March 24, 1936. J. F. SCHENCK, SR 2,034,836

COLLAPSIBLE SPINDLE

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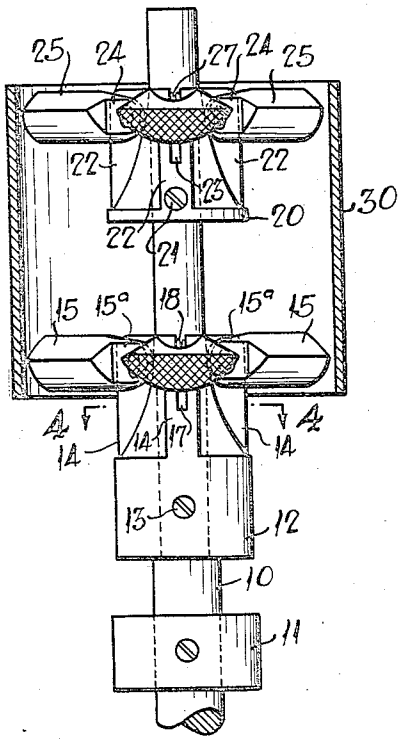


Fig. 1

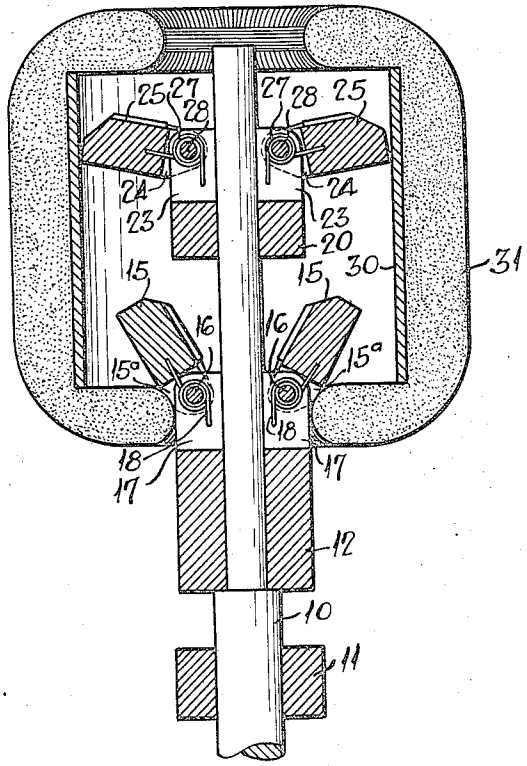


Fig. 3

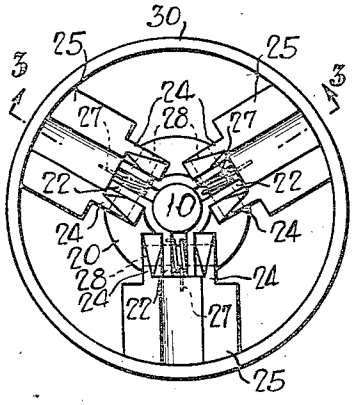


Fig. 2

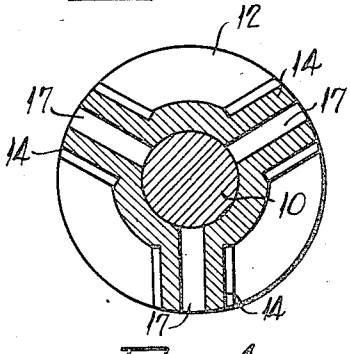


Fig. 4

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COLLAPSIBLE SPINDLE

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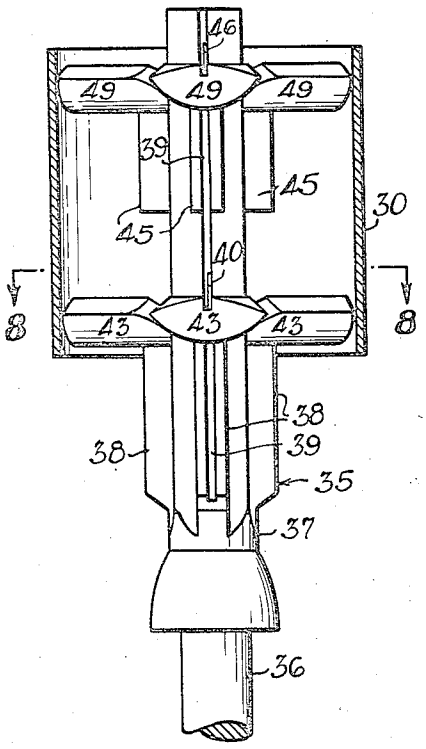


