The combination with an actuating shaft of a wire-covering machine, of a rotating spinning-head carried by said shaft comprising a disk, a flange projecting rearwardly of said disk, a ring, a plurality of posts arranged substantially parallel with said shaft sustaining said ring in spaced relation with respect to said disk, a wire-covering material feed-roll projecting beyond the periphery of said flange, means for actuating said feed-roll from said shaft whereby lubricant is prevented from reaching the feed-roll through said flange, guides permitting the covering-material to be wound in whole and fractional convolutions about one of said posts, and a delivery-nozzle for the covering-material.

15. The combination with an actuating shaft of a wire-covering machine, of a rotating spinning-head carried by said shaft including a disk, a casing projecting rearwardly from said disk, a recess provided in said casing having side walls formed with oppositely disposed apertures, spaced bushings seated in said apertures, a feed-roll spindle journaled in said bushings, and means interposed between said bushings for rotating said spindle.

In testimony whereof, I have signed my name to this specification.

DONALD NOBLE.