Nov. 15, 1932. L. B. STOGNER 1,887,790

TUBE OR CONE HOLDING MANDREL

Filed July 18, 1930

FIG. 1.

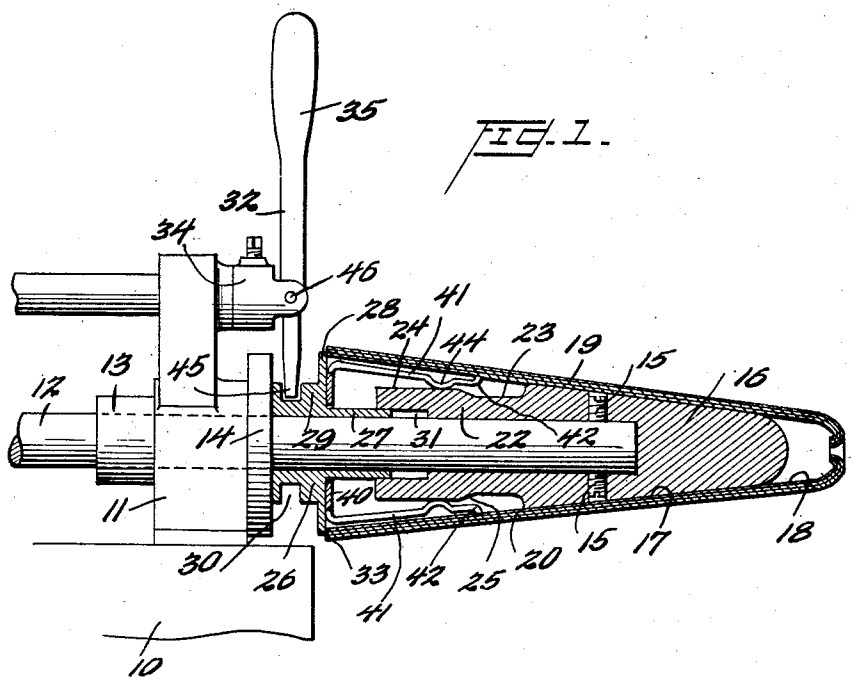


FIG. 2.

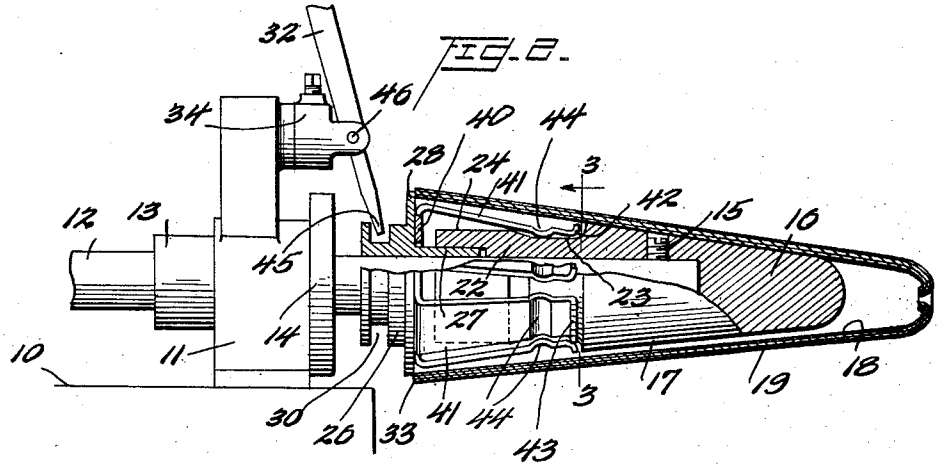
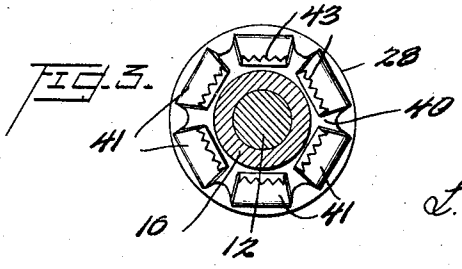


FIG. 3.