Fig. 5

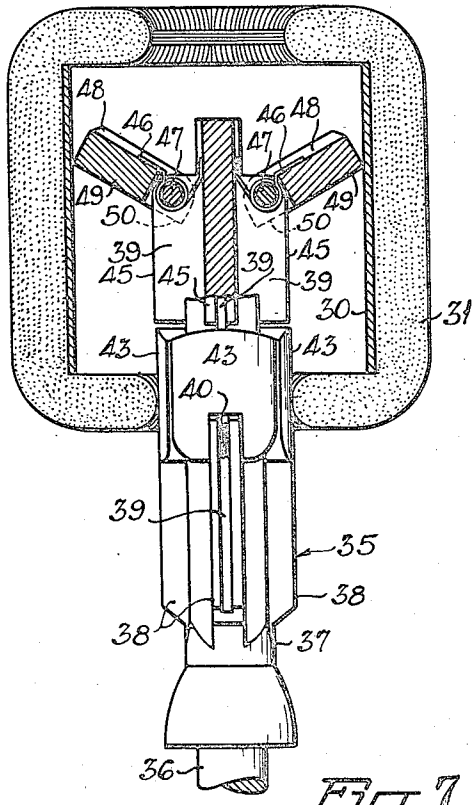


Fig. 7

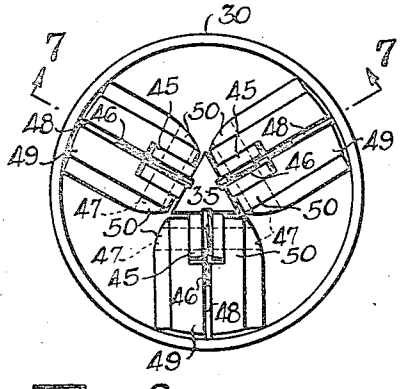


Fig. 6

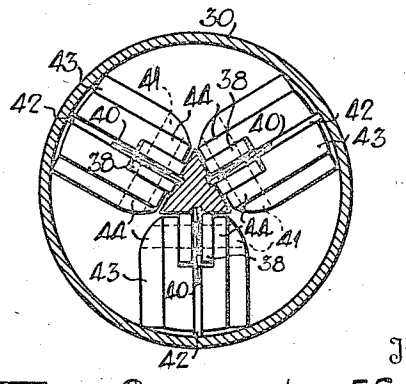


Fig. 8

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COLLAPSIBLE SPINDLE

John F. Schenck, Sr., Lawndale, N. C.

Application November 1, 1934, Serial No. 751,110

9 Claims. (Cl. 242—46.3)

This invention relates to a collapsible spindle for holding a tube onto which a ball of yarn is adapted to be wound and from which the tube and ball of yarn can be easily removed.

It is an object of this invention to provide a collapsible spindle for holding a tube onto which yarn is wound, said collapsible spindle having spring clasped individually mounted arms which, when in outstretched position, are adapted to engage the inner surface of a tube for receiving the yarn. These arms comprise a set of front and rear movable arms, each arm being equipped with a torsion spring for normally forcing the same to a right angle, distended position to cause the outer ends thereof to resiliently engage the inner surface of a tube, said arms being individually mounted on front and rear collars, said collars being individually adjustable with relation to each other and individually mounted on the spindle.

It is another object of this invention to provide a spindle having resilient means for holding a tube onto which a ball of yarn can be wound, said holding means being resiliently mounted whereby they may be collapsed by slight pressure of the ball of yarn toward the front or free end of the spindle arm so that the package of yarn which usually has its ends restricted can be withdrawn from the spindle without injury to the yarn.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which:—

Figure 1 is an elevation of the device showing a tube mounted thereon in section;

Figure 2 is a top plan view of Figure 1 but showing the tube complete;

Figure 3 is a vertical sectional view of the device taken along line 3—3 in Figure 2 with the tube and yarn thereon, being shown in section;

Figure 4 is a transverse sectional view taken along line 4—4 in Figure 1;

Figure 5 is a view similar to Figure 1 but showing a slightly modified form of the invention;

Figure 6 is a top plan view of Figure 5 but showing the tube complete;

Figure 7 is a vertical sectional view of the device taken along line 7—7 in Figure 6 with the tube and yarn thereon being shown in section;

Figure 8 is a sectional plan view taken along line 8—8 in Figure 5.