Inventor

L. B. Stogner

By Watson, Cole, Morse & Grindle

Attorneys

Patented Nov. 15, 1932 1,887,790

UNITED STATES PATENT OFFICE

LAWRENCE B. STOGNER, OF HARTSVILLE, SOUTH CAROLINA

TUBE OR CONE HOLDING MANDREL

Application filed July 18, 1930. Serial No. 468,868.

This invention relates to winding machines and more particularly to that part of winding machines comprising the tube or cone holding mandrel, sometimes known as the cop tube holder.

It is a general object of the present invention to provide a novel and improved tube holding mandrel.

One of the important features of the invention consists in tube or cone holding means associated with the mandrel adapted to be actuated by the placing of the tube or cone on the mandrel or to be actuated by means independent of the tube or cone.

Another feature comprises the arrangement of a mandrel fixedly secured to a spindle and a sleeve movable in respect to the mandrel and having associated therewith tube engaging means which cooperate with a portion of the mandrel upon movement of the sleeve for projection into tube engaging position.

Another and important feature of the invention resides in having the tube engaging means move in the same direction as the tube when being applied to the mandrel to draw it tightly into engagement therewith and to remove in the opposite direction when removing the tube to assist in its release.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon consideration of the accompanying drawing and following specification wherein is disclosed a single exemplary embodiment of the invention with the understanding, however, that such changes and deviations from the disclosure may be made as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawing:

Figure 1 is an elevation of a portion of a winding machine showing the tube holding mandrel in central section with the tube holding fingers in engaging position;

Figure 2 is a view similar to Figure 1 but showing the tube in released position and showing some of the tube engaging fingers in elevation; and

Figure 3 is a transverse section through the tube holding mechanism taken on line 3—3 of Figure 2.

In winding various yarns into cops it is customary to wind them either on straight sided tubes or onto cones. In any case, the tube or cone, and hereafter the word tube will be used in the generic sense to include cone, is placed on a rotatable mandrel to be driven for winding the yarn. Various expedients have been devised for retaining the tube on the mandrel and yet permitting its ready application and removal. The present invention contemplates the provision of holding means for the tube which can be operated either by the placing of the tube on the mandrel or by other means which on release disengages the tube from the surface of the mandrel.

The present invention is shown, for the sake of convenience, in connection with a single taper cone although it will be appreciated that it is equally applicable to tubes, spools or multi-taper cones and other winding forms.

Referring now to the drawing there is disclosed at 10 part of the frame of a winding machine having mounted thereon a suitable bearing block 11 adapted to rotatably support the spindle 12 which is held against longitudinal movement in the bearing by means of collars 13 and 14.

Secured over the end of the spindle by means of suitable set screws 15 or other fastening means is the winding mandrel or cop tube holder 16. In the present instance the main or tube engaging portion of this mandrel is frusto-conical having the conical surface 17 to engage the inner wall 18 of the paper cone 19 from a point a short distance within the end to a point 20, more than half way down the length of the cone. The taper of the mandrel is, as nearly as possible, exactly the same as the taper of the inner wall of the cone to provide a good fit and smooth running.

The mandrel proper is provided with an extension 22 in the direction toward the base of the cone and this extension preferably has a portion adjacent the cone engaging part provided with a cylindrical surface 23, and

a portion remote from the cone engaging part and provided with a cylindrical surface 24. Intermediate the surfaces 23 and 24 is the tapered section 25 merging the two surfaces.

Slidably mounted on the spindle 12 is the sleeve 26, between the mandrel and the collar 14. This sleeve comprises the thin tubular extension 27 to provide sufficient length of engagement with the shaft to prevent canting, a radial flange 28 and a base portion 29 provided with a circumferential groove 30. The extension 28 may slide within a counterbore 31 in the portion 24 of the mandrel. The flange is of sufficient diameter to be engaged by the base 33 of the cone and the circumferential groove 30 is for the purpose of receiving the end 45 of the lever 32 pivoted at 46 in a bracket 34 preferably mounted on the top of the bearing block 11. A suitable handle 35 at the far end of the lever permits it to be rocked to slide the sleeve along the spindle from the position shown in Figure 1 to the position shown in Figure 2.

Mounted on the face of the flange 28 which is directed toward the mandrel, is a disk 40 from the periphery of which radiates a plurality of spring fingers 41 each bent adjacent its junction with the disk to extend along and over the extensions of the mandrel and to converge toward the mandrel as clearly seen in Figure 2. The end of each of these spring fingers is bent outwardly substantially at a right angle as seen at 42 forming hooks or claws provided with a plurality of sharp points 43 to engage the inner surface of the cone and hold it upon the mandrel. Each spring finger is provided near its end with an inward projection 44 the purpose of which is to engage upon the surfaces 23, 24 and 25.

When the sleeve is moved to the right as shown in Figure 2 these projections 44 rest on the smaller circumference 23 under the action of the springiness of the fingers and cause the tips 43 to be retracted out of engagement with the inner surface of the cone. However, as the sleeve is moved to the left these parts 44 ride over the conical surface 25 and onto the surface 24 which projects the cone engaging tips outwardly to a position where they will engage the inner surface of the cone if one be placed on the mandrel.

An important feature of the invention resides in having the cone engaging tips of the fingers move in the direction toward the base of the cone as they are projected outwardly for this draws the cone into close engagement with the mandrel surface 17 and thus ensures true running.

The flange 28 is adapted to be engaged by the base of the cone before the cone is seated on the mandrel, as seen in Figure 2 so that the device can be readily operated by merely pushing the cone onto the mandrel until the base of the cone engages the flange and moves the sleeve to the left and causes a projection of the cone engaging fingers and thus secures the cone in position. Conversely, when the cone is being removed, operation of the lever 32 to slide the sleeve to the right releases the fingers and at the same time the flange forces the cone from the surface of the mandrel so that it can be easily removed.

It will be obvious that the spring fingers 41 need not be formed integral with the disc 40 nor in fact need not be of themselves springy. It is clear that they could be hinged to the flange 28 and provided with separate springs to retain them in contracted position.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a winding machine, in combination, a rotatable spindle, a cop tube mandrel secured thereon and having a tube engaging portion and a portion of reduced diameter, a support movable on said spindle, a plurality of spring fingers carried by said support and normally bearing on said mandrel portion of reduced diameter, a second portion of larger diameter on said mandrel, and means to move said support to engage the fingers with said last mentioned portion to extend them into tube gripping position.

2. In a winding machine, in combination, a rotatable spindle, a cop tube mandrel secured thereon and having a tube engaging portion, a portion adjacent thereto of less diameter and a third portion of greater diameter than the second, a sleeve on the spindle, a plurality of spring fingers mounted on said sleeve and overlying the reduced portions of said mandrel, tube engaging portions on said fingers, and mandrel engaging portions on said fingers engaging the second portion when the sleeve is moved toward the mandrel and the third portion when it is withdrawn to project the fingers with their tube engaging portions into tube engaging position.

3. In a winding machine, in combination, a rotatable spindle, a cop tube mandrel secured thereon, a sleeve slidable on said spindle, tube gripping fingers carried by said sleeve and extending toward the mandrel, cam means surrounding said spindle and cooperating with said fingers to project them to tube engaging position when the sleeve is moved away from the mandrel, and a flange on said sleeve adapted to engage the end of the tube to release the tube from the mandrel when the sleeve is moved toward the mandrel to retract the fingers.