Referring more particularly to the drawings, the numeral 10 denotes a spindle having an adjustable collar 11 thereon which usually serves as a bearing, resting on top of a bolster and the like, and secured to spindle 10 in front of collar 11 is a collar 12 which is secured thereon by any suitable means such as a set screw 13 whereby the collar 12 may be adjusted lengthwise on shaft 10. This collar 12 has a plurality of ribs 14 extending therefrom whose front ends have slots 17 therein for receiving torsion springs 18.

Torsion spring 18 surrounds the pin 16 and has one end thereof embedded in arm 15 and the other end thereof embedded in collar 12 to prevent movement of the ends of torsion spring 18, said torsion spring normally moving the arm 15 in the position shown in Figure 1. Each of arms 15 has a pair of projections 15a which are disposed on each side of rib 14 and are penetrated by the pin 16 to pivotally secure the arm to collar 12. The arms and ribs just described, appearing on collar 12 are identical and like reference characters will apply.

Disposed on shaft 10 and in front of collar 12 is another collar 20 which is adjustably secured on shaft 10 by any suitable means such as set screw 21, this collar 20 having a plurality of longitudinally disposed ribs 22 thereon which likewise are slotted as at 23 for receiving torsion spring 27 which has one end embedded in collar 20 and the other end embedded in arm 25, said arm 25 being normally pressed to the position shown in Figure 1. Torsion spring 27 surrounds a pin 28, said pin 28 penetrating rib 22 and a pair of projections 24 which are integral with arm 25.

The distending arms 15 and 25 are adapted to receive a tube 30 which is adapted to receive yarn 31 thereon which is usually in the form of a ball. When the yarn has been wound on tube 30, to make a package of proper size, the spindle 10, of course, is stopped and the yarn is severed and the yarn package is seized and pulled forward. The outer ends of arms 15 and 25 are moved forward with the forward movement of the ball, and the rear restricted portion of the yarn package 31, forces the arms 15 into the partially folded position as shown in Figure 3.

These arms fold forward against shaft 10 and pass through the rear restricted end of the yarn package and thus the yarn package is easily removed from the collapsible spindle without disarranging the layers of yarn, and the arms then spring back to normal position as shown in Figure 1. At this time, a new tube 30 can be disposed thereon and the winding operation again resumed. In distended position, the arms 15 and 25 or 43 and 49 snugly fit the interior of a tube when it is placed thereover and hold the tube in

position while yarn is being wound thereon. The outer ends of said arms are roughened to prevent slippage of the tube while yarn is being wound thereon.

It is evident that a machine having a great number of such units, can be equipped, the units usually being disposed side by side.

Figures 5 to 8, inclusive, show a modified form of the invention in which the supporting means for the pivoted arms is one piece. This form may be constructed by taking a shaft of the proper diameter and cutting the support **35** therefrom. Support **35** is fastened to or is an integral part of a restricted portion **36** which is adapted to fit in a suitable bearing when the spindle is mounted for operation. Portion **37** has a plurality of ribs **38** projecting therefrom, said ribs having slots **39** cut lengthwise therein for receiving torsion springs **40**. The torsion springs **40** surround pins **41** and one end of each spring normally rests in slot **39**, while the other end of said spring rests in slot **42** which is cut in the inner surface of pivoted arms **43**. Each of arms **43** has a pair of projections **44** integral therewith, which are disposed on each side of rib **38** and are penetrated by the pin **41** to pivotally secure the arm to rib **38**. The torsion springs **40** normally tend to move the arms **43** in the position shown in Figure 5.