4. In a winding machine, in combination, a rotatable spindle, a cop cone mandrel secured thereon and adapted to engage a cone intermediate its ends, a sleeve slidable on said spindle, cone gripping fingers carried by said sleeve and normally sprung to a con-

tracted position, means surrounding said spindle to engage the fingers and extend them to cone gripping position when the sleeve is moved away from the mandrel, and a flange on said sleeve engageable by the cone to move the sleeve until the cone engages the mandrel.

5. In a winding machine, in combination, a rotatable spindle, a cop cone mandrel secured thereon and adapted to engage a cone intermediate its ends, a sleeve slidable on said spindle adjacent the base of the mandrel, spring cone gripping fingers carried by the sleeve and extending and converging toward the mandrel, a portion on said mandrel extending within the springs and having an enlarged head, and a flange on said sleeve adapted to be engaged by the cone base before the cone tightens on the mandrel whereby the springs are drawn over the head and expanded into cone gripping position.

6. In a winding machine, in combination, a frame member, a bearing thereon, a spindle rotatable in said bearing, a cop tube mandrel secured on said spindle, a sleeve slidable on said spindle, tube gripping means carried by said sleeve, a wedge member fixed in relation to said spindle and adapted upon movement of the sleeve away from the mandrel to extend the tube gripping means, a circumferential groove in said sleeve, a bracket on said bearing, a lever pivoted in said bracket and having an end extending into said groove whereby movement of the lever slides the sleeve to operate the tube gripping means.

7. In a winding machine, in combination, a rotatable spindle, a cop cone mandrel secured thereon and adapted to engage a cone intermediate its ends, a sleeve slidable on said spindle adjacent the base of the mandrel, spring cone gripping fingers carried by the sleeve and extending and converging toward the mandrel, a portion on said mandrel extending within the springs and having an enlarged head adapted upon relative movement therebetween to extend said fingers into cone gripping engagement, a flange on said sleeve adapted to be engaged by the cone base before the cone tightens on the mandrel, and means independent of the cone to operate the sleeve.

8. In a winding machine, in combination, a rotatable spindle, a cop cone mandrel immovably secured thereon and adapted to engage a cone intermediate its ends, a sleeve slidable on said spindle adjacent the base of the mandrel, resilient gripping means supported by said sleeve adapted to engage the inner surface of a cone but normally sprung inward and means to extend said gripping means when the sleeve is moved in the direction of application of a cone onto said mandrel.

9. In a winding machine, in combination, a rotatable spindle, a cop tube mandrel secured thereon, a support slidably mounted upon said spindle and movable relatively to said mandrel, means for effecting said movement, tube gripping fingers carried by said slidable support, and means for causing said fingers to operate to engage a tube which is placed over the mandrel prior to the final positioning of said tube upon said mandrel and to pull said tube lonigtudinally of said spindle toward its proper position upon said mandrel upon movement of said support.

10. In a winding machine, in combination, a rotatable spindle, a cop tube mandrel secured thereon, a sleeve slidably mounted upon said spindle rearwardly of said mandrel and movable relatively to said mandrel, means for effecting said movement in either direction, tube gripping fingers carried by said slidable sleeve and cam means for causing said fingers to operate to engage a tube which is placed over the mandrel prior to the final positioning of said tube upon said mandrel and to pull said tube longitudinally of said spindle toward its proper position upon said mandrel upon rearward movement of said sleeve.

11. In a winding machine, in combination, a rotatable spindle, a cop cone mandrel secured thereon, a sleeve slidably mounted upon said spindle rearwardly of said mandrel and movable relatively to said mandrel, means for effecting said movement in either direction, cone gripping fingers carried by said slidable sleeve and having their free ends extending forwardly toward said mandrel, claws provided upon said free ends for imbedding in the inner surface of the cone, and cam means for causing said fingers to operate to engage a cone which is placed over the mandrel prior to the final positioning of said cone upon said mandrel and to pull said cone rearwardly longitudinally of said spindle toward its proper position upon said mandrel upon corresponding movement of said sleeve.

In testimony whereof I hereunto affix my signature.

LAWRENCE B. STOGNER.