The upper end of support **35** has a plurality of ribs **45** projecting therefrom which also have lengthwise slots **39** cut therein. These slots are adapted to receive torsion springs **46** which surround pins **47** and one end of each spring normally rests in a vertically disposed slot **39**, while the other end of said spring rests in slot **48** which is cut in the upper surface of pivoted arms **49**. Each of the arms **49** has a pair of projections **50** integral therewith which are disposed on each side of ribs **45** and are penetrated by the pin **47** to pivotally secure the arm to the rib. This spring also normally tends to move the arms **49** to the position shown in Figure 5.

It is seen that by constructing the spindle in this manner that the ends of the arms **43** and **45** will be broad enough to engage the interior surface of tube **30** and hold it in proper position. When the tube, with yarn wound thereon, is withdrawn from the spindle, the arms assume the position shown in the central portion of Figure 7 and in this position the outside surface of the arms are of the same outside diameter as the shaft from which the supporting means is formed. While the arms in this form of the invention are not adjustable with relation to each other, the fact that the support **35** may be cut from one shaft without the necessity of making several different parts, presents a very decided manufacturing advantage over other forms.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being set forth in the appended claims.

I claim:

1. A collapsible spindle comprising a rotatable shaft, a pair of collars adjustably mounted on said shaft and having a plurality of radially disposed ribs thereon, an arm pivotally mounted on each rib and having a torsion spring normally forcing the arms to extended position for receiving a yarn carrier thereon.

2. A collapsible spindle for winding machines comprising a rotatable shaft, a pair of collars adjustably mounted on said shaft and being adjustable independently of each other, each of said collars having pivotally mounted therein a plurality of arms, resilient means for normally moving said arms to extended position for reception of a yarn carrier thereonto, the resiliently mounted arms being movable to a folded position by the pressure of the yarn as the yarn package is removed from the spindle.

3. A collapsible spindle for yarn winding machines comprising a rotatable shaft, a pair of collars mounted on said shaft and being adjustable of each other lengthwise on the shaft, each of said collars having a plurality of pivotally mounted arms thereon, torsion spring means for normally forcing said arms to occupy an extended position for reception of, and holding a tube thereon onto which yarn is to be wound, the yarn being adapted to overlap the ends of the tubes and to form restricted openings in the ends of the yarn package and the arms being movable by the restricted portion of the yarn to a folded position when the yarn package is removed from the said arms.

4. The combination of a collapsible spindle having a pair of independently adjustable collars thereon, each of said collars having a plurality of radially disposed ribs thereon, an arm pivotally mounted on each of said ribs and normally projecting radially outward, said arms being resiliently mounted and movable to an inoperative position entirely within the periphery of the carrier, resilient means independent of each of said arms for maintaining said arms in their normal radial position and arranged to yield as said arms are moved to inoperative position.

5. A collapsible spindle comprising a rotatable supporting member having on its surface a plurality of longitudinal ribs, said ribs being radially disposed with respect to the supporting member, a plurality of radially disposed arms pivotally mounted on each rib and normally projecting radially outwardly, said arms being resiliently mounted and collapsible to an inoperative position, a resilient means for each of said arms for normally forcing the arms in an extended position.

6. A collapsible spindle comprising a rotatable supporting member having on its surface a plurality of longitudinal ribs, said ribs being radially disposed with respect to the supporting member, a plurality of radially disposed arms pivotally mounted astride each rib and normally projecting radially outwardly, said arms being resiliently mounted and collapsible to an inoperative position, a resilient means for each of said arms for normally forcing the arms in an extended position.

7. A collapsible spindle, comprising a shaft, a plurality of radially disposed ribs thereon, arms pivotally mounted astride of and on said ribs, each arm having a spring normally forcing the arm to an extended position for receiving the yarn carrier thereon.

8. A collapsible spindle for winding machines, comprising a shaft, a plurality of longitudinal and radially disposed ribs thereon, a plurality of arms pivotally mounted astride of and on said ribs, resilient means for normally moving said arms to radial extended position for reception of a yarn holder thereon, resiliently mounted arms being movable to a folded position by pressure of the yarn as the yarn package is removed from the spindle.

9. A collapsible spindle comprising a shaft, a plurality of spaced radially disposed ribs supported on said shaft, a plurality of pins penetrating said ribs, a torsion spring mounted on each pin, an arm pivotally mounted astride of and on each rib, one end of said spring engaging said rib and the other end engaging its associated arm to normally force the arm to an extended position to engage the interior of a yarn carrier and hold the same in position for receiving yarn on its exterior.

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